Clinical Feedback in Emergency Medical Service (EMS) Education:

Identifying and resolving the training needs of clinical supervisors in Saudi Arabia

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Summary

Clinical supervision and feedback are crucial in Emergency Medical Services (EMS) education, as they play a significant role in enhancing the competence and professional growth of EMS students . Supporting and addressing the training needs of supervisors is essential to ensuring they can provide effective feedback and guidance. However, there is no existing literature on the specific training needs of EMS supervisors in the unique cultural context of Saudi Arabia, highlighting the need for focused research in this area. Grounded in the Clinical Performance Feedback Intervention Theory (CP-FIT), the research navigated through a comprehensive examination of clinical feedback's perceptions, challenges, and training needs from the perspectives of both EMS students and clinical supervisors.

The thesis begins with a scoping review, finding that only twelve studies specifically targeted clinical feedback in EMS education over the past two decades, highlighting its importance but also underscoring gaps in the literature. Notably, existing studies fail to explore the perceptions of clinical feedback between students and supervisors and largely focus on the general context of clinical placements, thus diluting the potential insights into feedback's effectiveness, challenges, and impact on learning and performance. Furthermore, it notes a lack of research in EMS education, especially within Saudi Arabia.

To address these gaps, the thesis delves into the perceptions of EMS students and clinical supervisors in Saudi Arabia, thereby filling a regional research void. It investigates the specific challenges in feedback provision and receipt, emphasising the training needs of supervisors, including effective communication, personalised feedback, constructive methods, emotional intelligence, feedback follow-up, technology use, understanding feedback differences, and promoting a positive feedback environment. Furthermore, the thesis employs a Delphi study to consolidate

expert consensus on the best approaches to address identified challenges and needs in clinical feedback, including the particular training needs of clinical supervisors.

The findings highlight the need for a structured feedback approach that considers the diverse needs and perceptions of both students and supervisors. The thesis proposes a comprehensive strategy, including tailored training programmes and quality assurance and ongoing support, to improve clinical feedback standards. This strategy aims to bridge perceptual gaps, and to foster the students' learning and professional growth.

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Chapter 1 Introduction

1.1 Emergency Medical Services Education

Emergency Medical Services (EMS) education provides systematic and comprehensive training to equip individuals with the skills and knowledge required to deliver prehospital emergency care (Amirrafiei et al. 2021). EMS education produces highly trained professionals including paramedics, doctors, and nurses specialised in prehospital care (Leggio Jr and D'Alessandro 2015).

EMS education focuses primarily on developing competent, confident, and empathetic professionals capable of providing high-quality, life-saving emergency services in challenging scenarios (Shields and Flin 2013). The curriculum is broad, covering diverse subjects like basic and advanced life support, trauma, pharmacology, cardiology, and more (Sanders et al. 2012). EMS programmes emphasise hands-on skills ranging from basic procedures such as CPR and wound dressing to advanced techniques such as intubation (Sanders et al. 2012). Another critical aspect of EMS education is the development of clinical decision-making capabilities for rapid assessment and effective treatment in high-pressure circumstances (Collen 2022). EMS education programmes instil strong communication skills and a deep understanding of professional ethics and the legal aspects of care (Willis and Dalrymple 2019).

EMS education has evolved considerably since its initiation in the 1960s and 1970s. The field initially focused on basic first aid skills for firefighters and police officers, before transforming into the highly-specialised and recognised field that it is today (Edgerly 2013; Brennan and Krohmer 2006). This evolution saw the introduction of advanced life support skills in the late 20th century and a greater emphasis on foundational medical knowledge such as anatomy, physiology, and pathophysiology

(Krohmer 2017). In the 21st century, EMS education has been increasingly acknowledged as a profession, with degree-based programmes now offered globally (Margolis 2005).

Terminology for EMS education varies. In Saudi Arabia, it includes “Emergency Medicine”, ”Emergency Medical Services”, “Emergency Medical Care”, and “Emergency Medical Services and Critical Care” (AlShammari et al. 2017). In the UK, the field is referred to as “prehospital emergency care” or “prehospital emergency medicine” (PHEM) (Thompson et al. 2022), while in the US and Australia it is “paramedic education” or “paramedic training”(Hou et al. 2013; Reid et al. 2019; Ball et al. 2022).

These differing terms reflect cultural, regulatory, and educational contexts but all refer to prehospital emergency medical care. EMS encompasses professionals such as doctors and nurses with specialised prehospital training. Paramedics typically complete a bachelor’s degree in EMS, while doctors and nurses specialise in EMS after prior degrees.

While the terminology differs, the primary objective for all these professionals – EMS doctors, EMS nurses, and EMS paramedics – is the same: to provide immediate, skilled care in emergency situations. It is crucial, however, to understand the differences in their scopes of practice. EMS doctors typically lead medical control, overseeing the entire healthcare procedure. They might perform advanced medical operations and are responsible for directing EMS paramedics and nurses regarding medical procedures and medication dosages. EMS-specialised nurses often work hand-in-hand with EMS doctors. Their focus lies in stabilising the patient and providing continued care during transportation. Paramedics are usually responsible for on-site emergency responses. They administer both basic and some advanced life support measures, such as advance airway management, advanced cardiac life support and advance trauma life support. Although each role has distinct functions and

responsibilities, they collectively aim to deliver coordinated, efficient, and life-saving prehospital medical services during emergencies.

EMS education holds a pivotal role in global healthcare systems. It provides EMS personnel with the ability to manage a wide array of medical emergencies, making them a first and vital contact in the patient care pathway (Administration 2017; Alberts et al. 2011). Moreover, EMS education also contributes to the broader sphere of health promotion, disaster response, and public education when it comes to first aid and injury prevention (Tan et al. 2022). There has also been a drive towards improved and standardised EMS education across the globe, with organisations like the World Health Organisation (WHO) and the International Federation of Red Cross and Red Crescent Societies (IFRC) including EMS education as a key component of their emergency care system framework (Dick 1992; Camacho et al. 2016).

EMS education has expanded from basic first aid training to an advanced, academically-recognised discipline (Wheeler and Dippenaar 2020). This progression mirrors the broader evolution of EMS as an integral part of the global healthcare system, shaping EMS education as a significant contributor to enhanced worldwide healthcare delivery.

1.2 EMS Education in Saudi Arabia

EMS education in Saudi Arabia, while relatively new compared to its global counterparts, has developed significantly over recent decades. Its progression can be divided into three main stages: Beginnings (1934–2005), Development (2005–2012), and Academic Transition (2007–present) (AlShammari et al. 2017).

Saudi EMS's Beginnings stage focused on first aid and basic life support training, parallel with early EMS education in Australia and the United Kingdom (O'Brien et al. 2014; Brooks et al. 2016) However, this period lacked the concept of the paramedic as

a separate health professional in Saudi Arabia. Instead, the Saudi Red Crescent aimed to elevate the nursing profession with training in hospital work and emergency situations. A notable shift towards organised EMS education was seen in the 1960s in the United States, with physicians and registered nurses becoming the main trainers (Krohmer 2017).

The Development stage marked the introduction of EMS diploma programmes, reflecting a transition towards professional paramedic education (AlShammari et al. 2017). This phase saw the initiation of advanced life support (ALS) training and the establishment of the first Red Crescent-operated ALS unit in Riyadh by 2005 (AlShammari et al. 2017). However, issues like considerable unemployment among health diploma graduates and the World Health Organisation's recommendation for bachelor's degrees as minimum qualifications led to the discontinuation of all medical diplomas, including for EMS, in 2012 (AlShammari et al. 2017).

The Academic Transition stage, which commenced in 2007 and continues now, is marked by the shift towards university- or college-based bachelor's degrees in EMS, started by King Saud University and King Saud bin Abdulaziz University for Health Sciences (King Saud University 2016). This step is seen as an attempt to improve the number and quality of Saudi paramedic nationals, alongside supporting research in EMS. The EMS bachelor's programme was adopted from Flinders University in South Australia, with a unique approach that focuses on problem-based, student-based, and patient-based curriculum integrated into work practice (Alanazi 2012). Now, bachelor's programmes are being offered by ten universities and colleges across the KSA; comparisons can be drawn with Australia where 21 universities offer paramedic bachelor's degree programmes and the UK with 46 recognised programmes (Bandura and Walters 1977).

Paramedic certification in Saudi Arabia, through a bachelor's degree in EMS, entails an intensive five-year programme. This pathway is distinct from the EMS certifications for

medical doctors or nurses. The initial year lays groundwork in essential subjects such as English, physics, maths, and biology. Subsequent years immerse students in foundational and advanced EMS topics, integrating both theoretical instruction and hands-on experience in labs, hospitals, or ambulance stations. Upon completing these focused stages, students undergo a year-long supervised internship. This rigorous process leads to the bachelor's degree in EMS, certifying graduates as professional paramedics.

The bachelor's degree curriculum for EMS integrates multiple educational theories to meet the profession's specific requirements. These theories not only help students develop a profound understanding of emergency care, but also equip them with the practical skills they need to provide effective emergency services, thereby enhancing their overall competence.

Constructivism focuses on how students construct knowledge through their experiences and reflections. Melissa (2017) asserts that this theory is brought to life in EMS education through problem-based learning, in which students address actual medical emergencies. Students may be required to apply their theoretical knowledge of triage protocols and trauma treatments to solve a simulated multi-vehicle accident scenario. This procedure bridges theory and practise, enabling students to translate abstract medical principles into concrete problem-solving abilities.

Kolb's (1984) theory of experiential learning serves as a foundational pillar of EMS education, positing that learning is a cyclical process deeply rooted in experience (Kolb 2014). This theory is applied through various pedagogical formats in EMS education such as clinical rotations, simulations, and hands-on training. For instance, simulation labs utilise high-fidelity manikins to mimic a range of medical conditions, offering a safe and controlled setting for students to apply theoretical knowledge to practical scenarios. This immersive approach not only facilitates the acquisition of critical thinking, decision-making, and practical skills but also emphasises the importance of

reflective practice. According to Kolb, effective learning from experience requires engaging in a reflective cycle that includes concrete experience, reflective observation, abstract conceptualisation, and active experimentation. This cycle is crucial for transforming experiences into deep, actionable knowledge. In comparison, the conceptual change framework suggests that learning, especially the rectification of misconceptions, is significantly enhanced by reflective cycles and cognitive dissonance. Integrating insights from this framework, EMS education could further leverage the power of reflection to address and reshape students' pre-existing misconceptions, thereby enriching their learning experience.

The theory of social learning, as proposed by Bandura (1971), holds particular significance for EMS education, given the inherently collaborative nature of the EMS profession (Bandura and Walters 1977). This theory goes beyond the mere acquisition of collaborative skills to highlight how social interactions play a pivotal role in the learning process, contributing significantly to the construction of meaning. For instance, EMS students gain invaluable insights by shadowing paramedics and nurses, observing their interactions with patients, families, and other medical professionals (Melissa 2017). Such hands-on learning constitutes a mandatory clinical practice component in the second year of the EMS bachelor's curriculum in Saudi Arabia. This exposure not only enables the learning of essential collaborative skills but also embodies the integration of social learning principles, as outlined by Vygotsky, into EMS education. By observing and engaging in these professional interactions, students experience first-hand the importance of effective communication, leadership, and teamwork. Thus, EMS education aligns with Bandura's theory by fostering an environment where learning is mediated through social interaction, enhancing the meaningfulness and applicability of acquired knowledge and skills.

The reflective practice theory proposed by Schön (1986) is especially pertinent to EMS education, emphasising the importance of self-examination, learning from mistakes, and adapting in response to unpredictable and challenging situations. Reflective

practice is often integrated into EMS education through debriefing sessions following simulations or real medical incidents. For example, after a cardiac arrest simulation, students might engage in a facilitated debriefing session to assess their performance, identify improvement areas, and reconcile theoretical knowledge with practical application. This process not only aligns with Kolb's experiential learning cycle by emphasising the role of reflection in learning from experience but also expands the application of reflective practice beyond the individual learner to encompass the profession's collective learning culture. When Schön's theory is placed in dialogue with Kolb's, it becomes evident that EMS education is designed to foster not just individual competence but also a reflective mindset and a culture of continuous professional development and learning. This comprehensive approach prepares students to navigate the complexities of EMS work, emphasising the value of both individual and collective reflection in achieving professional excellence and improving patient care (Melissa 2017).

In Saudi Arabia, these theories are employed strategically to inform instructional practices and enrich the EMS curriculum. The aim is to create a robust learning experience for future EMS professionals, preparing them to deliver effective emergency care. A distinguishing aspect of EMS education is its emphasis on practical, hands-on learning, which makes up as much as half of the total instruction time. This practicality manifests in field internships where students get to interact with patients under the supervision of experienced EMS professionals. Applied assessments, constructive feedback from clinical supervisors or instructors, and real-life clinical experiences form the bedrock of this approach.

EMS education in Saudi Arabia possesses unique regional characteristics. Socio-cultural factors, such as respect for local customs, traditions, and religious values, considerably influence EMS delivery (AlShammari et al. 2017). Saudi EMS professionals are trained to provide culturally competent care, respecting Islamic perspectives on healthcare, gender interactions, and modesty. For instance, EMS

professionals must be able to handle situations where a female patient may not feel comfortable being attended to by a male paramedic.

From a geographical perspective, Saudi Arabia's diversity, encompassing both densely populated, resource-rich urban locations and remote, resource-limited rural regions; EMS professionals must be prepared to deliver effective care in both (Alanazy et al. 2022). The extreme climatic conditions, often exceeding 40° C in summer, necessitate specific training for managing heat-related emergencies and delivering care under harsh environmental conditions (Alanazy et al. 2022).

Despite the significant strides achieved, EMS education in Saudi Arabia is not without shortcomings. One such issue is the lack of a cohesive, locally relevant, and standardised model of competence (AlShammari et al. 2017; AlShammari et al. 2018). Inconsistencies in the skill sets and knowledge of EMS graduates from different institutions could result in discrepancies in the quality of care, as some professionals might be better equipped than others to handle certain emergency situations. This variation underscores the need for a more robust and standardised educational model.

AlShammari et al. (2018) proposed a future direction for this model, a Saudi-specific standard of competence that would be a combination of international standards, Saudi-specific requirements, and contributions from a variety of stakeholders. International standards may include universally accepted guidelines for basic life support or trauma care, whereas local requirements may pertain to understanding specific health challenges endemic to Saudi Arabia such as the management of heatstroke emergencies or culturally specific practises associated with patient interaction and care.

Furthermore, EMS in Saudi Arabia has a compelling need for more extensive research and scholarship to provide an in-depth comprehension of current challenges, to evaluate the efficacy of implemented interventions, and to guide the development of

new educational strategies. It is essential to invest in and prioritise research addressing local EMS needs such as delivery effectiveness, competency development, cultural competence, and educational methodologies.

In conclusion, Saudi Arabia's EMS education system has achieved notable progress but still grapples with specific challenges. These include the need for enhanced clinical education and for more rigorous research within the field (AlShammari et al. 2017). Addressing these challenges will be crucial to further development. By focusing on these areas, the standard of EMS education can be elevated, ensuring the provision of high-quality and culturally appropriate care nationwide. The promotion of a culture that values continuous learning and innovation will empower Saudi Arabia to reinforce its EMS system, tailoring it to meet the distinct needs of its people and the unique conditions of the country (Al-Wathinani et al. 2023).

1.3 The Role of Clinical Supervisors in EMS Education

Globally, clinical supervision plays a crucial role in paramedic education (Kilner 2004; Perron et al. 2009; Gordon-Pershey and Walden 2013; Bourke-Matas et al. 2020). Paramedic education programmes often include clinical placements where students work in an operational ambulance environment under the supervision of qualified paramedics (Langford et al. 2020). Clinical supervisors are crucial in EMS education, guiding students to comprehend and excel in the complex world of emergency medical services. With their deep understanding of EMS protocols, procedures, and regulations, EMS clinical supervisors mould students into proficient individuals capable of providing high-quality emergency care (Hanna et al. 2021).

Differentiating between EMS supervisors and clinical supervisors is pivotal to understanding their roles in EMS education. Although their titles suggest similar functions, each practitioner possesses unique responsibilities. EMS supervisors primarily manage the operational aspects of emergency medical services, including

oversight of paramedics and Emergency Medical Technicians (EMTs), emergency response coordination, and ensuring adherence to policies and procedures (Clinical Field Supervision of EMS Providers 2017). Their tasks encompass scheduling, quality control, and resource management. However, their role is centred around enhancing the delivery of emergency care services and may not involve direct educational activities (Kilner 2004).

Clinical supervisors, on the other hand, are predominantly tasked with overseeing the students' educational progression. They act as pivotal mentors, instrumental in shaping the careers of forthcoming EMS professionals. Their influence is especially evident in environments such as ambulance stations, hospitals, and simulation laboratories.

In ambulance facilities, clinical supervisors often monitor students while they familiarise themselves with emergency equipment or engage in authentic triage exercises. Within hospital settings, these supervisors oversee student interactions with seasoned healthcare professionals, ensuring that students adeptly navigate the intricate dynamics inherent in hospital care. In simulation laboratories, they steer students through diverse emergency simulations, ranging from complications during childbirth to hazardous material exposure scenarios. At the core of these diverse educational environments, clinical supervisors are essential pillars of EMS education. They provide instruction, extend feedback, and nurture cognitive skills including decision-making, critical thinking, and clinical proficiency. Their principal aim is to merge theoretical understanding seamlessly with its practical application across various clinical contexts (Carroll et al. 2023). Their tailored pedagogical approach guarantees that educational methodologies and training initiatives are meticulously synchronised with the unique duties and challenges presented by each role. Clinical supervisors deliver consistent clinical feedback, resonating with multiple pedagogical theories.

Drawing upon social constructivism as proposed by Vygotsky (1978), clinical supervisors enhance collaborative learning by organising collective debriefings following emergency encounters (Palincsar 1998). Such collaborative evaluations empower students to assimilate insights from their peers, thereby enriching their grasp of EMS practices.

Piaget's cognitive constructivism (Piaget 1973) posits that these supervisors, by offering nuanced feedback targeting individual cognitive structures, aid students in assimilating novel information within pre-existing conceptual frameworks. For instance, guiding students through decision-making in a trauma situation fosters autonomous reasoning and problem-solving skills.

Supervisors in simulation labs guide students through repeated cycles of direct experience, self-reflection, and skill improvement within Kolb's experiential learning framework (Kolb 2014). For example, students are guided to reflect on their actions after a simulated mass-casualty event to enhance their real-world response skills.

Clinical supervisors play a comprehensive role within EMS education, training, mentoring, and assessing EMS students across various real and simulated environments. They are also responsible for nurturing essential soft skills such as communication, leadership, and teamwork, offering insights from their own field experiences and supporting students in professional and emotional growth (Carroll et al. 2023). Assessment is integral to their role, involving the evaluation of students' abilities, knowledge, and competencies through rigorous hands-on testing and reflective practice. By creating a rich learning environment that mirrors real-world challenges, clinical supervisors foster continuous growth and preparedness in their students, shaping the next generation of skilled EMS professionals (Carroll et al. 2023).

To fulfil these responsibilities effectively, clinical supervisors require diverse skills and competencies. These include deep medical knowledge, excellent communication,

leadership skills, and the ability to handle pressure (Perron et al. 2009). A thorough understanding of EMS protocols and procedures and superior interpersonal skills, such as empathy, patience, and providing constructive feedback, are also crucial given their role's interactive nature (Sutkin et al. 2008). Ensuring both theoretical and practical competence elevates the abilities of future EMS professionals, enhancing education quality and emergency care standards (Perron et al. 2009).

EMS clinical supervisors, while sharing some common responsibilities with other healthcare clinical supervisors, also have unique duties stemming from the specificity of emergency medical services. Their emphasis on immediate response and acute care necessitates broad clinical skills and swift decision-making under pressure (Clinical Field Supervision of EMS Providers 2017b). Conversely, other healthcare supervisors might prioritise long-term patient assessment, treatment planning, and chronic disease management (Sutkin et al. 2008). The unpredictable environment of EMS practice also necessitates preparing students for a range of situational variables and effective interactions with diverse community members, contrasting against the more controlled environments of many other healthcare fields (Sutkin et al. 2008).

In conclusion, clinical supervisors play an invaluable role in EMS education. By nurturing the upcoming generation of emergency medical service providers with a mix of practical knowledge and professional skills, their contributions significantly enhance the quality of EMS education and elevate the abilities of future EMS professionals. A key element in this process is the delivery of clinical feedback. Through tailored feedback mechanisms, grounded in pedagogical concepts like social constructivism, cognitive constructivism, and experiential learning, clinical supervisors provide continuous guidance and evaluation. This essential feedback loop not only connects theoretical learning to practical application, but also fosters a culture of reflection, growth, and continuous improvement, laying the groundwork for empathetic and effective EMS professionals. This blend of instruction, mentoring, and feedback

ensures that clinical supervisors will continue to be essential to the future success of the EMS profession.

1.4 Clinical Feedback in EMS Education

Clinical feedback is a fundamental aspect of learning in EMS education, driving improvements in students' skills, competence, and professionalism (Clynes and Raftery 2008). Clinical feedback is the information provided – to students – by clinical supervisors about the students' performance in a clinical setting. Its aim is to highlight strengths and areas for improvement, thereby enhancing learners' skills and competencies (Eaton-Williams et al. 2020; Branch Jr and Paranjape 2002). It is typically provided immediately after the student's performance, establishing a direct correlation between action and response. Its purpose is to guide students in understanding their performance, appreciating strengths, identifying areas for improvement, and reflecting on strategies for enhancement (Branch Jr and Paranjape 2002).

Cognitive constructivism, a theory that emphasises learners as active participants in their knowledge construction, finds its roots in the seminal work of Piaget. Piaget's theory (1973) is pivotal for understanding how EMS students engage with and learn from their educational experiences. His model of cognitive development, which outlines a series of stages through which individuals progress and acquire, organise, and use knowledge, offers valuable insights for the design and implementation of EMS education.

In the context of EMS training, the application of Piaget's stages, specifically the concrete operational and formal operational stages is particularly relevant. During the concrete operational stage, learners begin to think logically about concrete events, making this stage critical for initial EMS training where students learn to apply basic concepts in practical, real-world situations. The formal operational stage, where abstract and hypothetical thinking becomes possible, aligns with advanced EMS

training, enabling students to engage in complex decision-making and problem-solving scenarios typical in emergency medical situations.

Immediate feedback, a key component of EMS education, aligns with Piaget's emphasis on the importance of experiences in cognitive development. For example, during a simulated emergency, when an EMS student incorrectly administers a treatment, immediate feedback from a supervisor not only corrects the mistake but also triggers cognitive processes that can be understood through Piaget's theory. This moment of correction and reflection allows the student to assimilate the new information into their existing schema or to adjust their schema through accommodation, thereby constructing new knowledge. Such experiences are critical for moving from the concrete operational stage to the formal operational stage, in which learners are able to apply logical reasoning to abstract scenarios and improve patient care outcomes.

Clinical feedback in EMS education can be understood through the lens of Vygotsky's theory of social constructivism (1978), which posits that learning unfolds within social interactions under the guidance of more knowledgeable others. Central to Vygotsky's theory is the concept of the Zone of Proximal Development (ZPD), the difference between what learners can do without help and what they can achieve with assistance. In the context of EMS training, when a student practices intubation, the clinical supervisor's role is to identify and target this ZPD by providing feedback and demonstrations that are within the student's reach but beyond their current level of competence.

Rather than merely telling the student what to do, the supervisor's immediate feedback should aim to scaffold the learning process. This involves offering support, hints, and guidance that enable the student to stretch their capabilities and gradually internalise the skill of intubation. The supervisor might, for example, demonstrate a technique, then step back to allow the student to attempt it, intervening as necessary to guide the

student's learning process. This approach ensures that feedback and demonstration are not only immediate but also appropriately calibrated to the student's developmental needs, facilitating a deeper and more effective learning experience.

Moreover, immediate feedback in EMS education fits well within Kolb's experiential learning model (1984), emphasising learning through experience and reflection. Immediate feedback allows students to reflect on their actions in real time, making necessary adjustments, and consolidating their learning. While responding to a trauma scene, an EMS student might have to manage a patient's airway. Immediate feedback on their technique allows them to reflect and adapt their approach, translating the experience directly into enhanced skill and knowledge.

A unique characteristic of clinical feedback in EMS education, compared to other healthcare settings, is the necessity for immediacy (Wilson et al. 2022). EMS often involves time-sensitive, unpredictable, and high-stress situations, such as accidents or severe medical emergencies (Lindskou et al. 2019) . As such, EMS students must be able to swiftly apply their learned skills and knowledge, making real-time, constructive feedback crucial for effective learning (Carroll et al. 2023). This feedback must align with the unique competencies required for pre-hospital emergency care, including not only clinical knowledge and skills but also attributes such as decision-making, teamwork, communication, and stress management.

The short timeframe of EMS learning contrasts against that in other healthcare settings. For instance, the feedback given to a medical student on surgical technique may not come until the end of a lengthy operation, and the feedback to a nursing student may not come until the end of a complex, multi-day patient care process. While all of these fields share a concern with patient-centred care and communication, the immediate, life-or-death context of EMS creates a distinctly different learning environment that necessitates uniquely immediate feedback practices (Branch Jr and Paranjape 2002).

Therefore, the delivery, focus, and application of clinical feedback in EMS education must be contextually appropriate and targeted, underscoring the importance of well-prepared clinical supervisors who understand the unique learning needs and challenges of EMS students. The distinctive nature of EMS education makes it critical that feedback be not simply constructive but, from a broader strategic perspective, also delivered in a manner that encourages and supports students in managing the demanding pre-hospital environment.

Research consistently demonstrates the impact of clinical feedback on learning outcomes. Timely and specific feedback is associated with improved knowledge and skills, efficient learning, and enhanced self-assessment capabilities (Cantillon and Sargeant 2008). Recent studies further establish a strong correlation between effective clinical feedback and the development of clinical competence in EMS education (Watling and Ginsburg 2019; Carroll et al. 2023). For example, Watling et al. (2019) found that feedback facilitated self-reflection and self-directed learning, both of which are key to enhancing clinical competence and patient care practices.

Despite its significance, further understanding of clinical feedback within EMS education is necessary, particularly considering the rapid expansion and evolution of EMS as a profession in Saudi Arabia and the consequent need for quality and effectiveness in EMS education (Alrazeeni and Al Sufi 2014). Providing effective clinical feedback requires careful execution. Feedback should be specific, and linked to observable behaviours or actions, enabling students to identify their successes and areas for improvement (Van De Ridder et al. 2008; Eaton-Williams et al. 2020; Kuhlmann Lüdeke and Guillén Olaya 2020). It should also be constructive, guiding students towards improvement while balancing corrections with positive commentary to avoid discouragement (Van De Ridder et al. 2008; Burgess et al. 2020; Eaton-Williams et al. 2020; Wilson et al. 2022). Timeliness is essential, with feedback ideally delivered immediately during and after the observed behaviour or action to facilitate prompt corrections (Sultan and Khan 2017; Kuhlmann Lüdeke and Guillén Olaya 2020;

Nerali et al. 2021). Engaging in feedback as a dialogue encourages learners to reflect, ask questions, and gain deeper insights into their performance (Sultan and Khan 2017; Burgess et al. 2020).

Clinical feedback significantly influences learning outcomes by enabling students to identify their strengths, recognise areas for improvement, and develop strategies for skill and competence enhancement (Sultan and Khan 2017). It fosters self-awareness, encourages critical thinking, and strengthens clinical decision-making skills, establishing crucial foundations for effective EMS practice (Branch Jr and Paranjape 2002; Eaton-Williams et al. 2020; Carroll et al. 2023).

A substantial body of research provides evidence for the necessity of feedback in fostering clinical competence in EMS education (Bleijenberg et al. 2017; Eaton-Williams et al. 2020; Wilson et al. 2022; Carroll et al. 2023), emphasising that feedback plays a crucial role in enhancing performance within clinical settings. Wongtongkam and Brewster (2017) provide additional evidence supporting the beneficial effects of feedback on the retention of knowledge and skills, ultimately leading to improved competence among EMS students.

In conclusion, the importance of clinical feedback in EMS education cannot be overstated. It serves as a cornerstone for building vital competencies, enhancing both the efficiency and effectiveness of the learning process. By incorporating education principles such as cognitive and social constructivism, experiential learning, and immediate feedback, EMS education fosters a rich learning environment that uniquely caters to the demands of emergency care. Clinical feedback shapes not only the clinical skills but also the critical thinking, decision-making, and emotional resilience required in high-stakes, time-sensitive situations. The fusion of immediate feedback with broader educational theories ensures that EMS students are equipped with the essential tools to become competent and compassionate professionals. The integral role of well-prepared clinical supervisors in delivering this feedback further

underscores its significance, creating a dynamic, responsive educational landscape that promises to advance the field of EMS.

1.5 Current Challenges in EMS Education and the Specific Challenges in Saudi Arabia Regarding Clinical Feedback

Globally, EMS education faces significant challenges that impact upon its effectiveness and success. A principal issue is the lack of standardised EMS education and training across regions, leading to varied competencies among EMS professionals (Shrestha et al. 2018; Afshari et al. 2021). Rapid advancements in medical knowledge and emergency care techniques necessitate continual curriculum updates, posing logistical and financial challenges (Shrestha et al. 2018; Afshari et al. 2021). Additionally, a scarcity of qualified educators with direct EMS experience hampers the delivery of high-quality education (Sorani et al. 2018).

In Saudi Arabia, EMS education faces unique challenges. Cultural barriers can hinder effective communication and learning among a diverse student body (Alamri 2017). The relatively recent recognition of EMS as a professional field in Saudi Arabia has limited public awareness of EMS professionals' roles and contributions, affecting both student recruitment and public perception (Alrazeeni 2016; AlShammari et al. 2018). Furthermore, the lack of comprehensive regulation and standardisation in educational content and certification requirements presents significant concerns for maintaining quality EMS professional training (AlShammari et al. 2018).

These challenges, both global and local, extend to the delivery of effective clinical feedback, which is particularly nuanced in EMS due to its unique, dynamic environment. As noted in the previous section, EMS students often operate under time-pressured, high-stress conditions requiring swift decision-making and adaptability,

which demands specific pedagogical approaches for effective learning and feedback delivery (Okuda et al. 2009; Fraser et al. 2012; Naismith and Cavalcanti 2015).

The unpredictable EMS environment complicates the provision of timely and constructive feedback, essential for real-time learning and adaptation (Scalese et al. 2008; LeBlanc 2009). This can lead to delays in achieving competency, limit the development of professional judgment, and increase the risk of burnout (LeBlanc 2009; Fraser et al. 2012).

Moreover, EMS clinical feedback's multifaceted nature encompasses technical, cognitive, emotional, and interpersonal dimensions, requiring supervisors to integrate feedback across these areas within the dynamic EMS setting. This complexity necessitates innovative feedback approaches and comprehensive supervisor training tailored to EMS's unique demands (Cantillon and Sargeant 2008; Okuda et al. 2009; Brame 2016).

Despite these global challenges, in Saudi Arabia, there is a notable gap in research specifically addressing the challenges and needs associated with clinical feedback in EMS education. This lack of localised study underscores the necessity of this thesis. By addressing this gap, the thesis seeks to enhance the quality of EMS education, thereby improving the competency of EMS professionals and ultimately leading to better patient outcomes in emergency care. This effort aligns with the broader goal of advancing healthcare standards both nationally and globally.

1.6 The Importance of Identifying the Training Needs of Clinical Supervisors

Identifying learning needs among clinical supervisors in EMS education is paramount for enhancing the quality and effectiveness of their teaching practices, particularly in the domain of feedback. This focus is crucial as it paves the way for targeted

professional development, ensuring that supervisors are well-equipped with contemporary knowledge, skills, and tools essential for their roles. Sargeant et al. (2015) highlight the importance of such development, noting that understanding and addressing these needs can significantly improve the delivery of feedback, thereby influencing student comprehension and achievement positively. Moreover, the capability to provide effective clinical feedback, especially within the challenging contexts of EMS education, is a critical skill that requires continuous refinement (Sargeant et al. 2015; Pront et al. 2016).

Understanding the perceptions of clinical supervisors and students regarding clinical feedback is essential where there are discrepancies in expectations and experiences. Such discrepancies often stem from the diversity of needs and challenges faced by both groups. Ramani and Krackov (2012) and Ajjawi and Regehr (2019) stress the importance of addressing these differences, as they can significantly impact upon the feedback's effectiveness and the learning process. Identifying these differences aids in tailoring feedback to meet students' educational needs more effectively, fostering a more supportive and constructive educational environment (Hardavella et al. 2017; Jug et al. 2019).

Given the centrality of clinical supervisors in clinical EMS education, their role directly affecting both student performance and patient outcomes, it becomes imperative to ascertain their learning needs and challenges. As such, a tailored research question for this thesis would be:

> "What are the perspectives of students and clinical supervisors on feedback in Saudi EMS education?", " What are the clinical feedback needs and challenges of both students and supervisors and how can these be effectively addressed?"

In light of the above backdrop, a research programme titled, Clinical Feedback in EMS Education: Identifying and Resolving the Training Needs of Clinical Supervisors in Saudi Arabia was undertaken. The rationale of this thesis is to bridge the identified gaps in clinical feedback, ensuring EMS students are optimally prepared for their roles. The thesis is structured into three studies:

1. Examination of Experiences and Perceptions of Clinical Feedback in EMS Education: This first study aims to understanding the perceptions and experiences of clinical feedback. The study reveals significant concerns regarding perceptions with feedback from both students and clinical supervisors. The results highlight distinct differences between the perceptions of students and clinical supervisors, with diverse themes emerging around the usefulness, preference, perception, and impact of feedback.

2. Clinical Feedback during the COVID-19 Pandemic: This study assesses the adaptations in clinical feedback techniques in response to the pandemic, which forced departure from traditional educational methods. It shows that, while both students and supervisors adapted to new online feedback delivery techniques, challenges continue to exist. However, most feedback methods proved effective in continuing the learning process during the pandemic.

3. Addressing Training Needs using a Delphi Study on Clinical Feedback: This study builds upon the findings from the preceding studies, aiming to propose an educational strategy to address the challenges and needs related to clinical feedback. It applies the Delphi method to develop consensus on training, support, and guidelines for clinical feedback.

The overarching goal of this PhD thesis is to identify the learning needs and challenges associated with EMS clinical feedback and propose an educational strategy to address these needs and challenges to improve EMS clinical feedback in Saudi Arabia.

Overall, this chapter has provided a comprehensive overview of EMS education, particularly in Saudi Arabia, outlining its historical evolution, current state, and the roles of EMS professionals. It emphasises the critical importance of clinical feedback in the education and training of EMS professionals, highlighting the necessity for competent, confident, and empathetic individuals to provide high-quality, life-saving emergency services. This foundational chapter sets the stage for a deeper exploration of clinical feedback within EMS education, emphasising the need to identify and address the training needs of clinical supervisors to enhance the overall quality of EMS education and practice.

Next, Chapter 2 builds upon this foundation with a critical scoping review that investigates clinical feedback between EMS students and clinical supervisors. This review examines the existing literature to identify gaps and uncover insights into EMS clinical feedback. By analysing studies on the perceptions of clinical feedback from both paramedic students and clinical supervisors, this examination not only contributes to the academic discourse on EMS education but also underscores the thesis's rationale: to enhance the effectiveness of clinical feedback in EMS education in Saudi Arabia by addressing the identified gaps and challenges.

Chapter 2 Scoping review

2.1 Abstract

Background:

Feedback plays a critical role in healthcare education, particularly in Emergency Medical Services (EMS), where it is essential for developing clinical competence, enhancing professional growth, and ensuring effective clinical practices. Unlike other healthcare fields, EMS feedback occurs in unpredictable, high-pressure environments, necessitating immediate, practical, and targeted feedback. However, the unique challenges and perceptions associated with EMS clinical feedback have not been fully explored, especially in diverse cultural settings such as Saudi Arabia.

Objectives:

This scoping review systematically explores and summarises the available evidence on EMS clinical feedback, focusing on the perceptions of both EMS students and clinical supervisors. The review also seeks to identify gaps in the literature and propose directions for this PhD thesis to enhance the feedback mechanisms in EMS education, particularly in Saudi Arabia.

Method:

The review follows the Joanna Briggs Institute (JBI) Methodology for Scoping Reviews, guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension for Scoping Reviews checklist. A comprehensive search of relevant databases was conducted to identify studies published between 2003 and 2023. Both qualitative and quantitative peer-reviewed empirical studies were included,

while non-peer-reviewed publications, opinion pieces, and studies focusing on non-clinical settings were excluded.

Eligibility Criteria:

Studies were required to focus on clinical feedback within EMS education settings, such as ambulances, hospitals, or practical simulation labs, and include EMS students and clinical supervisors. Studies were also required to be written in English and published within the last 20 years.

Sources of Evidence:

An exhaustive search was conducted across multiple databases, including CINAHL, EMBASE, MEDLINE, Web of Science, Scopus, ASSIA, British Education Index, Education Collection (ProQuest), and ERIC. Additional searches were performed using Google Scholar, Trove, Open Access Theses and Dissertations, and select discipline-focused journals.

Charting Methods:

Data were extracted and analysed using a framework that categorised the studies based on their focus, methodology, and key findings related to EMS clinical feedback. The analysis identified recurring themes, methodological strengths, and weaknesses, as well as gaps in the existing literature.

Results:

The review identified 12 studies that met the inclusion criteria, revealing five primary themes: perceptions of clinical feedback by paramedic students, suggestions and training needs, clinical supervisors' perceptions, recommendations for improving feedback, and the role of preceptors in feedback delivery. While feedback is universally acknowledged as crucial, significant challenges such as inconsistencies in feedback,

cultural misunderstandings, and a lack of structured training for preceptors were identified.

Conclusions:

The findings underscore the need for more targeted research on clinical feedback in EMS education, particularly in diverse cultural settings such as Saudi Arabia. The review highlights the importance of developing a comprehensive feedback framework that addresses the specific needs of EMS students and supervisors, with a focus on timely, constructive, and culturally sensitive feedback. The proposed research will fill the existing gaps and contribute to the advancement of EMS education and practice in Saudi Arabia.

2.2 Introduction

Feedback is widely recognised as essential for enhancing student learning, confidence, and clinical skills across various domains of healthcare education (Bing-You et al. 2017; Wong and Shorey 2022). Understanding the perspectives of clinical supervisors and students on clinical feedback is crucial and has been explored in fields such as medicine (Perera et al. 2008; Moaddab et al. 2015; Abraham and Singaram 2016; Riaz et al. 2021), nursing (Giles et al. 2014; Groves et al. 2015; Killingback et al. 2020), and other areas of healthcare (Nugraheny et al. 2016; Javed et al. 2021). Additionally, feedback mechanisms have been extensively studied in high-stress professions outside of healthcare.

In nursing and medicine, clinical feedback typically occurs in controlled environments, such as hospitals or clinics, where there are opportunities for structured, reflective learning through mentorship, case discussions, and formative assessments (Clynes

and Raftery 2008; Linton and Murdoch-Eaton 2020). In these settings, feedback is often integrated into a structured curriculum, supported by regular supervision, simulated practice, and advanced diagnostic tools, allowing for gradual skill development (Veloski et al. 2006; Bing-You et al. 2017).

However, clinical feedback in EMS education fundamentally differs from these systems, as it is tailored to the immediate and life-critical nature of pre-hospital care. Unlike the feedback mechanisms in firefighting, police training, or social work—where the focus is often on situational awareness, procedural adherence, and team coordination—EMS feedback is directly linked to patient outcomes and is designed to rapidly enhance the clinical skills needed for emergency medical interventions, where any delay or error can have serious consequences for patient survival and recovery (Wilson 2013; Morrison et al. 2017).

Moreover, while social work education emphasises reflective and developmental feedback aimed at improving client interactions and fostering critical thinking (Kourgiantakis et al. 2019), EMS feedback must be immediate, practical, and specifically targeted at refining hands-on medical procedures. Paramedic students often operate in unpredictable, high-pressure environments requiring split-second decisions, making real-time feedback crucial not just for future performance improvement but for immediate adjustments that directly affect patient outcomes.

The structure and timing of feedback further distinguish EMS education. In police and firefighting training, feedback is typically provided during post-incident debriefings or structured sessions, allowing for reflective learning. In contrast, EMS feedback frequently occurs in the moment, during or immediately after patient care, necessitating an intense focus on precise clinical actions and their immediate outcomes. This immediacy is vital in EMS due to the minimal margin for error and the potentially dire consequences of mistakes.

These differences are not mere nuances but are reflective of the unique demands of EMS work, where the ultimate goal is to enhance clinical competence and ensure that paramedic students are fully prepared to manage the complexities of emergency medical care. The feedback in EMS education does not mirror that of other professions because it must address the specific challenges of providing medical care in unpredictable and often chaotic environments. This intense focus on clinical precision, patient safety, and immediate applicability sets EMS feedback apart from the broader, often more reflective feedback models seen in firefighting, policing, social work, and other healthcare fields.

Given these distinct disciplinary contexts, the nature of clinical feedback in EMS is significantly influenced by the unpredictable and high-stress situations paramedics encounter (O'Meara et al. 2014b). Therefore, the rationale for this review is twofold: to systematically summarise the available evidence on clinical feedback within EMS education and to highlight areas where further research is needed.

The primary objective of this scoping review is to systematically explore the perceptions of clinical feedback within EMS education, focusing on the perspectives of both EMS students and clinical supervisors. This review addresses two key research questions:

- What research has been conducted to date about EMS students' and clinical supervisors' perceptions of clinical feedback?

This question seeks to explore the existing body of literature on how feedback is perceived by those directly involved in EMS education. It aims to identify the prevailing themes, challenges, and gaps in understanding the feedback processes from both the learners' and educators' perspectives.

- To what extent does the research on EMS clinical feedback provide insights into the training needs of clinical supervisors?

This question examines the extent to which current research addresses the training and support needs of clinical supervisors in delivering effective feedback. It seeks to understand the preparation, challenges, and resources available to supervisors, and how these impact the quality and effectiveness of the feedback provided to EMS students.

By addressing these objectives, this review aims to contribute a comprehensive summary of the current understanding of clinical feedback in EMS education, identify gaps in the literature, and propose areas for further research, particularly in the context of Saudi Arabia's EMS educational practices.

2.3 Method

Systematic scoping reviews seek to chart the available literature on a topic, summarise and disseminate key findings, and identify gaps in existing literature in what appears to be an area of research yet to be explored (Arksey and O'Malley 2005). Scoping reviews are also used to examine emerging evidence to determine if more questions can be asked (Peters et al. 2015). This type of review aims to identify what evidence is available on a topic by drawing on all types of evidence or research methodology, regardless of quality (Peters et al., 2015). The Joanna Briggs Institute (JBI) Methodology for JBI Scoping reviews (Peters et al. 2015), guided this review and it is reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Extension for Scoping Reviews checklist (Tricco et al. 2018).
A detailed PRISMA-ScR checklist was included to ensure transparency and replicability of the review process (Tricco et al. 2018). This checklist, which can be found in Appendix 2.01, outlines the key elements of the review, including eligibility

criteria, information sources, data charting methods, and synthesis of results. The checklist provides a comprehensive guide to the reporting of each section of the review, ensuring that all relevant aspects are thoroughly covered.

2.3.1 Research question

This scoping review was guided by two explicit research questions:

- What research has been conducted to date about EMS students' and clinical supervisors' perceptions of clinical feedback?
- To what extent does the research on EMS clinical feedback provide insights on the training needs of clinical supervisors?

2.3.2 Search strategy

In order to be comprehensive and identify both published and unpublished literature, the search strategy for this review followed the three steps proposed by Peters et al. (2015). The first of these involved an initial search using the MEDLINE and CINAHL databases, and analysing the titles, abstracts, keywords, and years of publication of all relevant articles retrieved from these databases. A twenty-year period from 2003 to 2023 was chosen for the search as this period marks significant advancements and changes in paramedic education and practice, ensuring that the review captures the most relevant and contemporary perspectives on clinical feedback.

The second step involved searching a wider selection of databases, meticulously considered to encompass a wide range of disciplines and sources of evidence. The inclusion criteria for databases are based on their relevance to paramedic education, their coverage of healthcare and educational research, and their coverage of relevant, peer-reviewed, and grey literature. This strategic choice aims to ensure a thorough capture of the literature on perceptions of clinical feedback, learning, and training needs within the EMS context. Specifically, the search was extended to include CINAHL, EMBASE, MEDLINE, Web of Science, Scopus, Applied Social Sciences Index

and Abstracts (ASSIA), British Education Index, Education Collection (ProQuest), and ERIC: Educational Resources Information Centre. The rationale for excluding other databases, such as PubMed, is based on their overlap with MEDLINE in terms of content coverage and the strategic decision to focus on sources that would yield the most unique and relevant studies for this review's specific research questions.

Following full-text screening of all studies, the third step in this process involved hand searching the reference lists of all studies thus far identified. The key search terms are based on the research question and applied to the concept of Population, Concept, and Context (PCC), as per Peters et al. (2015):

Population:	EMS Students and clinical supervisors.
Concept:	Perceptions of clinical feedback, learning and training needs.
Context:	EMS (Emergency Medical Services).

The search strings used are shown in Table 2.1.

Table 2.1 CINAHL database search.

Step	Search string	
S1	paramed* or emergency medical or EMS or EMT or pre hospital or ambulance	
S2	exp* Emergency Medical Services	
S3	S1 OR S2	
S4	(student* or undergrad* or educat* or train*)	
S5	exp* Students or exp* Students, Health Occupations	
S6	S4 OR S5	
S7	feedback	
S8	performance evaluation	
S9	S7 OR S8	
S10	S3 AND S6 AND S9	
S11	supervis* or educat* or mentor*	
S12	S10 AND S11	*N* = 333
S13	(2003 – 2023)	*N* = 322
S14	Narrow by Language – English	*N* = 317

As the search strings illustrate, a multifaceted search strategy was employed for a comprehensive identification of relevant literature. A librarian from Cardiff University was consulted on ensuring that no important studies were overlooked. The librarian suggested that the approach could be further refined by excluding certain terms that yielded a large number of unrelated results, such as “EMS” and “EMT”. Moreover, terms such as “clinical”, “learning and training needs”, and “perceptions” seemed to exclude important material, so they were removed. For example, searching for “clinical” and “learning and training needs” in CINAHL yielded only 161 papers.

Beyond the predefined database search outlined previously, supplementary searches were performed using Google Scholar, Trove, Open Access Theses and Dissertations, and select discipline-focused journals (namely *the Australasian*

Journal of Paramedic Practice, Journal of Paramedic Practice, International Journal of Paramedic Practice, and *Prehospital Emergency Care*). Given the limited search capabilities of these platforms, only the first 200 results were assessed from searches for the phrases “paramedicine education”, “paramedic student feedback”, and “clinical feedback in paramedicine”. The rationale behind this meticulous manual search is to ensure the inclusion of potential literature that might not have emerged from the initial database queries. Additional rounds of searches were also executed afterwards to ensure that any recently published or unpublished works, potentially missed in the primary processes, were captured and considered for inclusion in the study.

The focus on English-language studies was driven primarily by the need to ensure ease of translation and interpretation. This strategic decision is crucial for maintaining the integrity of the data analysis process, as nuances in language and terminology could significantly impact the understanding and interpretation of findings.

2.3.3 Study selection process

The inclusion criteria are detailed in Table 2.2. Additionally, only studies reporting primary research on the student and their supervisors’ experience were included; opinion and discussion pieces were excluded.

Table 2.2: Scoping review inclusion criteria

Criterion	Inclusion	Exclusion	Rationale
Date	Last 20 years (2003–2023)	Publications before 2003	To ensure the review captures the most relevant and contemporary perspectives on clinical feedback
Language	Written in English	Written in a language other than English	Ensures ease of translation and interpretation
Country	All countries	None	Aims to capture diverse international studies across different healthcare systems and cultural settings
Study focus	Clinical Feedback with emphasis on EMS education settings such as Ambulance, Hospitals, and practical simulation labs	Feedback in non-clinical settings, such feedback in class	Ensures the findings are specific to feedback in clinical settings
Study type	Peer-reviewed empirical studies (both qualitative and quantitative)	Non-peer-reviewed publications; Opinion pieces, commentaries (unless foundational)	Prioritise evidence-based findings. Reviews or opinion pieces may be too subjective.
Publication	Peer-reviewed journals, select conference papers, grey literature from reputable institutions	Non-peer-reviewed journals or dubious sources	Ensures the quality and authenticity of the information retrieved

Continued overleaf

Table 2.2 continued

Criterion	Inclusion	Exclusion	Rationale
Population	Students and clinical supervisors in EMS education settings	Learners and supervisors from non-clinical settings or disciplines outside of EMS education	Targeted EMS learners and supervisors in EMS settings to ensure relevance
Consultation with an expert	Consultation with my PhD supervisor to offer expert insight into the methodological quality of the studies	Helps discern and address any studies of questionable quality	Enhances the reliability and validity of the studies selected for the review

To facilitate the removal of duplicates and a multiphase review process, all studies were exported into Rayyan systematic review software. Trustworthiness was evaluated by screening the title and abstracts (Ouzzani et al. 2016; Harrison et al. 2020). Following initial title and abstract screening, the full texts of included studies were obtained. Studies that did not meet the inclusion criteria were excluded.

2.3.4 Quality appraisal

Scoping reviews seek to develop a comprehensive overview of the evidence available on a specific topic, rather than focusing exclusively on the highest-quality evidence. Typically, methodological quality is not evaluated (Peters et al. 2015) and may be deemed optional (Tricco et al. 2018), but Daudt et al. (2013) assert that quality assessment is important. Given the small number of studies recognised for inclusion in this review, no studies were excluded due to quality assessment.

2.3.5 Data charting and extraction

A rubric from Peters et al. (2015) was adapted for extracting metadata and data from the included studies detailed in Appendix 2.02. Examples of metadata include study author, year, country, type of study/resource, and design and study purpose. Examples of data include findings on clinical feedback, insights on students and

supervisors, and suggestions and training needs regarding clinical feedback. Each study was meticulously read and reread to ensure accurate representation.

2.4 Results

The exhaustive database search identified 7,218 potentially relevant studies in nine databases: CINAHL (*N* = 317), EMBASE (*N* = 722), MEDLINE (*N* = 315), Web of Science (*N* = 264), Scopus (*N* = 1179), Applied Social Sciences Index and Abstracts (ASSIA) (*N* = 1831), British Education Index (*N* = 24), Education Collection (ProQuest) (2,530), and ERIC (*N* = 36).

Rayyan was used to manage and rationalise this extensive list. Rayyan is renowned for its capability in systematic review processes, and has been supported by scholars such as Ouzzani et al. (2016) and Harrison et al. (2020). Rayyan facilitated rapid scanning of titles, abstracts, authors, and research methodologies, and hence rapid sorting through the search results to winnow out the relevant studies. This resulted in the exclusion of 5,655 studies on the grounds of irrelevance due to their primary focus being on unrelated subjects. Most of these irrelevant studies concerned the perspectives of medical students, nursing and other healthcare students. Others dealt primarily with clinical feedback from the viewpoints of patients, healthcare workers and other professionals, which was not aligned with our interest in the perceptions of clinical supervisors and students.

The database search was followed by an exhaustive manual search of reference lists and grey literature. This process revealed four additional studies. It is important to note that, despite these efforts, one study – an unpublished thesis cited in another pertinent study – remained inaccessible. After the meticulous removal of duplicates (*n* = 1,272), the full texts of the remaining 284 studies were reviewed. Only 12 of these met the stringent inclusion criteria, which focused on the perspectives of paramedicine clinical supervisors and students regarding clinical feedback, and were, therefore, selected for this scoping review. Figure 2.1 comprehensively outlines this procedure.

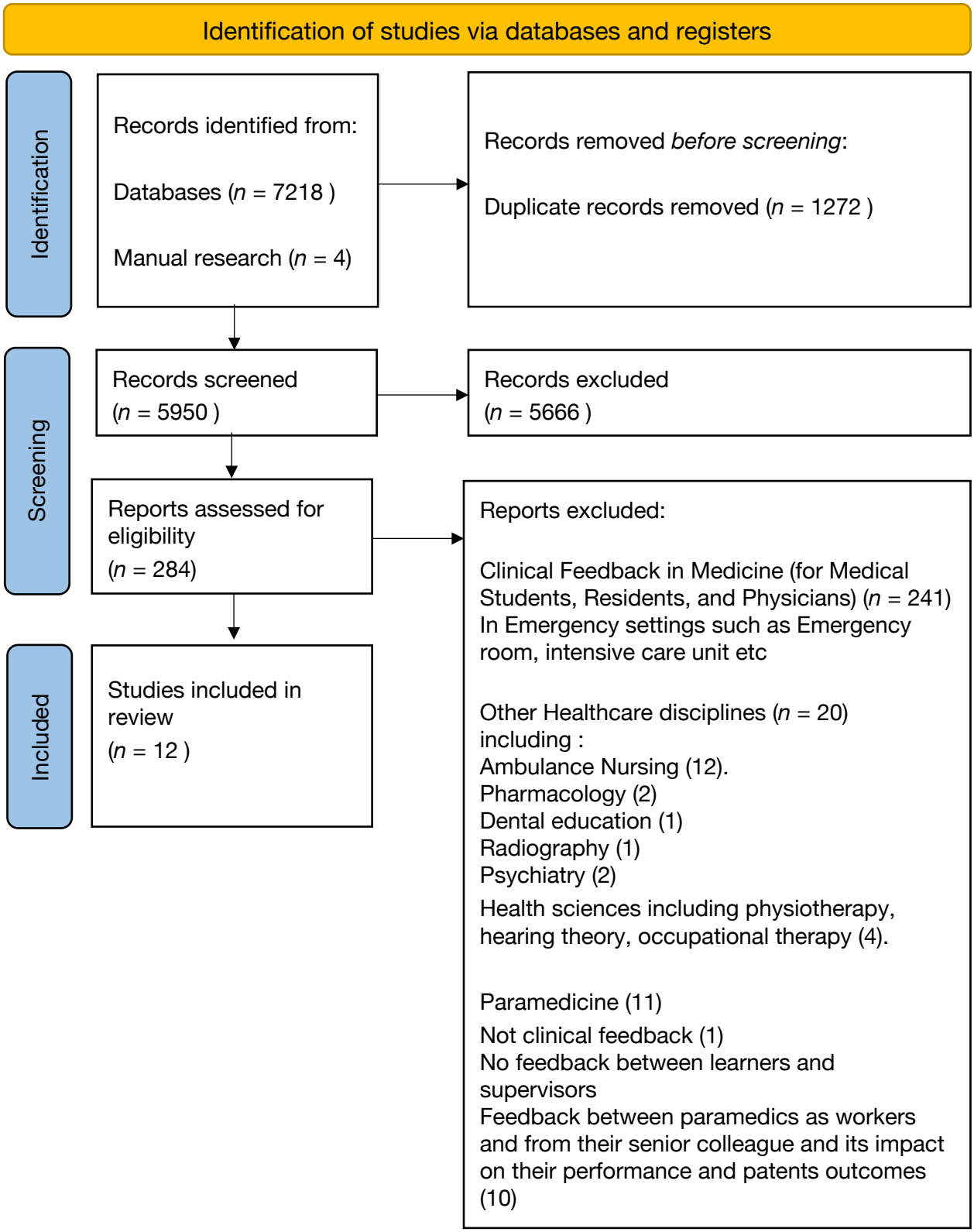

Figure 2.1 Flowchart of scoping studies selection process

2.4.1 Data analysis

After extracting data and metadata from the twelve studies included in this review, an analysis and thematic construction process was undertaken. This procedure, conducted under the framework proposed by Arksey and O'Malley (2005) and further enriched by the suggestions of Levac et al. (2010), included meticulously reading and reviewing the studies and the extracts to ensure a comprehensive understanding of the information. Initial codes were then developed from the extracts, with the assistance of colour coding. This approach aided in grouping patterns and trends together by highlighting similarities and differences within the data, thereby facilitating the emergence, confirmation, naming, and defining of the key themes.

All twelve studies were empirical, focusing on various aspects of the clinical placement experience for paramedical students. Geographically, the majority (9) of the studies were conducted in Australia (Boyle et al. 2008; Lane 2014; O'Meara et al. 2014b; O'Meara et al. 2015; Ross et al. 2015; Carver 2016a; Williams et al. 2016; Wongtongkam and Brewster 2017; Edwards 2019), and one was conducted in each of Sweden (Nilsson et al. 2023a), the United States (Filipp 2022) and South Africa (Moodley 2016a). Two studies were published peer-reviewed research from Sweden and South Africa, and two were unpublished master's theses from the United States and Australia.

Five primary themes were discerned: "Paramedic Students' Perceptions of Clinical Feedback (Key Findings)", "Paramedic Students' Perceptions of Clinical Feedback (Suggestions and Training Needs)", "Clinical 'Supervisors' Perceptions of Clinical Feedback", "Training Recommendations and Requirements", and "Role and Preparedness of Preceptors in Providing Feedback". The first two themes pertain specifically to the perceptions and suggestions of paramedic students regarding clinical feedback within their educational context, shedding light on the essential elements of effective feedback from the students' perspectives. These themes emphasise the significance of clarity, timeliness, and constructiveness in feedback,

as well as the importance of a supportive learning environment for optimising the feedback experience.

The third and fourth themes broaden the scope, addressing the clinical supervisors' perceptions of feedback and their suggestions and training needs in the paramedic education context. These themes underscore the integral role both the clinical practice environment and feedback providers (clinical supervisors) hold in shaping the feedback process and perceptions therein. They highlight the need for structured, consistent feedback that is tailored to individual student needs, as well as the importance of ongoing supervisor training to enhance the quality and effectiveness of feedback delivery.

The fifth theme, focusing on the role and preparedness of preceptors in providing feedback, accentuates the pivotal role that preceptors play in the feedback process. This theme underscores the importance of preceptors' readiness in delivering effective, constructive feedback, and outlines the need for targeted training and robust support systems to ensure the successful facilitation of the feedback process within the clinical education setting.

Reflecting on the use of theoretical frameworks across the 12 studies included in the scoping review reveals a diverse range of approaches, highlighting both strengths and weaknesses in the integration of theory within paramedic education research. Some studies were deeply rooted in established theories, while others relied more on empirical data without a strong theoretical basis.

For example, Edwards (2019) utilised symbolic interactionism and role theory to explore paramedics' perceptions of their roles as preceptors. Grounding the research in these well-established sociological theories provided a nuanced understanding of the complexities and dynamics within preceptor-student relationships. Similarly, Carver (2016) employed philosophical hermeneutics and sociometrical theory to analyse paramedic preceptorship, offering insights into the

interactions between humans and non-human elements (such as medical equipment) in clinical practice.

In contrast, Boyle et al. (2008) did not explicitly state a theoretical framework, focusing instead on the practical aspects of clinical placements. The lack of a theoretical lens limited the depth of analysis, potentially overlooking broader contextual and systemic factors. O'Meara et al. (2014) adopted a pragmatic approach, emphasising experiential learning and competency development without grounding the study in a specific theory. While this approach provided practical insights, it lacked the theoretical depth to enhance the interpretation of the results.

Other studies, like Lane (2014) and Moodley (2016), also took more descriptive and phenomenological approaches, respectively. These methodologies provided valuable practical insights and rich, detailed descriptions of students' subjective experiences but lacked the theoretical grounding to offer comprehensive explanations or generalise findings broadly. Nilsson et al. (2023) employed a mixed-methods approach without a strong theoretical foundation, limiting the depth of analysis and interpretation of the findings.

Rose et al. (2015) conducted a study focusing on empirical data regarding paramedic student placements without a theoretical framework. The absence of a theoretical framework meant that while practical insights were gained, the study did not offer a deeper theoretical understanding. Williams et al. (2016) conducted a cross-cultural study comparing simulation experiences between Australian and Jordanian students. The lack of a specific theoretical framework limited the analysis of cultural differences, though the empirical data highlighted significant variations in student satisfaction.

Wongtongkam and Brewster (2017) used a retrospective design to analyse preceptor evaluations and student feedback forms. The reliance on self-reported data and the retrospective design limited the depth of analysis. Filipp (2022) employed an action research framework, engaging participants in cycles of

reflection and action to improve clinical placement experiences. This theoretical approach facilitated a participatory process, enhancing the relevance and applicability of the findings.

O'Meara et al. (2015) followed a pragmatic approach, examining clinical placement programmes without a specific theoretical foundation. The focus on practical outcomes and the development of student competencies provided useful data but lacked the depth of analysis that a theoretical framework could offer.

The use of theory in the included studies varied widely, with some studies deeply rooted in established theoretical frameworks and others relying more on empirical data. This variation highlights the strengths and weaknesses of different approaches, with theoretically grounded studies offering deeper insights and empirical studies providing practical, actionable data. Future research in paramedic education could benefit from a more balanced integration of theory and practice, enhancing both the depth and applicability of findings.

Methodological Limitations and Their Implications:

Several methodological limitations were identified across the 12 studies included in the scoping review, impacting the robustness and generalisability of their findings. These limitations pertain to study design, sampling methods, data collection processes, and the contexts in which the studies were conducted.

For instance, Boyle et al. (2008) focused on clinical placements without a clear theoretical framework, using observational and interview methods. The lack of peer review raised concerns about the rigour and reliability of the findings, and convenience sampling limited the generalisability of the results. Edwards (2019) employed a robust theoretical framework but used a qualitative approach with a small sample size, and the study's single geographic location (Australia) limits the generalisability of the findings.

Filipp (2022) conducted an action research study involving reflective cycles to improve clinical placements, adding depth but introducing potential bias through self-reported data. While peer-reviewed, the context-specific findings may not be widely generalisable. Carver (2016) used philosophical hermeneutics and sociometrical theory, providing depth but also complexity that might limit applicability. The small sample size and single-institution focus further limit generalisability.

Other studies, such as Lane (2014) and Moodley (2016), employed descriptive and phenomenological approaches, respectively. These methodologies offered valuable practical insights but lacked strong theoretical foundations and relied on convenience sampling, limiting generalisability. Nilsson et al. (2023) conducted a mixed-methods study but lacked a strong theoretical framework, and the convenience sampling and specific institutional context further reduced generalisability.

Rose et al. (2015) focused on the practical aspects of paramedic student placements without a clear theoretical foundation. The convenience sampling and specific geographic context limited the generalisability of the findings. Williams et al. (2016) conducted a cross-cultural study comparing simulation experiences between Australian and Jordanian students. While the empirical approach provided valuable insights, the lack of a theoretical framework limited the depth of analysis.

Wongtongkam and Brewster (2017) used a retrospective design to analyse preceptor evaluations and student feedback forms. The reliance on self-reported data and the retrospective design were significant limitations. O'Meara et al. (2015) followed a pragmatic approach, examining clinical placement programmes without a specific theoretical foundation. While the pragmatic approach provided useful data, the findings are limited by the specific context and lack of diversity in the sample.

The methodological limitations identified in these studies have significant implications for the conclusions drawn and their generalisability. The reliance on convenience samples, single geographic locations, and small sample sizes mean that the findings may not be broadly applicable across different contexts or populations. The variation in peer review standards further suggests that some findings should be interpreted with caution.

The absence of strong theoretical frameworks in several studies limits the depth of analysis and the ability to draw robust conclusions. Studies that fail to effectively bridge the theory-practice gap may offer insights that are theoretically sound but practically unfeasible, reducing their utility in informing practice or policy. Therefore, while the reviewed studies contribute valuable knowledge to the field of paramedic education and practice, their limitations must be carefully considered when applying their findings to broader contexts.

This thesis aims to address these limitations by employing a robust methodological approach and integrating strong theoretical frameworks. The research focuses on the unique context of Saudi Arabia, acknowledging that the findings from other regions may not be directly applicable due to cultural, educational, and operational differences. By incorporating a comprehensive and context-specific strategy, this thesis seeks to enhance the applicability and impact of its conclusions, ultimately contributing to the advancement of paramedic education and practice in Saudi Arabia.

2.4.2 Paramedic students' perceptions of clinical feedback (key findings)

Numerous studies from various settings and geographical locations were carefully examined to illuminate paramedic students' perceptions of clinical feedback across various global contexts, directly addressing the first scoping review question.

In Australia, a study by Wongtongkam and Brewster (2017) analysed the impact of clinical encounters in out-of-hospital emergency care on 'students' satisfaction and learning outcomes. The researchers collected data from student feedback forms (*n*

= 21) and preceptor evaluations (*n* = 160). The study found that 72% of students reported a welcoming and supportive learning environment fostered by clinical supervisors. This highlights the importance of creating a positive atmosphere for students' educational experiences. Additionally, 71% of respondents acknowledged the competence of their leading paramedics and their encouragement of students to ask probing questions. This finding emphasises the role of paramedic expertise in shaping student experiences. However, the study also revealed areas for improvement. Only 52.3% of felt that the verbal feedback received was insufficiently constructive for their clinical growth. This suggests a need for enhancing the feedback process to better support students' learning and growth.

Ross et al. (2015) focused on the primary clinical themes that emerged among undergraduate paramedic students after clinical rotations. The researchers employed an innovative approach by using an online discussion forum to gather insights from 116 second-year Bachelor of Emergency Health (Paramedic) students at Monash University, Melbourne. The results of this study clearly highlighted the significance of feedback in the students' learning experiences. The students expressed deep appreciation for the immediate feedback they received from paramedic instructors during their fieldwork. They emphasised that this feedback played a crucial role in enhancing their clinical skills.

A study by Boyle et al. (2008) explored various experiences that students had while completing clinical assignments in ambulances. The study surveyed 77 students and found that 93% of them felt their clinical placement in an ambulance was beneficial. Within this positive framework, several common themes emerged, including feelings of inclusion, a diversity of educational opportunities, and consistent assistance from on-road paramedics. Among areas of concern, approximately 57% of students reported experiencing unfavourable treatment by crew members, pointing to inconsistencies in the feedback environment.

O'Meara et al. (2014) examined the issues influencing the quality of paramedic student clinical placements. The study involved a conference in Bendigo, central

Victoria, with 53 participants including paramedics, educators, students, and ambulance service managers. The study identified several challenges, including a lack of standardised duration or quality standards for clinical placements in Australia, leading to inconsistent feedback. Communication and coordination problems among key stakeholders, as well as the daily rotation of students among different ambulance crews, were also identified as obstacles to effective feedback. The study emphasised the importance of consistency in placements for the development of productive instructor-student relationships and improved feedback.

O'Meara et al. (2015) conducted another pivotal study involving both nursing and paramedic students. The study incorporated 19 paramedic student participants among a total of 40 participants. The participants engaged in three simulation scenarios while their actions were recorded through eye-tracking glasses. Post-simulation, various assessment techniques were employed. Participants often demonstrated a lack of awareness regarding the medical condition presented and the surrounding patient environment. However, the introduction of "eye tracking" was positively received, with nearly all participants believing that it enhanced both feedback and learning. The study underscored the importance of feedback, with participants valuing video debriefing and areas of reflection. Eye tracking was seen to augment the video debriefing process, although a few believed that video debriefing on its own held more value than with eye tracking.

Lane (2014) examined the perspectives of eight paramedic students on the role of the paramedic educator (PEd). Semi-structured interviews were conducted to gather significant insights regarding clinical feedback. The study found that students emphasised the importance of learning through observation and felt that PEds should have strong clinical expertise. The working relationship between PEds and students was found to be intimate, making communication, especially in delivering feedback, a vital PEds skill. The study showed that students greatly appreciated both the technical and emotional support offered by PEds, especially the feedback provided in challenging situations they had faced. Interestingly, some students preferred their PEds to have a "friend-like" demeanour, although this

occasionally made accepting critical feedback more difficult. The study concluded that for optimal student engagement, PEds should possess a comprehensive understanding of the paramedic role and the students' Higher Education Institution (HEI) programme, demonstrate genuine enthusiasm and motivation for teaching, and possess superior communication skills. Additionally, addressing organisational barriers and ensuring that PEds serve as exemplary role models were identified as essential for optimising the feedback mechanism for paramedic students.

Transitioning to the United States: Filipp (2022) conducted an in-depth phenomenological exploration of the lived experiences of a small cohort of paramedic interns ($n = 7$) during their preceptorship phase. The study used surveys and in-depth interviews to reveal the central role played by structured and consistent feedback in the interns' professional and personal development trajectories. The study highlighted the necessity of consistent feedback, the efficacy of employing a variety of feedback techniques that respond to various learning styles, the importance of allocating sufficient time for comprehensive feedback, and the strategic significance of establishing clear expectations at the outset of the preceptorship programme. The study argued that holistic success required not only skill mastery but also a proactive learning mindset and the confidence to ask for assistance when necessary.

Transitioning to South Africa: In 2016, a study by Moodley (2016) explored the experiences of paramedic students during their clinical practice placements. This unpublished thesis made significant findings. Twenty students out of a total sample of 63 participated in the primary segment (Sample 1) of this study. Subsequently, a secondary segment (Sample 2) comprised 10 graduates from the primary sample. The primary methods of this investigation were focus groups and individual interviews. Multiple areas of concern were highlighted by student feedback. They often felt that the feedback they received was exceedingly negative and demotivating, which impacted their overall confidence and learning. Students were yelled at or ignored by teachers. The feedback frequently lacked a structured approach, focusing on a student's character rather than their specific clinical

actions or behaviours. The high student-to-clinical-supervisor ratio was identified as another barrier to effective feedback, with some supervisors avoiding negative feedback to preserve their rapport with the students. The study also revealed that not all healthcare personnel possessed the necessary skills to provide constructive feedback, despite their clinical proficiency.

Williams et al. (2016) conducted a comparative study, contrasting the simulation satisfaction experiences of Australian (n = 306) and Jordanian (n = 205) paramedic students. Both groups reported commendable levels of satisfaction with their simulation experiences, but differences emerged in the evolution of satisfaction over the course of study. Australian students' satisfaction levels were generally high, but as they advanced in their degree, satisfaction with "debrief and reflection" decreased, possibly due to the increasing complexity of simulations and the lack of time for in-depth debriefing. In contrast, satisfaction among Jordanian students increased, possibly due to strong student–teacher relationships.

Overall, these studies support that a common understanding feedback, in its various forms and contexts, is central to the educational experiences of paramedic students. Whether in Australia, the United States, South Africa or Jordan, the transformative force of constructive feedback is universally acknowledged. Institutions and educators must refine feedback mechanisms to be timely, consistent, constructive, and tailored to individual learning styles and requirements in order to produce the next generation of competent paramedics.

2.4.3 Paramedic students' perceptions of clinical feedback (suggestions and training needs)

Delving into the training needs and suggestions for enhancing clinical feedback. Filipp (2022) provided several recommendations for training preceptors that build on the importance of standardising and optimising feedback. These include standardising feedback training, introducing feedback toolkits, managing feedback time efficiently, and establishing clear expectations at the beginning of

preceptorships. The importance of personal growth and feedback retreats in creating a holistic learning environment is also emphasised. Training preceptors to strike a balance between positive reinforcement and constructive feedback is crucial to ensure that students receive insights into both their strengths and areas for improvement.

Ross et al. (2015) highlighted the significance of immediate feedback, noting that students greatly value direct insights from paramedic educators while actively engaged in the field. This real-time feedback allows students to make immediate adjustments and improvements to their practice. Boyle et al. (2008) also emphasised the significance of creating an inclusive learning environment, and offering more practical opportunities, especially during downtime. In this context, “downtime” refers to periods when there are no critical patients or emergency situations, allowing for a break in the demanding pace of paramedic work. Even during these quieter periods, the presence of clinical instructors is essential to ensure uninterrupted and consistent feedback throughout the students’ placements. This productive use of downtime enhances learning by providing additional opportunities for students to refine their skills and knowledge in a real-world setting without the pressure of an emergency situation.

Williams et al. (2016) pointed out the necessity of adapting feedback mechanisms to the cultural contexts of students. Effective communication and understanding of feedback are crucial in ensuring its impact. The cultivation of strong student-teacher relationships is also emphasised, as these relationships contribute to a supportive and conducive learning environment. The role of feedback in simulation-based education is also highlighted. Lane (2014) discusses the essential qualities required of PEds. A solid clinical foundation is considered indispensable for PEds to provide pertinent feedback. PEds should also prioritise communication skills training to deliver feedback that is effective, unambiguous, and encouraging.

Moodley (2016) provided a comprehensive list of recommendations, emphasising structured feedback, behaviour-centric evaluations, long-term observation using the

RIME tool, and detailed feedback in clinical workbooks. Establishing distinct learning objectives, fostering robust mentorship, and curating a conducive clinical learning environment are also highlighted as primary considerations. O'Meara et al. (2015) emphasised the importance of feedback in the development of clinical skills. Their research recommends the innovative approach of video debriefing and eye-tracking to assist students in self-reflecting on their performances, thereby augmenting clinical decision-making.

The findings collectively shed light on a pathway for enhancing clinical feedback in paramedic education. Key recommendations include standardising feedback practices, improving the learning environment with positive and constructive feedback, utilising technology for innovative feedback approaches, and customising feedback to cultural and individual learning requirements. Implementing these suggestions could greatly enhance the educational experiences of paramedic students, preparing them effectively for their future responsibilities.

2.4.4 Clinical Supervisors' perceptions of clinical feedback in EMS education

This section examined the perspectives of clinical supervisors regarding clinical feedback within paramedic education, addressing the scoping review's second question by exploring the insights and experiences that shape feedback practices.

Nilsson et al. (2023) conducted a study in Sweden to investigate the experiences of nursing students and clinical supervisors using a digitalised feedback tool for formative assessments in EMS education. The study involved individual telephone interviews with 13 supervisors. The findings revealed predominantly positive perceptions of the digitalised assessment tool (DAT). The DAT was seen as beneficial in visualising strengths, areas for improvement, and tracking progress. It also enhanced communication and transparency in assessments, making it preferable over traditional methods.

Edwards (2019) conducted research in Australia to study the capabilities of paramedics as supervisors. Interviews with 9 paramedic supervisors highlighted

their desire for feedback on their performance. The introduction of a 360° feedback system, in which both the learner and the supervisor evaluate each other, was viewed favourably. Such feedback systems were recognised as catalysts for change and growth in the supervisor role. However, a challenge identified was the absence of clear guidelines and preparedness in giving feedback to learners perceived as challenging.

O'Meara et al. (2014) conducted a study that shed light on the issues affecting the quality of paramedic student clinical placements. The lack of standardised duration or quality standards for placements hindered feedback consistency. Other challenges included students working with varying ambulance crews, leading to missed feedback opportunities. The study underscored the significance of continuity in placements for more effective feedback.

Another study conducted in Australia, O'Meara et al. (2015), aimed to understand paramedic 'instructors' views and expectations concerning clinical and field placements for paramedicine students. Interviews with 15 paramedic instructors revealed several key insights. The purpose of placements differed with the instructors' educational backgrounds. Communication challenges persisted, with many instructors uncertain about the appropriate protocols for conveying feedback to universities. A significant request was the establishment of structured feedback times after shifts, especially following critical incidents.

Carver (2016) conducted an Australian study to explore the experiences of paramedic supervisors guiding novice paramedics. Conversations with 11 qualified paramedics highlighted the central role of supervisors in enhancing novices' communication skills, particularly during patient handovers. While supervisors provided essential feedback to bolster confidence, a gap was identified in university training related to interpersonal communication. Another concern was the lack of adequate preparation and support for paramedics transitioning to supervisor roles, particularly regarding feedback delivery.

In summary, from the perspectives of clinical supervisors, several key areas for improvement in clinical feedback in paramedic education emerge. Clear communication channels, structured feedback times, consistent placements, and adequate preparation for supervisors are identified as crucial needs. The potential of digital tools in enhancing feedback was also acknowledged. Addressing these concerns can pave the way for a more cohesive and productive educational environment in paramedic training.

2.4.5 Clinical supervisors' perceptions of clinical feedback (suggestions and training needs)

Clinical feedback, as provided and interpreted by clinical supervisors, forms the foundation of meaningful paramedic education. The perspectives of clinical supervisors offer valuable insights into evaluating and refining feedback mechanisms due to their depth and complexity. This section explores the extensive perspectives of these essential stakeholders and provides suggestions and training needs based on their insights.

In the study by Nilsson et al. (2023), concerns were raised regarding the usability of the Digital Assessment Tool (DAT). While students experienced challenges with the interface, clinical supervisors highlighted a distinct issue – the allocation of time. Due to their demanding professional circumstances, supervisors require structured assessment periods. However, despite the obstacles, supervisors recognised the potential of the DAT as a central communication centre. A well executed platform of this type could expedite feedback communication among supervisors, thereby improving the quality of collective feedback.

O'Meara et al. (2015) examined the multifaceted domain of feedback delivery in depth. Their research highlights the need for a standardised comprehension of the objectives of field placements to ensure that instructors and students share the same expectations. They suggest allocating dedicated feedback times to ensure thorough and in-depth reviews. Their findings also highlight a major deficiency – the

absence of specialised training modules for preceptors on providing actionable feedback. Implementing such training modules could dramatically improve the quality of feedback. Additionally, there is a call for establishing clear communication channels to ensure collaboration between paramedic services, instructors, and educational institutions. The study also proposes post-placement feedback mechanisms as a means for sustained learning and incremental improvement.

O'Meara et al. (2014) stressed the importance of consistent standards in clinical placements. Their findings emphasise the need for clear quality metrics and standardised durations. A key insight emerges regarding the value of continuity: longer, uninterrupted clinical placements can significantly bolster the student–preceptor relationship, making feedback more meaningful. The study also champions the idea of expanding student placements to diverse healthcare settings to ensure a rich tapestry of feedback experiences.

Carver (2016) emphasised the importance of interpersonal communication skills, particularly during patient handovers. There is a critical need for preceptors to receive structured, specialised training on providing effective feedback. This feedback should be tailored to individual student requirements, ensuring it is both constructive and actionable. The study also highlights the importance of a support system for preceptors, with mentoring from seasoned educators providing valuable insights to improve the feedback process. Carver's work also emphasises the role of peer feedback in nurturing a culture of mutual respect, learning, and constant improvement.

A variety of approaches to improving clinical feedback in paramedic education is evident from these studies. Suggestions involve using technology for communication, providing structured training for supervisors, and setting clear standards and expectations for clinical placements. Building strong student–supervisor relationships and ensuring that supervisors are adequately prepared to provide constructive feedback are crucial components.

2.5 Discussion

This scoping review provides a comprehensive examination of current literature on the views of paramedicine students and clinical supervisors regarding clinical feedback. The research identified four central themes: the perceptions of paramedicine students about clinical feedback, the perceptions of paramedic clinical supervisors about clinical feedback, training needs and requirements from the students' perceptions, and training needs and requirements from the clinical supervisors' perceptions. While various aspects related to clinical feedback are mentioned in the analysed studies, none focus specifically on understanding the views of both paramedicine students and clinical supervisors specifically on clinical feedback. This highlights a significant gap in the existing literature on this subject.

This scoping review significantly enhances the understanding of clinical feedback in paramedicine, particularly in relation to the perceptions of students and supervisors. Previous research has undoubtedly contributed to this field, but with limited scope. For example, Carroll et al. (2023) shed light on the feedback experiences of undergraduate paramedic students from 2000 to 2021 but did not investigate the perceptions and challenges of clinical supervisors. Understanding the challenges faced by supervisors and their training requirements is essential for gaining a more complete picture. Hence, Carroll et al. emphasised the need for a broader investigation to fully comprehend the dynamics of feedback in this discipline.

In contrast, this review takes a holistic approach, covering a longer period from 2003 to 2023 and examining diverse clinical settings. These settings range from simulation laboratories, which provide controlled environments for skill development and feedback, to the high-stress arenas of ambulance services and hospital emergency departments. Additionally, this study incorporates the perspectives of both paramedic students and supervisors, providing a dual lens through which to understand the nuances of clinical feedback. This comprehensive approach ensures

that the findings represent a significant step forward in bridging the existing knowledge gap in this crucial area of paramedic education and practice.

While there are similarities between the findings in this review and literature from nursing. (Clynes and Raftery 2008; Wong and Shorey 2022), medicine (Veloski et al. 2006; Bing-You et al. 2017; Kornegay et al. 2017), and other healthcare disciplines (Paterson et al. 2020; Nelson et al. 2021; Rung and George 2021), it is important to recognise that drawing comparisons from other disciplines may not accurately represent the perceptions of paramedicine students and supervisors regarding clinical feedback in the unpredictable and high-stress environment of emergency ambulance services. Further investigation into the perceptions of students and clinical supervisors in emergency services will contribute to a better understanding of their learning and supervision experiences.

This review underscores the significant value that paramedicine students place on clear and objective clinical feedback. This importance is recognised not only by students but also by clinical supervisors. Clinical supervisors emphasise the need for feedback on their own performance as preceptors for self-evaluation, as noted by Edwards (2019) Such feedback allows them to identify areas for improvement and seek relevant professional development opportunities. Carver (2016) further elaborates on the significance that clinical supervisors attribute to giving feedback and its impact on student growth. Paramedic students appreciate supervisors who are encouraging, supportive, kind, and actively involve them in patient care or simulation activities. Wongtongkam and Brewster (2017) and Filipp (2022) demonstrate that students believe that feedback enhances their autonomy, refines their clinical skills, and provides a robust understanding of their clinical progression. This perspective aligns with findings from nursing literature, which similarly emphasises the positive impact of feedback on the development of students' clinical practice (Sweet and Broadbent 2017; Linton and Murdoch-Eaton 2020). Feedback during clinical practice is foundational in cultivating knowledgeable, conscientious, and clinically adept clinicians (Wells and McLoughlin 2014; Linton and Murdoch-Eaton 2020). Clearly, students across multiple disciplines, including

paramedicine, recognise clear and objective feedback as pivotal in honing their clinical skills (O'Meara et al. 2015; Ross et al. 2015; Wongtongkam and Brewster 2017).

However, not all experiences of feedback for paramedicine students are positive. This review identifies instances where feedback is personal and destructive (Moodley 2016). Inconsistencies in feedback, as highlighted by Wongtongkam and Brewster (2017), further exacerbate students' frustrations and lead to doubts about their clinical skills and judgment. Contradictory feedback from different preceptors can cause confusion and doubt. Timing also plays a role in the effectiveness of feedback, as feedback given too long after an event may be less relevant and impactful (Ross et al. 2015). Students also report encounters with clinical supervisors who lack enthusiasm, are ill-prepared, or are untrained in delivering effective feedback (Lane 2014). Feedback in these instances may be too vague or excessively critical without providing actionable points for improvement. Negative feedback may overshadow recognition of the student's correct actions (Moodley 2016), further decreasing self-esteem and motivation. Cultural nuances are sometimes overlooked in feedback, leading to misunderstandings or feelings of unfair judgment due to cultural biases (Williams et al. 2016). Additionally, a high student-to-clinical-supervisor ratio and infrastructure gaps can limit students' opportunities to document and reflect upon feedback, resulting in lost learning opportunities (Moodley 2016). These findings align with the broader literature, which emphasises the significant impact of poor and destructive feedback on student well-being, self-esteem, and confidence (Burgess et al. 2020; Imanipour et al. 2023). Boyle et al. (2008) particularly emphasise the importance of constructive and supportive feedback, highlighting the need for students to feel welcomed and included by the ambulance crew.

Fortunately, there are practical solutions to these challenges. Filipp (2022) suggests solutions such as standardised feedback training, diverse feedback tools, and specialised workshops focusing on time management and personal development. Moodley (2016) proposes structured feedback, mentorship programmes, and the

integration of feedback into the curriculum to ensure its integral role in learning. Cultural sensitivity workshops (Williams et al. 2016), training for preceptors (Lane 2014; Filipp 2022), and the use of digital platforms for documenting feedback were also emphasised. O'Meara et al. (2015) demonstrate the promise of innovative techniques such as video debriefing and eye tracking in enhancing the feedback experience.

In conclusion, feedback is a crucial tool in clinical settings, and its delivery, timeliness, and relevance are of utmost importance. A concerted effort is needed to address the challenges and enhance the feedback experience for both students and clinical supervisors. This includes appropriate training for preceptors, the implementation of innovative feedback tools, and the creation of a supportive, inclusive, and nurturing learning environment. When properly implemented, feedback transforms from a routine academic exercise into a transformative tool that guides students towards clinical excellence and ensures they feel valued, understood, and continuously supported on their professional journey. The cascading effect of this transformative feedback experience is the emergence of well-rounded, skilled, and clinically competent paramedic professionals who are prepared to make a significant contribution to their field.

Clinical supervisors in the field of paramedicine face the challenge of balancing operational demands with their responsibilities to provide clinical supervision and timely feedback to students. In the unpredictable and high-stress settings of emergency ambulance environments, feedback opportunities are often rushed and relegated to the end of shifts, limiting the opportunities for paramedicine students to engage in constructive feedback discussions and diverse clinical care scenarios. This challenge mirrors the situation in nursing and other disciplines and negatively impacts the clinical learning experiences of students (Jack et al. 2018; Rebeiro et al. 2021).

The research conducted by Nilsson et al. (2023) resonates with these sentiments, highlighting the need for designated assessment times in demanding work contexts.

Their study also introduces the concept of the DAT, a centralised hub for communication and feedback among supervisors. This innovative idea provides a promising avenue for enhancing the feedback experience and ensuring timely and effective communication between supervisors and students. In addition to being time-constrained, EMS clinical supervisors often feel ill-prepared to provide quality feedback. This concern is echoed in various studies that highlight mentors' apprehension in delivering feedback due to fear of straining their relationships with students (Clynes and Raftery 2008; Duffy 2013; Nugent et al. 2020). Identifying students who may be at risk is an emotionally taxing task that is often avoided (Hughes et al. 2016).

Edwards (2019) provides additional insights into this complex dynamic, noting that paramedics express a strong desire to receive feedback on their performance as preceptors, not only from their organisations but also from the students they mentor. This inclination towards a 360° feedback system fosters a comprehensive feedback loop among learners and preceptors. However, despite its advantages, a significant gap exists in delivering feedback, especially when dealing with difficult learners. Edwards (2019) emphasises the need for a dedicated practice education coordination role and a community of practice (CoP) for paramedic preceptors, which can enhance shared understanding and role identity.

O'Meara et al. (2014) and O'Meara et al. (2015) further amplify these insights by highlighting the diverse perspectives of vocationally trained and university-educated paramedics on field placements. They emphasise the need for clear communication channels, dedicated feedback periods, and structured training programmes for instructors to deliver effective feedback. The importance of continuity in placements is also underscored, as it fosters improved relationships between students and instructors and enriches the feedback process.

Carver (2016) underscores the pivotal role of paramedic preceptors in refining the interpersonal communication skills of novices, particularly during significant patient handovers. Preceptors play a fundamental role in building students' confidence and

clarity in communication, addressing a notable gap in university training. However, the lack of preparation and support for paramedics transitioning into preceptor roles is evident, highlighting the need for robust structures and systems to support these transitions and enhance the overall quality of clinical supervision and feedback in paramedicine education and practice.

The conclusion derived from this scoping review draws attention to a significant void in the existing body of literature on clinical feedback in paramedicine education. Specifically, there is a lack of direct examination of the perspectives of both clinical supervisors and paramedicine students. While previous studies have provided valuable insights into clinical placements, they have often overlooked the specific dynamics of clinical feedback. Instead, these studies have primarily focused on the experiences of qualified paramedics, neglecting a balanced exploration that encompasses both students and supervisors. Given the pivotal roles that both students and supervisors play in the feedback process, it is crucial to understand their respective perceptions in order to fully comprehend the clinical feedback within the EMS field (Ramani and Krackov 2012). The absence of attention to this aspect underscores the necessity for targeted research that aims to understand the interplay of perceptions between these two crucial groups, particularly in the high-pressure context of emergency services. Addressing this gap is essential for enhancing the feedback process, which is instrumental in student development, supervision quality, and ultimately, patient care outcomes. Consequently, this marks a critical step towards improving paramedicine education and practice.

2.5.1 Reflection

The process of conducting this scoping review highlighted several key reflections on the research methodology and findings. Firstly, the dual focus on both students' and supervisors' perceptions provided a comprehensive exploration of clinical feedback within paramedicine. However, the breadth of the review required careful balancing to adequately cover both perspectives within the scope of the study. This

presented challenges in managing the large volume of data and maintaining focus on specific insights, which might sometimes have diluted the depth of the analysis. Future studies might benefit from narrowing the research focus to allow for a more detailed examination of specific aspects of clinical feedback.

The use of Rayyan systematic review software was instrumental in managing the extensive list of studies. While this tool facilitated the screening process, reliance on a single researcher for initial screening introduced potential bias. To enhance the reliability of future reviews, employing multiple reviewers could ensure a more diverse and unbiased selection process.

Incorporating a quality appraisal of the included studies added rigour to the review process. However, this extended the timeline and emphasised the need to balance thoroughness with efficiency. The meticulous reading and re-reading of studies underscored the importance of accuracy but also highlighted the time-intensive nature of the process. Exploring software tools that streamline data extraction and synthesis in future reviews could help maintain accuracy while improving efficiency.

2.6 Thesis Rationale

Within the past two decades, a limited number of studies – only twelve – have specifically targeted the area of clinical feedback in the field of paramedicine. These investigations have underscored the vital importance of feedback in the development of clinical skills, the promotion of professional growth, and the enhancement of effective clinical practices among both students and supervisors. However, the comprehensive scoping review conducted as part of this research has identified significant gaps in the existing literature. In particular, there has been no study that examines the perceptions of both clinical supervisors and students on clinical feedback within EMS. This absence represents a critical gap, as understanding the perspectives of both key stakeholder groups is essential for the development of effective feedback mechanisms that address the comprehensive needs of participants in the educational process. Given that both students and

supervisors play pivotal roles in the feedback process, understanding their respective perceptions is crucial to comprehensively understand in depth feedback within paramedicine (Ramani and Krackov 2012). Furthermore, the existing studies have primarily focused on the general context of clinical placements, with clinical feedback addressed only as a secondary element. This methodological prioritisation has diluted the focus on clinical feedback, thereby limiting the depth of insight into its specific challenges, its effectiveness, and its impact on student learning and performance. Consequently, there is a clear and present need for research that specifically focuses on clinical feedback, placing it at the forefront of the study to thoroughly understand its nuances within EMS education.

Additionally, the scoping review has highlighted a notable deficiency in comprehensive analysis aimed at evaluating the effectiveness of feedback practices. Such analysis is crucial for identifying best practices, understanding the characteristics of effective feedback, and recognising the pitfalls of current feedback mechanisms. The geographical scope of the identified studies, predominantly centred in Australia with limited representation from other regions, including Saudi Arabia, raises concerns about the generalisability of the findings and underscores the necessity for research that takes into consideration the unique cultural, educational, and operational practices of Saudi Arabia (Alanazy et al. 2022).

The reviewed literature often presents the perspectives of qualified paramedics rather than focusing on the students and clinical supervisors who are actively engaged in the EMS educational process. This focus overlooks crucial insights into the educational needs, challenges, and perceptions that are fundamental to the learning and teaching dynamics within EMS programmes.

Moreover, the scoping review revealed that none of the studies examined the discrepancies between students' and supervisors' perspectives on feedback. Identifying these discrepancies is crucial for a deeper understanding of the feedback process (Ramani and Krackov 2012 ; Ajjawi and Regehr 2019). It aids in tailoring feedback to effectively meet students' educational needs, addressing the

differences in expectations between students and instructors, which can lead to more impactful and constructive feedback (Ramani and Krackov 2012; Hardavella et al. 2017) Considering these differences can enhance the learning experience, as students are more likely to engage with feedback that aligns with their expectations and learning styles. Furthermore, it encourages effective communication between students and educators, which is essential for a supportive educational environment.

Therefore, the need for this thesis is twofold: First, to fill the recognised gap in the literature by understanding the unique challenges and perceptions associated with EMS clinical feedback in Saudi Arabia. Second, to propose effective solutions that cater to the identified needs, ensuring that clinical feedback in paramedicine is constructive, relevant, and fosters the growth of medical students.

The three-phase approach (outlined in Chapter 1) addresses this oversight by:

1) Extensively exploring the perceptions of EMS students and clinical supervisors regarding clinical feedback in Saudi Arabia, thus filling a regional research gap.

2) Investigating the challenges and needs faced in the process of providing and receiving feedback, providing a clear picture of areas requiring intervention or support.

3) Proposing a strategy based on expert opinions to address the discovered EMS clinical feedback challenges and needs and to improve the clinical feedback framework within Saudi Arabian EMS institutions.

2.7 Conclusion

These studies shed light on the value that both students and supervisors placed on feedback, as well as the challenges they faced in its implementation. Feedback has been recognised as a crucial tool for refining clinical skills, promoting professional growth, and supporting effective clinical practice. However, there had been

instances where feedback had been ineffective, too vague, inconsistent, or negative. The limited number of studies conducted in this area over the span of two decades was concerning and indicated a significant knowledge gap. In contrast, preliminary searches in fields such as medical education and nursing produced a large number of studies, highlighting the underrepresentation of paramedicine in this crucial aspect of education. Additionally, the absence of research specifically from or about Saudi Arabia was noteworthy.

This review played a pivotal role in shaping the direction of the PhD thesis by providing insights into the (then) current understanding of clinical feedback in paramedicine and identified the existing gaps. Recognising the lack of knowledge in this field, particularly in culturally diverse settings such as Saudi Arabia, emphasised the importance and relevance of the research focus. This understanding informed the methodology, interventions, and assessments that would be employed in the PhD, ensuring that they were tailored to directly address these gaps.

Conducting this scoping review as a sole researcher presented certain limitations, including the potential for biases in study selection and interpretation. To reduce these concerns, clear and objective criteria were implemented for study selection. Recognising the inherent challenge of achieving perfect objectivity, especially considering that peer consultations often involve individuals with similar biases, efforts were made to broaden the review's perspective. This included checking the findings with external peers, not just for objectivity but also to introduce diverse viewpoints into the analysis and interpretation process. Furthermore, the search parameters were expanded to include regional and lesser-known publications, aiming for a more inclusive and comprehensive review.

The available studies concerning paramedicine have predominantly focused on immediate feedback needs. However, when comparing this with the literature from medical education and nursing, it became evident that these other fields had delved deeper into training requirements, curriculum integration, longitudinal feedback mechanisms, and mentorship structures. The PhD hence aims to propose a

comprehensive feedback strategy informed by best practices from these fields but contextualised to paramedicine and cultural context, taking Saudi Arabia as its case study.

This scoping review highlights the urgent need for more focused research on clinical feedback in paramedicine, especially considering its importance in shaping future paramedical professionals. The review underscores significant gaps in the literature, in terms of both quantity and regional representation. As this chapter concludes with a detailed scoping review of the feedback dynamics between EMS students and clinical supervisors, it becomes apparent that, while substantial insights have been gained, there remains a crucial need for a more precise definition and measurement of clinical feedback in the EMS educational context. This realisation sets the stage for Chapter 3, where the focus will shift to developing a comprehensive understanding of how clinical feedback can be effectively defined and measured. Next, building upon the gaps and needs identified in the current literature, Chapter 4 will aim to propose a reliable evaluation tool. This endeavour is critical for advancing the quality of clinical supervision and, by extension, the efficacy of EMS education.

Chapter 3 Defining and Measuring Clinical Feedback in EMS Education

3.1 Introduction

The importance and definition of clinical feedback in various healthcare settings, including EMS and medical education, have been extensively discussed in the literature review and scoping review in chapters one and two. Clinical feedback plays a crucial role in enhancing learning outcomes and promoting the development of essential clinical skills (van de Ridder et al. 2015). It provides students with a precise understanding which performance areas need improvement, allowing them to focus where development is required (van de Ridder et al. 2015). Studies have shown that feedback quality has a significant influence on clinical performance and skill enhancement (Al-Mously et al. 2014; Abraham and Singaram 2016). Therefore, defining and measuring clinical feedback is pivotal for improving the overall quality of medical education.

Clinical feedback definitions are needed for benchmarking educational practices and setting standards in medical education (Burgess et al. 2020). By establishing clear criteria for effective clinical feedback, educators and researchers can evaluate the quality of feedback provided to learners and identify best practices (van de Ridder et al. 2015). Such benchmarking and standardisation ensure the quality and consistency of feedback across different educational settings, ultimately improving the overall quality of medical education (van de Ridder et al. 2015).

A comprehensive understanding of clinical feedback is essential for educators to provide meaningful guidance and support to learners (Van De Ridder et al. 2008). Without a clear understanding of what constitutes effective feedback and how to measure its impact, educators may inadvertently provide feedback that is vague, inconsistent, or unhelpful, hindering the learning process and impeding the

development of critical clinical skills (Eva et al. 2012). Therefore, it is crucial to provide a clear definition and measurement of clinical feedback to ensure that both educators and learners are aligned in their educational journey, enhancing learning outcomes and facilitating the development of essential clinical skills.

3.2 Using Evaluation Data to Identify Learning Needs

Conceptual and theoretical frameworks play crucial roles in any research study, as they serve as the basis for its design, justification, and overall research development (Bordage 2009). This thesis undertook a comprehensive examination of the definition and measurement of clinical feedback within the context of EMS education. Gaining an understanding of how and why clinical feedback is defined and measured in existing literature serves as a guiding compass for the methodology of this thesis, ensuring that the investigation is not only grounded in empirical evidence but also conceptually robust and contextually relevant.

Prior research has shown that feedback to healthcare professionals, though widely used as a quality improvement strategy, exerts only inconsistent improvements to clinical performance (Brown et al. 2019). The importance of clinical feedback in EMS settings, particularly within the distinctive healthcare environment, highlights the need for an integrated theoretical framework for this thesis (Wilson et al. 2022). To meet such needs, Brown et al. (2019) developed Clinical Performance Feedback Intervention Theory (CP-FIT). This theory provided a framework for the thesis to understanding and evaluate clinical feedback within EMS. CP-FIT focuses on three types of variables that influence the effectiveness of clinical feedback: feedback variables, recipient variables, and context variables. This theory provides a multidimensional perspective through which the practices of clinical feedback can be examined and enhanced.

This chapter outlines the methods used to define and measure clinical feedback in the literature, discussing prevalent tools and techniques. It justifies the selection of surveys and interviews for data collection, ensuring that the questions and items are

deeply rooted in theoretical foundations. By weaving together these theoretical viewpoints, the chapter explores the varied aspects of clinical feedback in EMS education. It considers the specific challenges and needs from the perspectives of both clinical supervisors and students, with the ultimate goal of proposing an educational strategy that is not only grounded in empirical evidence but also enriched by theoretical insights. The focus on using evaluation data to identify learning needs, supported by a robust conceptual framework, positions this chapter as a critical component of the thesis, contributing to the broader discourse on enhancing EMS education through effective feedback mechanisms.

3.3 Clinical Performance Feedback Intervention Theory (CP-FIT).

The exploration of clinical feedback in EMS education within the distinct contexts of healthcare and education underscores the necessity for a solid theoretical foundation. Traditional feedback theories such as control theory (Carver and Scheier 1982), goal setting theory (Locke and Latham 2002), and feedback intervention theory (Kluger and DeNisi 1996), while offering valuable insights, fall short of capturing the full spectrum of feedback within healthcare settings (Brown et al. 2019) . Brown et al. (2019) criticise these theories as primarily focusing on singular aspects of feedback processes, such as behavioural regulation, goal-setting impacts, or direct feedback effects on behaviour, without addressing the comprehensive feedback loop or the unique challenges of healthcare environments.

Control theory posits that behaviour is self-regulated through a process of comparing one's current state against a standard or goal, followed by adjustments to minimise discrepancies. However, this theory does not cover the entire feedback process, particularly in relation to healthcare quality improvement, indicating its more general applicability rather than healthcare-specific use.

Goal setting theory focuses on the importance of setting specific and challenging goals to enhance performance. It underlines the motivational aspects of goal setting and how feedback is crucial in informing individuals about their progress towards

these goals. This theory could be particularly relevant to the thesis as it aligns with the idea of using feedback to motivate EMS students and improve their clinical skills. However, it might not address all aspects of feedback, such as the method of delivery, the content of feedback, and the adaptability of feedback processes during disruptions such during the COVID-19 pandemic.

Feedback intervention theory (FIT) explores how feedback influences behaviour and performance, taking into account the nature of the feedback, task characteristics, and individual differences. While FIT provides a broad framework for understanding how feedback affects performance across various domains, CP-FIT narrows these concepts down to focus on the unique aspects of clinical education and practice (Brown et al. 2019). CP-FIT can offer a more nuanced understanding of how feedback interventions can be optimised to improve clinical skills, knowledge, and professional behaviours (Brown et al. 2019).

In response to these gaps, CP-FIT was developed to provide a comprehensive and healthcare-specific framework (Brown et al. 2019). While CP-FIT not as widely known as the other theories, it is tailored specifically to clinical settings. It integrates elements of feedback intervention with the unique context of clinical performance, making it potentially the most suitable framework for this thesis. CP-FIT offers insights into how feedback mechanisms can be optimised to address the identified training needs and challenges within EMS education. It supports the exploration of feedback's role in clinical skill development, the impact of external factors such as pandemic response, and the creation of strategies to enhance feedback effectiveness.

CP-FIT identifies three critical types of variables that influence the effectiveness of feedback: feedback variables (characteristics of the feedback itself such as accuracy, timeliness, and specificity), recipient variables (characteristics of the individuals receiving feedback, including their openness to feedback, self-efficacy, and capacity for self-regulation), and context variables (aspects of the environment in which feedback is given, including organisational culture, support systems, and

the learning and improvement climate). This three-dimensional model facilitates a comprehensive understanding of the factors that contribute to the success or failure of feedback interventions in healthcare settings.

Given the focus of the thesis on identifying and resolving training needs specific to clinical supervisors and EMS students and considering the unique challenges of clinical feedback in educational settings, CP-FIT was the most appropriate theoretical framework. CP-FIT's specificity to clinical contexts allows for a nuanced exploration of feedback in EMS education, addressing the complexity of clinical skill development, the interpersonal dynamics involved in feedback processes, and the adaptability required in the face of disruptions such as the COVID-19 pandemic. This alignment makes CP-FIT an ideal choice to guide the thesis, offering a robust theoretical foundation for investigating and improving clinical feedback mechanisms in Saudi Arabia's EMS education system.

Integrating CP-FIT results in a comprehensive framework for examining clinical feedback practices in EMS education, particularly within Saudi Arabia's context. It not only justifies the methodologies employed but also lays a conceptual groundwork for understanding in depth the clinical feedback.

3.4 Utilising Clinical Feedback Evaluation Data to Identify Learning Needs

The scoping review showed that traditional evaluation methods, predominantly qualitative interviews and quantitative surveys, have been the primary tools used to study clinical feedback in EMS education. Of the 284 empirical research papers considered, only twelve specifically addressed EMS, with the remainder focusing on broader medical and health-related fields. Notably, none of them concentrated specifically on clinical feedback but rather considered multiple aspects of clinical placements, of which feedback was a crucial component.

The analysis underscored a significant gap in EMS education: while the value of clinical feedback is widely recognised, there is no consensus on effective measurement. This gap calls for a new comprehensive tool to evaluate clinical feedback across multiple dimensions, thereby improving educational practices and enhancing EMS education quality. In constructing this new measure, insights from Allen et al. (2022) prove invaluable. They critique the prevalent reliance on outcome evaluation models in health professions education (HPE), such as the Kirkpatrick Model, which primarily asks, “Did it work?” without considering the complexities of educational interventions and the processes leading to outcomes, including unintended ones. This critique is particularly relevant as it highlights the need for an evaluation tool that goes beyond merely evaluating predetermined outcomes to understand the underlying mechanisms and contextual factors influencing feedback in EMS education.

The need for a comprehensive clinical feedback evaluation tool in EMS education emerges from limitations highlighted in various studies, as feedback quality and its effectiveness remain critical yet under-examined components. EMS research from Williams et al. (2016), O’Meara et al. (2014) , Lane (2014), Moodley (2016), and Carver (2016) underscores the challenge: existing measures, often qualitative and focused on satisfaction or perceptions of clinical placements, fail to capture and focus on clinical feedback. The conceptual framework of this thesis facilitates a comprehensive examination of feedback perceptions from both supervisors and students. It aims to fill the existing gap by developing a new measure that encapsulates the four dimensions of feedback – quality, effectiveness, preferences, and interpretation—from both viewpoints.

Therefore, the CP-FIT guided the development of a multifaceted evaluation tool aimed at dissecting the quality, effectiveness, and interpretative dimensions of feedback within clinical settings. This initiative was driven by the limitations identified in prior studies where traditional measures failed to capture the intricate dynamics of feedback such as its direct impact on learning outcomes and variability in feedback delivery. These aspects will be explored in more detail in Chapter 4,

which delves into the specific methodologies and findings related to the PFQ survey.

The proposed tool, therefore, aims to offer a structured yet flexible framework that incorporates both quantitative and qualitative data to provide a comprehensive overview of feedback's influence in EMS education.

The complexity of clinical education interventions calls for a comprehensive evaluation tool that can capture a broad spectrum of influences and outcomes. The survey addresses this by evaluating the perceived understanding of different feedback types (Section 1), the effectiveness of feedback from both supervisors' and students' perspectives (Section 2), preferences for feedback delivery (Section 3), and the interpretation and use of feedback by students (Section 4). Each section is designed to uncover the intricate layering of clinical feedback, which ranges from initial reception to long-term application in clinical practise. In alignment with Allen et al. (2022) critique of traditional models, the instrument includes open-ended invitations to articulate unintended outcomes and to provide suggestions for enhancing feedback mechanisms. This component improves the evaluative process by uncovering potential areas for improvement and capturing a wider array of feedback impacts, including personal and professional growth, not typically measured by outcome-focused models.

Therefore, the decision to name the survey "Perceptions of Feedback Questionnaire (PFQ)" was careful and deliberate. The term "perceptions" was chosen to emphasise the subjective understanding, effectiveness, preferences, and interpretation of feedback based on participants' unique experiences, beliefs, and values. In this context, "feedback" refers to performance-related information received or provided by individuals or groups. The inclusion of "questionnaire" in the title signifies the structured approach taken to gather specific data, ensuring consistency in responses across all participants.

To determine respondents' attitudes or beliefs regarding feedback, the Likert scale was selected as the mechanism in the PFQ. The choice of Likert scale was influenced by its renowned clarity, which facilitates accurate responses, as supported by Simms et al. (2019). Since Likert introduced this scale in 1932, it has been widely used in various research fields. The evidence indicates that a five-point Likert scale has advantages over a binary scale because it allows for more detailed responses, enhances data accuracy, and enables a more thorough comprehension of attitudes, perceptions, and medical conditions. For example, Likert scales can capture the complexity and variability of patient symptoms, treatment effects, and psychological states more effectively than binary scales (Sullivan and Artino, 2013; Jebb et al., 2021; Norman, 2010). The consistent use of the Likert scale throughout the PFQ simplifies data comparison3.

Moreover, the Likert scale produces ordinal data, which is suitable for various statistical tests and descriptive analyses. While ordinal data has its limitations, the structure of the scale as used in this thesis allows for the expression of neutrality or indecision, thereby safeguarding the genuineness of feedback. This feature ensures that participants are not coerced into providing responses that do not genuinely reflect their opinions, as emphasised by Carifio and Perla (2008). Additionally, the equal distribution of positive and negative choices on the five-point scale aligns with Zhang and Savalei's (2016) suggestion that balanced choices can minimise response bias by providing respondents with an unbiased platform to share their perspectives.

Through the PFQ and the CP-FIT, this thesis advocates for a shift towards evaluation methodologies that not only measure feedback effectiveness but also illuminate the specific learning needs of EMS students. By identifying these needs, educators can tailor feedback to support student growth, addressing gaps in knowledge and skills with targeted, meaningful interventions. This focus on identifying learning needs through evaluation data represents a critical advancement in the ongoing effort to optimise clinical feedback and, by extension, EMS education quality.

3.5 Identifying Learning Needs Through Discrepancies and Challenges

The identification of discrepancies between the perspectives of students and supervisors on feedback is crucial for a deep understanding of the feedback mechanism within educational frameworks. This thesis harnesses the core principles of foundational learning theories, notably Vygotsky's concept of the Zone of Proximal Development (ZPD), to address and bridge these gaps. In Chapter 1, the significance of such theories to EMS education was underscored, laying down a theoretical scaffold for scrutinising feedback dynamics (Vygotsky 1978).

The gap between clinical supervisors' delivery of feedback and students' reception highlights a significant barrier within EMS education, akin to navigating outside the ZPD, where feedback is most effective as it falls within the learner's capacity to advance with appropriate scaffolding (Vygotsky 1978). Supervisors often perceive their feedback as clear and actionable yet, from students' perspectives, it may appear confusing or irrelevant, indicating a misalignment that hampers effective learning (Ramani and Krackov 2012; Ajjawi and Regehr 2019).

This misalignment can be understood as a failure to adequately scaffold learning experiences within the ZPD, emphasising the need for feedback that is not only tailored to students' immediate learning needs but also cognisant of the broader educational context . Moreover, the variability in feedback approaches across EMS educational settings complicates this issue, leading to inconsistencies in feedback quality and its impact on skill acquisition (O'Meara et al. 2014a; Williams et al. 2016). Timing and delivery manner also present significant challenges. The high-pressure nature of EMS work necessitates immediate, clear, and supportive feedback to ensure that learning opportunities are not missed and to foster a positive educational environment. However, achieving this ideal is often complicated by operational constraints and the need for feedback to be both

respectful and constructive (Clynes and Raftery 2008; Morrison et al. 2017; Wilson et al. 2022).

By understanding feedback through these lenses, this thesis aims to bridge the gap between theory and practice, advocating for strategies that cater to the nuanced needs of both learners and educators. This approach not only has the potential to improve the quality of clinical feedback but also contributes to the development of a more effective and responsive EMS education system by identifying and addressing learning needs via the examination of feedback discrepancies.

To address the identified discrepancies and challenges in clinical feedback within EMS education, a comprehensive educational strategy is proposed. ”Educational strategy”, in clinical settings, can be construed as a meticulously planned approach or framework for facilitating learning and education for healthcare professionals (Vanka and Hovaguimian 2019). This strategy includes developing and using precise methods, techniques, and resources to improve the knowledge, skills, and attitudes of healthcare professionals in order to enhance their performance (Vanka and Hovaguimian 2019). The strategy’s content may encompass theoretical concepts, practical skills, and pertinent information that pertains to the specific clinical context.

The proposed educational strategy offers a holistic approach to addressing the challenges and discrepancies identified in clinical feedback within EMS education, integrating theoretical insights with practical interventions to enhance the quality and effectiveness of feedback. CP-FIT focuses both on feedback delivery and also on the training needs of clinical supervisors and the development of guidelines for effective feedback.

3.6 Research strategy

This thesis employs a strategic research approach grounded in the Clinical Performance Feedback Intervention Theory (CP-FIT), integrating online surveys,

semi-structured interviews, and the Delphi technique to explore clinical feedback within EMS education. By deploying the Perceptions of Feedback Questionnaire (PFQ) across students and clinical supervisors, it evaluates feedback effectiveness and identifies perceptual discrepancies. Semi-structured interviews further uncover specific learning needs and challenges, offering deep qualitative insights. Finally, the Delphi technique refines these findings into actionable strategies, facilitating consensus among experts to address the identified learning needs. This multi-method strategy ensures a robust investigation that spans quantitative evaluation, qualitative exploration, and collaborative solution-finding, all underpinned by the CP-FIT framework to enhance the feedback process in clinical education settings. Below is an elaboration on how each component of the research strategy aligns with CP-FIT and contributes to the overarching aim of enhancing clinical feedback.

3.6.1 PFQ Survey

The PFQ (Perceptions of Feedback Questionnaire) is designed to evaluate the effectiveness of clinical feedback and identify perceptual discrepancies between clinical supervisors and students. This instrument addresses the CP-FIT dimensions as shown below. By evaluating these aspects, the survey provides a broad understanding of feedback's current state within EMS education, highlighting areas where expectations might not align.

Feedback variables

In addressing feedback variables, the research instruments were designed to capture the nature, timing, source, and mode of feedback provided in clinical settings. Question statements such as "When a clinical supervisor gives me a completed rubric, I understand what I am doing in performing medical skills in clinical settings" aimed to uncover the specificity and relevance of feedback content. Additionally, statements on preferences for feedback delivery methods, for instance, "I prefer to receive feedback orally", acknowledged the importance of the feedback mode in influencing student engagement and comprehension.

Recipient variables

The recipient variables were central to this study: the instruments aim to capture the perceptions and characteristics of feedback recipients. The survey initiated this exploration by asking students to self-assess their performance level, facilitating an understanding of self-efficacy and its potential impact on feedback reception and use. Further questions statements about students' actions following feedback reception, such as "After reading or listening to the clinical supervisor I try to identify and correct my errors in performing clinical medical skills", delved into their goal orientation and strategies for implementing feedback, providing insights into the recipient's active role in the feedback process.

Context variables

Contextual factors, while not directly questioned, were inferred throughout the survey and interviews. By exploring students' perceptions of feedback effectiveness, delivery preferences, and suggestions for improvement, the instruments implicitly addressed the educational environment, institutional culture, and the dynamics of the supervisor–student relationship. These contextual variables were recognised for their significant influence on the feedback experience and its outcomes. The open-ended suggestions and recommendations section allowed for the capture of nuanced views on the feedback culture and relational dynamics between students and supervisors, thus providing insights into the contextual backdrop against which feedback was given and received.

Online survey

The survey targeted multiple EMS institutions in Saudi Arabia. Given Saudi Arabia's vastness with its EMS institutions widely spread, an online survey was much more practicable than distribution of hard copy or face-to-face administration. This approach was not only logistically more manageable but also cost-effective, considering the financial, time, and environmental costs associated with travel.

Online delivery overcomes these geographical challenges. Furthermore, it increases accessibility for participants who might otherwise be disinclined due to distance or time constraints.

The choice to use online surveys is particularly suited to the unique requirements of EMS education. Supervisors and students in this field are not only geographically dispersed but also often operate on different time cycles. Thus, to navigate these logistical challenges, a combination of online surveys and semi-structured interviews was adopted. Surveys offered flexibility for participants, increasing the likelihood of a higher response rate. While the emphasis was on collecting qualitative insights through semi-structured interviews, the online surveys provided a wider quantitative perspective. This combination ensured that the data collection would be both comprehensive and broad.

In addition to the practical advantages of online surveys, there are also methodological reasons to use them. Online surveys offer anonymity to participants, which can encourage honest and candid responses. This is particularly important when collecting data on sensitive topics such as feedback in clinical settings. Participants may be more willing to provide honest disclosures when they are not required to disclose their identities. Furthermore, online surveys allow for standardised data collection, ensuring consistency in the responses obtained. This is important for the reliability and validity of the data collected.

It is important, of course, to acknowledge the limitations of online surveys. One limitation is the potential for self-selection bias. Participants who choose to respond to an online survey may have different characteristics or opinions compared to those who choose not to participate. To mitigate this limitation, efforts were made to broaden the sample's diversity by targeting multiple EMS institutions in Saudi Arabia. Additionally, supplementing the survey with semi-structured interviews helps to provide a more comprehensive understanding of the topic and mitigate the potential bias of online surveys.

The Perceptions of Feedback Questionnaire (PFQ) items

The Perceptions of Feedback Questionnaire (PFQ) used in this thesis comprises 28 statements with Likert-scale responses. Respondents rated their agreement with each statement, ranging from 1 ("strongly disagree") to 5 ("strongly agree"), to express their perceptions of clinical feedback within the EMS education context. This instrument's development was grounded in an extensive literature review to ensure its comprehensiveness and relevance to health science education, drawing on Jensen et al. (2012), Murdoch-Eaton and Sargeant (2012) Jothi and Yusoff (2015), Abraham and Singaram (2016), Carver (2016). While the core content of the questionnaire remained consistent across demographics, slight modifications in phrasing accommodated the distinct viewpoints of clinical supervisors and students.

The PFQ comprises four sections:

Section one: Perceptions of clinical feedback understanding (PFU). This section is foundational to the Performance Feedback Questionnaire (PFQ) and is meticulously crafted to delve into the nuances of clinical feedback understanding from the dual perspectives of students and clinical supervisors. Understanding feedback is pivotal as it directly influences its reception, interpretation, and subsequent application in enhancing clinical skills and performance. Prior research underscores the profound effect that comprehending feedback has on clinical outcomes, skill acquisition, and the educational trajectory of students in medical fields (Al-Mously et al. 2014; Abraham and Singaram 2016). This section aimed to understanding the perceived quality and clarity of different feedback types, directly addressing the feedback variable by exploring content and comprehension.

Section two: Perceptions of clinical feedback effectiveness (PFE). This section revolves around the extent to which feedback brings about desired changes in learners' knowledge, skills, or attitudes. Effective feedback should ideally close the gap between current performance and desired performance (Sadler 1989). In other

words, feedback should provide learners with specific guidance on how to improve their performance and bridge the gap between their current level of understanding and the desired level of understanding. This section is tailored to gauge expectations regarding feedback effectiveness. It aims to align instructors' feedback with participants' anticipations, thereby nurturing a more constructive learning environment and bolstering skill development (Murdoch-Eaton and Sargeant 2012; Jothi and Yusoff 2015). Feedback effectiveness, from the participants' perspectives, is gauged by assessing their agreement and satisfaction with the feedback received.

Section Three: Perceptions of clinical feedback preferences (PFP). This section pertains to the methods, timing, and sources of feedback that learners find most appealing or useful. Understanding these preferences can help educators to tailor feedback approaches to individual or group needs, thus optimising the learning experience (Eva et al. 2012). For example, some learners may prefer immediate feedback, while others may prefer delayed feedback. By considering learners' preferences, educators can provide feedback in a way that is most effective and meaningful for each individual. This segment explores preferences regarding various feedback delivery systems, intending to further align feedback with participants' expectations to encourage enhanced learning and skill development (Murdoch-Eaton and Sargeant 2012; Jothi and Yusoff 2015). This section explored participants' preferences about feedback delivery systems through a critical examination of feedback and context variables that acknowledges diverse learning styles and environmental constraints.

Section Four: Perceptions of clinical feedback Interpretations (PFI). This section concerns how learners decipher, internalise, or make sense of the feedback they receive. Feedback that is misunderstood or misinterpreted might not produce the intended educational outcomes. Exploring interpretations helps educators ensure their feedback is being received as intended and offers insight into potential areas of communication improvement (Bing-You and Trowbridge 2009). Upon

understanding how learners interpret feedback, educators can provide clarification or additional support to ensure that the feedback is understood and applied correctly. The final section evaluates the practical application and utility of feedback in augmenting clinical knowledge and skills (Jensen et al. 2012).

Each section of the questionnaire was designed to provide an in-depth understanding and evaluation of diverse facets of clinical feedback, facilitating a comprehensive and robust approach to enhancing feedback quality within clinical education. An open-ended question was included to allow participants to suggest any other improvements in feedback that they would like that had not been covered by the questionnaire; both the students' and clinical supervisors' surveys included an open-ended invitation to share personal experiences of clinical feedback.

Including these open-ended questions for both students and clinical supervisors facilitates the discovery of unforeseen feedback dynamics, a key aspect emphasised by Allen et al. (2022).

Clinical supervisors' open-ended question: If you could make recommendations to your students about what to do with the feedback, what would you tell them?

Students' open-ended question: If you could make one suggestion to your supervisor about how to give you clinical feedback on your performance, what would it be?

The design of these research instruments aims to provide a nuanced understanding of clinical performance feedback in EMS education. Aligning the instrument design with the CP-FIT framework positions the research to uncover the complex interplay between feedback content, recipient dynamics, and contextual influences.

3.6.2 Semi-structured interviews

Semi-structured interviews have been widely employed in various studies on clinical feedback (Lane 2014; O'Meara et al. 2015; Eaton-Williams et al. 2020; Wilson et al.

2022), including quantitative research (Boyle et al. 2008; Williams et al. 2016) and evaluative studies on feedback tools, such as those by Brown et al. (2019). While these methods facilitated scalable data collection, their depth was limited, potentially failing to capture the nuanced experiences and perceptions of individuals. The literature highlighted a need for more qualitative insights that delve into the subtleties and complexities of the feedback process from both educators' and students' perspectives (Lane 2014; Burgess and Mellis 2015). Semi-structured interviews have thus proved particularly adept at uncovering the rich, descriptive experiences of participants (Carless and Boud 2018). These interviews allowed for a deeper exploration of participants' feelings, opinions, and experiences beyond what structured interviews or surveys could offer. This approach not only addressed the gap in understanding the reasoning behind the effectiveness or ineffectiveness of feedback, and its emotional and professional impact on students and educators but also delved deeper into focusing on identifying specific learning needs, challenges, and the intricacies of individual experiences.

Qualitative inquiries into student perceptions of clinical placements, such as those by O'Meara et al. (2014), underscored the value of in-depth, narrative data. This data revealed the complexity of student experiences and learning, which might not be fully captured through closed-ended questionnaires. Moreover, semi-structured interviews could address specific areas where the literature suggested a lack of understanding, such as the individual tailoring of feedback (Van De Ridder et al. 2008), and how students and supervisors actually engaged with and perceived feedback in situ. By directly asking participants to list three words associated with good and bad feedback, researchers gained immediate insight into the core values and emotional reactions tied to feedback experiences.

Not only was the PFQ rooted in the Clinical Performance Feedback Intervention Theory (CP-FIT), but so was the semi-structured interview for EMS students and clinical supervisors. The interview questions crafted for this study were guided by the CP-FIT framework to ensure a robust approach to exploring the perceptions,

challenges, and needs related to clinical feedback among EMS students and their clinical supervisors.

Feedback variables

Feedback variables pertained to the nature, quality, and delivery method of feedback. Questions such as “What kind of feedback do you think is useful and why?” and “What do you think are the key elements of good feedback?” directly targeted these variables, drawing from literature that emphasised the value of constructive feedback in clinical learning environments (Ende 1983; van de Ridder et al. 2015). Supervisors were able to articulate their understanding of feedback usefulness, vital for tailoring educational interventions that resonate with clinical educators’ values and perceived needs. These questions explored supervisors’ expectations of the utility of their feedback in the student learning processes. The inquiry about the key elements of good feedback drew upon Nicol and Macfarlane-Dick (2006) principles of good feedback practice, emphasising the importance of helping students to self-correct. This question identified components of feedback that supervisors believed most strongly supported student learning, contributing to the development of an effective feedback framework. The request for supervisors to list words they associate with good and bad clinical feedback was informed by conceptual work on the characteristics of effective feedback in education Ramani and Krackov (2012).

Recipient variables

Recipient variables considered the characteristics of the feedback recipient, including their needs, preferences, and reactions to feedback. Questions targeting this domain included “Do you find certain groups or types of students where feedback is more useful and, if so, how do you determine what type of feedback to provide a particular student?” and “How did you feel when you received the feedback you received from the clinical supervisor about your work?” The question

“What was the hardest part of giving students feedback?” acknowledged the inherent challenges in delivering feedback, despite its recognised importance (Bing-You et al. 1997). This question delved into these challenges, affording supervisors the opportunity to reflect on their personal experiences against the broader backdrop of what the literature reports. Exploring experiences with students who initiated feedback conversations aligned with research suggesting that learner engagement could significantly enhance the feedback process (Watling et al. 2012). By examining supervisors’ experiences with proactive students, insights into how student initiation impacted the feedback dialogue and subsequent learning were anticipated. These inquiries aim to understand how individual differences among students affect their reception and use of feedback, a core consideration of the CP-FIT. Additionally, exploring the experiences of students who initiate conversations about their feedback sheds light on the proactive behaviours that can influence the feedback process.

Context variables

Context variables focus on the environment in which feedback is given and received, including the cultural, institutional, and situational factors that may affect the feedback process. Although the interview schedule did not explicitly mention context variables, the open-endedness of questions like “Are there any other points you would like to add?” allowed respondents to bring up any contextual factors that they considered relevant to the feedback experience. Moreover, the emphasis on confidentiality and the explanation of the purpose of the study at the beginning of the interview were designed to create a safe space for honest and open discussions, indirectly addressing the context in which feedback was provided and received.

In conclusion, the semi-structured interviews for EMS students and clinical supervisors were designed with the CP-FIT framework in mind, ensuring a comprehensive exploration of the multifaceted nature of clinical feedback. By

addressing feedback, recipient, and context variables, the study aims to uncover the nuanced perceptions, challenges, and needs associated with clinical feedback in EMS education, providing a solid foundation for identifying areas requiring intervention or support. This thoughtful alignment with CP-FIT not only enhances the validity of the study but also contributes to a deeper understanding of how to optimise clinical feedback processes for the benefit of EMS students and their educators.

3.6.3 Delphi Method

Following the identification of learning needs and challenges, the Delphi method was used to achieve consensus among experts on how these needs should be addressed (Diamond et al. 2014). This iterative process involves a series of rounds where feedback is given by a panel of experts, refined, and re-evaluated until a common solution is reached. The Delphi method serves as a strategic and forward-looking aspect of the research, concentrating on identifying solutions and improvements. It is in line with the CP-FIT dimensions by focusing on:

Feedback variables. This includes identifying previously recognised challenges and needs related to clinical feedback. The goal is to achieve consensus on training needs to address these challenges and needs effectively.

Recipient variables. This involves determining the training needs required to align expectations and address any discrepancies that may exist.

Context variables. This focuses on reaching agreement on who is responsible for implementing and addressing the training needs that arise from the discovered challenges and needs. It involves considering the roles and responsibilities of individuals or groups within the organisation to ensure effective training and resolution of identified issues.

3.7 Importance of Examining Perceptions of Both Clinical Supervisors and Students

Exploring the perceptions of both clinical supervisors and students is crucial to capturing the full spectrum of feedback dynamics, from its delivery to its reception and subsequent impact on learning and performance. A comprehensive understanding of these perspectives, as emphasised by CP-FIT, underscores the critical roles of feedback, recipient, and context variables in the feedback process, suggesting that a comprehensive examination of these factors as perceived by both givers and receivers of feedback was essential for optimising learning and performance outcomes.

O'Meara et al. (2014) and Moodley (2016) indicate the necessity of including both students' and clinical supervisors' views of the clinical placement and feedback system. Omitting the educators' perspectives in previous research has necessitated a conversation that encompasses inputs from both clinical supervisors and students.

Building upon this premise, the thesis proposes a relational and interactive view of feedback, emphasising that its quality can only be fully understood through a balanced methodology that captures the bidirectional nature of feedback. By considering both the intentions of the feedback givers (educators) and the interpretations of the feedback receivers (students), the thesis seeks to identify the strengths and weaknesses within the EMS education feedback loop.

Including multiple perspectives aligns with recommendations by Van De Ridder et al. (2008), Burgess and Mellis (2015) , and Carless and Boud (2018), who advocate for a collaborative process that involves active participation from both parties to enhance the generalisability and applicability of findings to wider educational settings.

In conclusion, examining the perceptions of both clinical supervisors and students through CP-FIT offers a comprehensive strategy to enhance the effectiveness of clinical feedback in EMS education.

3.8 Conclusion

This chapter examined the concept and assessment of clinical feedback within the EMS context. It has justified the research methods employed in this thesis, such as surveys and interviews, by explaining their importance to the evaluation of clinical feedback. The rationales behind the survey questions and interview schedules have been defined. Further, this section has delved into the complexities of defining and measuring clinical feedback in the realm of EMS education, introducing the Clinical Performance Feedback Intervention Theory (CP-FIT) as a pivotal framework for understanding and evaluating clinical feedback. It has critiqued the inadequacies of conventional feedback theories while advocating for a healthcare-centric framework such as CP-FIT, emphasising the need to appraise the efficacy and quality of clinical feedback and suggesting the creation of an all-encompassing evaluation instrument.

CP-FIT is an ideal foundational theory for the thesis because it offers a multi-faceted understanding of feedback in clinical education, encompassing the characteristics of feedback and its recipients, the influence of contextual factors, and the processes of feedback reception, interpretation, and action. This comprehensive approach aligned with the thesis's aims, enabling a deep exploration of perceptions, the identification of perceptual differences, and the development of strategies to address feedback challenges in the specific context of Saudi EMS education.

The chapter has highlighted the significance of amalgamating both quantitative and qualitative methods through the PFQ and semi-structured interviews, respectively. This combination promotes a comprehensive understanding and captures the nuances of clinical feedback. For EMS educators, understanding these aspects is

vital. The PFQ, noted for its focus on the understanding, effectiveness, preferences, and interpretations of feedback, emerges as a comprehensive instrument for evaluating the perceptions of both clinical supervisors and students regarding clinical feedback.

The next chapter will address the study outcomes, particularly scrutinising the measurement tools and methods used in this thesis. The reliability and validity of these instruments will be evaluated through preliminary testing, correlation analyses, and the computation of Cronbach's α and Confirmatory Factor Analysis (CFA), to ascertain the dependability of the instruments and the clarity of the interview questions.

This chapter's discussion on defining and measuring clinical feedback in EMS education grounds a significant shift in focus. The next chapter transitions from the theoretical underpinnings to an empirical exploration of the real-world experiences and perceptions of clinical feedback within the context of Saudi Arabia EMS education. Following that, Chapter 4, an "Examination of the Experiences and Perceptions of Clinical Feedback in Emergency Medical Services Education in Saudi Arabia", will introduce a mixed-methods investigation aimed at exploring the differing perceptions of feedback among students and clinical supervisors, with the objective of narrowing the divide between theoretical frameworks and practical application. The insights from this investigation will not only validate the concepts and frameworks discussed in Chapter 4 but will also shed light on the practical implications and efficacy of clinical feedback in the EMS educational landscape.

Chapter 4 A Mixed-Methods Examination of the Experiences and Perceptions of Clinical Feedback in Emergency Medical Services Education in Saudi Arabia

4.1 Abstract

Background: This research phase, forming an essential part of the thesis, explored clinical feedback within Emergency Medical Services (EMS) training at a college in Saudi Arabia. The study aimed to compare the perceptions of students and their clinical supervisors regarding clinical feedback. This study adheres to the Good Reporting of a Mixed Methods Study (GRAMMS) framework (O'Cathain et al, 2008) to ensure comprehensive and transparent reporting of mixed methods research. The framework provides detailed guidance on justifying, designing, implementing, and reporting mixed methods studies.

Methods: This was achieved using a mixed-methods approach that involved a questionnaire completed by 102 participants and 24 semi-structured interviews (13 students and 11 clinical supervisors). 72 male students from first to fourth (final) study year and 30 clinical supervisors from the College of EMS at King Saud University completed the Perception of Feedback Questionnaire (PFQ), which was carefully evaluated for validity and reliability using factor analysis. The questionnaire comprised four parts designed, respectively, to examine participants' perceptions of clinical feedback regarding (1) their understanding of the concept, (2) perceptions of efficacy, (3) their preferences of clinical feedback delivery, and (4) the way clinical feedback is interpreted.

Findings: The findings from the survey revealed several important insights. In terms of the perceived understanding of feedback, there was a notable difference

between students and supervisors. Supervisors reported a mean rank of 60.22, indicating a greater confidence in their feedback being understood than felt by students, who reported a lower mean rank of 47.87. This significant difference (Mann–Whitney $U = 1341.50$, $p = 0.019$) suggests a potential disconnect in how feedback is conveyed and comprehended between the two groups.

Regarding the perception of clinical feedback effectiveness, the results indicated a difference in understanding its importance. The students' mean rank was 54.40, while the supervisors' mean rank was lower at 44.53 ($U = 871.00$, $p = 0.099$). Although not statistically significant, this finding indicates a divergence in perceptions about the effectiveness of feedback between the two groups. The study also highlighted diverse preferences for different types of feedback, including handwritten, digital, oral, and multimedia formats. This diversity reflects the complex nature of feedback delivery and reception within the EMS training context. Additionally, for the perception of feedback preference, there was a statistically insignificant difference in perceptions between students and supervisors (students' mean rank 48.26, supervisors' mean rank 59.28; $U = 1313.50$, $p = 0.063$). Finally, there was no significant difference in perceptions regarding feedback interpretations between students and supervisors (students' mean rank 50.35, supervisors' mean rank 54.25; $U = 1162.50$, $p = 0.479$).

Thematic analysis of the interviews unearthed key themes related to the nature, delivery, perceptions, and impact of feedback. These themes included the challenges of providing feedback, the clarity and context of feedback delivery, and the emotional and behavioural responses it elicited. A noticeable divergence was observed in perceptions of feedback engagement and interpretation between supervisors and students, with supervisors expressing uncertainty about students' engagement with the feedback.

Conclusion: This phase made a significant contribution to the broader narrative of the thesis. It provided empirical evidence on the perceptions and experiences of clinical feedback in EMS education, reinforcing the theoretical foundations laid out

in earlier chapters. Moreover, it offers new insights into the complexities of clinical feedback within this specific educational context. The findings from this research was instrumental in informing the development of the research protocol for subsequent phases of the thesis, which focused on examining the quality and effectiveness of clinical feedback in EMS training programmes in Saudi Arabia. Importantly, this study's findings highlighted critical educational needs and propose strategies for enhancing feedback within Saudi EMS education. These insights are vital for developing more effective training methods and improving the overall quality of EMS education in Saudi Arabia, ensuring that students and supervisors are better equipped to engage in meaningful and effective feedback processes.

4.2 Introduction

Clinical feedback is an crucial component of the clinical teaching-learning process, often equated with immediate debriefings that identify and resolve learners' knowledge and skill gaps (Fanning and Gaba 2007; Rudolph et al. 2008; Raemer et al. 2011). In conventional EMS education, paramedic students receive prompt formative feedback from clinical supervisors (Van den Bossche et al. 2010), which is crucial for their knowledge development and practical skills learning (Bleijenberg et al. 2017). This feedback process not only informs students of their progress but also highlights areas for improvement and motivates engagement in learning activities (Burgess et al. 2020)

While the relevance of concise, adequate, and timely feedback is well-recognised in clinical settings (Cushing et al. 2011; Papastavrou et al. 2016; Woo and Li 2020), there are significant challenges to address in clinical feedback delivery. These challenges include transparency issues, provision of inappropriate data, lack of attention to performance-influencing factors, and feedback provider problems (Branch Jr and Paranjape 2002; Groves et al. 2015; Jamshidian et al. 2019; Burgess et al. 2020). Furthermore, communication incongruences between feedback givers and receivers exacerbate dissatisfaction (Carless 2006; Murdoch-Eaton and

Sargeant 2012; Barnett and Molzon 2014; Jamshidian et al. 2019), potentially compromising student learning and patient safety.

4.3 Study Rationale

Despite extensive exploration of feedback efficacy and satisfaction in nursing and medical education (Cushing et al. 2011; Al-Haqwi et al. 2012; Giles et al. 2014; Douglas et al. 2016; Papastavrou et al. 2016; Woo and Li 2020), there is a dearth of literature on feedback in EMS education specifically. This gap is especially pronounced in the Saudi Arabia higher education landscape, which has historically lagged in health science and clinical education research (Alharbi 2016).

The comprehensive research synthesis, presented in the earlier chapters of this thesis, identified a significant gap in literature on clinical feedback among EMS students. While there is extensive research on clinical feedback in healthcare education more broadly, little of that has focused on its role in EMS student training. This thesis, therefore, aims to investigate the experiences and perceptions of clinical feedback from the perspectives of both clinical supervisors and students across EMS colleges in Saudi Arabia.

The aim of this study was to explore the perceptions of clinical feedback within the context of EMS education in Saudi Arabia. Central to this exploration was the Perception of Feedback Questionnaire (PFQ), designed to gauge various dimensions of feedback including understanding, effectiveness, preferences, and interpretation from both students and clinical supervisors. By capturing these diverse aspects, the study aimed to provide an understanding of how clinical feedback is delivered in Saudi Arabia's EMS context. Recognising the pivotal role of clinical feedback in EMS training, as highlighted in previous research, this study sought to uncover insights that would enhance the understanding and application of clinical feedback within this specific educational and cultural context.

This study was the first phase of the PhD and served as a foundation for refining subsequent phases to be conducted in other institutions. The aims of the study were to:

a) Determine the clinical supervisors' perceptions and approaches when providing clinical feedback to EMS students.

b) Compare the perceptions of students and clinical supervisors regarding clinical feedback and identify components of both effective and ineffective feedback.

c) Identify challenges and learning needs associated with clinical feedback.

4.4 Methodology

4.4.1 Research design

In alignment with the complexities and nuanced understandings of clinical feedback in EMS education, a mixed-methods design was adopted. This approach, recommended by (Wisdom and Creswell 2013), ensures a holistic and grounded exploration of participants' experiences. The quantitative element of the study comprised a survey to examine, test, and validate the findings regarding clinical feedback (Creswell et al. 2007; Morgan 2018). It provided a statistical evaluation of numerical data, confirming how the research constructs were operationalised (Willig and Rogers 2017) . However, relying solely on quantitative methods would not fully capture the complexity of clinical feedback in EMS education.

Participants completed a survey to assess their perceptions and experiences of clinical feedback. This phase was crucial for validating the survey and for quantifying the effectiveness and impact of clinical feedback.

The qualitative phase, comprising semi-structured interviews, aimed to delve into the deeper layers of their experiences, expectations, and perceptions of what

constitutes effective or ineffective clinical feedback. This qualitative phase, informed by the insights from the quantitative survey, sought to unearth rich, narrative data, providing a deeper understanding of the nuances in clinical feedback processes. The mixed-methods approach aligns with Cook et al. (2002), who emphasise the importance of validating research constructs through quantitative methods, and for exploring the deeper meanings behind participant experiences (Creswell and Poth 2016). To ensure comprehensive and transparent reporting, this study adheres to the GRAMMS framework (O'Cathain et al. 2008), as detailed in the checklist provided in Appendix 4.01. This methodology was particularly suitable for exploring human behaviour and gathering data on less tangible variables. The qualitative phase, thus, complemented the quantitative findings, providing a comprehensive understanding of the clinical feedback in the EMS education setting.

4.4.2 Population and sample size

A total of 72 male EMS students, in their first to fourth years, and 30 clinical supervisors from the College of EMS, King Saud University, completed the PFQ. This sample (72 plus 30) was considered an acceptable size for a quantitative case study (Stake, 2010).

4.4.3 Materials

Survey development

Given the limitations in existing instruments for evaluating clinical feedback perceptions in EMS education, a more encompassing tool is needed. This need aligns with the insights gathered in Chapter 3, which highlighted the complexity and multifaceted nature of clinical feedback in EMS education. To address these limitations, the PFQ was developed, integrating multiple domains of feedback that existing tools often overlook or inadequately cover. This new scale, comprising three phases – item development, scale development, and scale evaluation as outlined by Hinkin (1995, cited in Boateng et al. 2018) – was designed to provide a

comprehensive understanding of clinical feedback perceptions in EMS education. The item development phase involved creating the initial set of questions, focusing on the identification of relevant domains and ensuring content validity. This was followed by the scale development phase, where the items were refined through pre-testing, sampling, item reduction, and extraction of latent factors. Finally, the scale evaluation phase encompassed tests of dimensionality, reliability, and validity, ensuring that the PFQ is a robust tool for its intended purpose. Each of these phases was critical in creating a comprehensive, reliable, and valid instrument, catering to the complexities of clinical feedback in EMS education.

Step 1: identification of the domain(s) and item generation

The initial step in creating the PFQ involved identifying relevant domains to ensure the comprehensive encapsulation of all facets of clinical feedback. This process was informed by the gaps identified in Chapter 2, which explored the nuances and complexities of clinical feedback in EMS education through a scoping review. Four critical dimensions were identified: quality, expectation, preferences, and interpretation. These dimensions were selected to capture the essence of clinical feedback in EMS education.

Both deductive and inductive processes (Boateng et al. 2018) were applied to generate PFQ items.

The deductive method, or “logical partitioning” is based on the description of the relevant domain and the identification of items through literature review and assessment of existing scales (Hunt 1991; Hinkin 1995; Raykov and Marcoulides 2011). Based on theoretical frameworks and findings from the literature review, items were deductively generated. This approach ensured that each item was firmly rooted in established academic constructs and theories relevant to feedback in clinical education (Clark and Watson 2016). Concurrently, the inductive method, or “grouping”, involved generating items from the responses of individuals (Hunt 1991; Hinkin 1995). This method was adopted to capture the nuanced and lived

experiences of EMS experts. In-depth cognitive interviews with three EMS experts, who played dual roles in research and clinical supervision, were conducted using interview guides. The data from these interviews were thematically analysed, with the results informing the identification of items to be added, 2 items for example in section 3 of the survey "Clinical feedback preferences" it was suggested to add, *"I prefer to receive comments on my performance in clinical settings through audio or video recordings."* as the clinical supervisors are planning to continue provide feedback online in some clinical situations. One person also suggested adding an item to the survey to gauge expectations and the effectiveness of feedback: "*When a clinical supervisor reports my mistakes, I understand what I am doing in performing medical skills in clinical settings.".* This suggestion sparked curiosity among other experts, who concurred with its inclusion. Following this consensus, no further interviews were conducted, as the responses had reached saturation. Additionally, the interviews contributed to the development and revision of answer choices in the survey. This inductive method proved essential for capturing the lived experiences and subtleties of the feedback process as experienced in real-world clinical settings.

This integration of deductive and inductive insights led to the development of a questionnaire that captures a holistic view of clinical feedback. In the end, the PFQ comprised 28 items, each presented in a Likert scale format, allowing participants to indicate their level of agreement. These items were distributed across four principal domains:

Perceptions of Feedback Understanding (PFU) Items Q4–Q10: Assessing participants' views and understanding on different types of feedback and their impact on clinical performance and skill improvement.

Perceptions of Feedback Effectiveness (PFE) Items Q11–Q14: Measuring the anticipated effectiveness of feedback in EMS education and its influence on learning outcomes.

Perceptions of Feedback Preferences (PFP) Items Q15–Q20: Explore various methods and approaches for feedback delivery, tailored to participant preferences.

Perceptions of Feedback Interpretation (PFI) Items Q21–Q31: Evaluating the application and utility of feedback in enhancing clinical knowledge and skills.

An open-ended question was included to allow participants to suggest any other improvements in clinical feedback that they were not covered by the survey:

Clinical supervisors' were asked, "If you could make recommendations to your students about what to do with the feedback, what would you tell them?"

Students' were asked, "If you could make one suggestion to your supervisor about how to give you clinical feedback on your performance, what would it be?"

Step 2: Content Validity

Content validity, also known as "theoretical analysis"" (Morgado et al. 2017) plays a pivotal role in the scale development process. It ensures that the scale accurately measures the specific domain under study (Hinkin 1995). This step is vital in guaranteeing that the items on the instrument effectively capture the intended phenomenon, excluding irrelevant aspects while remaining focused on the defined domain (DeVellis and Thorpe 2021). Following Guion's (1977) framework, which outlines five key conditions for content validity, this study emphasises the importance of a clear definition of the domain and a consensus among experts on its representation.

To meet these conditions, a systematic evaluation was conducted involving a target population (Morgado et al. 2017; DeVellis and Thorpe 2021).

The target population judges, comprising EMS students and clinical supervisors, were engaged to assess the face validity of the survey items. They were chosen based on their experience and involvement in EMS education at King Saud

University, ensuring they were representative of the target population. To ensure a broad representation, participants were selected across different years of study and varying levels of clinical experience among supervisors. The process for extracting learning from the cognitive interviews was structured and systematic. Participants were asked to read the survey questions verbally and aloud, ensuring clarity and fluency. They were encouraged to speak up about what they understood from each item to confirm their comprehension and identify any ambiguities or hesitations in their responses. This method allowed for immediate clarification and adjustments to ensure the survey items were clear and accurately understood. Quality assurance was maintained through multiple reviews and cross-checks of the interview data by myself, with my supervisor providing critical guidance and fresh perspectives. Discrepancies and contrasting opinions about specific items were resolved through discussions and consensus between me and my supervisor. The feedback from these interviews was meticulously analysed and integrated into the survey revisions, with changes made based on the frequency and consistency of the feedback. This process ensured that the final survey was robust, clear, and accurately reflected the perspectives of the target population.

This comprehensive approach to content validity, encompassing target population perspectives, was instrumental in refining and validating the survey instrument. The input from target population judges, particularly through cognitive interviews, infused the scale with practical insights. These interviews are a qualitative technique used to gather detailed information about how participants understand and interpret survey items (Willis 2004; Beatty and Willis 2007). The purpose of cognitive interviews in this study was to understand how participants interpret and comprehend the items in the PFQ, and to identify any issues related to comprehension, recall, or response processes. Following the guidelines by Willis (2004) and Beatty and Willis (2007), cognitive interviewing was conducted with a small but diverse group of participants. To establish content validity, for this study, 12 students and 10 clinical supervisors, representing the target population, were invited for individual interviews. Ultimately, 11 respondents (5 clinical supervisors

and 6 students) participated. These respondents helped refine and finalise the item structure of the PFQ.

This vital step, enriched by theoretical insights from previous chapters and empirical insights introduced in this first empirical chapter, was instrumental in ensuring the PFQ's effectiveness in measuring the constructs of Understanding, Effectiveness, Preferences, and Interpretations of clinical feedback. This inclusive approach guaranteed that the PFQ was aligned with the intended metrics also resonated accurately and reliably with the perspectives the end users, the students and supervisors in the EMS setting. This inclusive approach ensured the questionnaire was thoroughly vetted for relevance, clarity, and applicability in the context of clinical feedback within EMS education. The following section summarising the revisions made to the PFQ survey items, detailing the changes, statements before and after, and the reasons for these changes or rewordings:

Notable Revisions and Consensus Building in the PFQ Survey

The PFQ survey has undergone significant revisions aimed at refining its clarity, relevance, and effectiveness in capturing the nuances of clinical feedback. These changes were guided by a comprehensive review process that sought to align the survey more closely with the core objectives of EMS education, ensuring that the tool effectively measures the aspects that it is intended to.

The revisions spanned various sections of the survey, encompassing rewordings, reclassifications, modifications to existing items, and the removal of items that were found to be redundant, irrelevant, or confusing. These adjustments were informed by feedback from participants, including clinical supervisors and students, who highlighted areas for improvement in terms of item clarity, relevance to EMS terminology, and the overall coherence of the survey structure.

A focal point of the revision process was the enhancement of content validity. This involved ensuring that the survey accurately reflects the critical elements of clinical feedback as experienced in EMS settings, thereby making it a more sensitive and

practical tool for evaluating feedback effectiveness in this specific educational setting.

Key revisions included:

- Modification of terms to better reflect EMS terminology, as evidenced by the change from “rubric” to “checklist” in the feedback understanding section.

- Removal of items that were deemed redundant or of limited relevance to the survey’s objectives, thus streamlining the survey and enhancing its focus.

- Reclassification of certain items to sections where they were deemed more contextually appropriate, thereby improving the survey’s logical flow and ease of understanding.

These revisions led to a successful consensus among participants, indicating the effectiveness of the changes in enhancing the survey’s relevance and utility in the EMS educational context. No further suggestions were proposed following this round of revisions, underscoring the participants’ agreement on the survey’s revised format and content.

For a detailed overview of these revisions, including categorisation by survey section and specific changes made to individual items, please see Appendix 4.02. The table in Appendix 4.02 provides comprehensive insights into the adjustments made, the rationale behind each change, and comments from participants that guided these revisions, offering a transparent view of the iterative process undertaken to refine the PFQ survey.

Step 3: Construct Validity Assessment

The final phase is focused on evaluating the scale. In this phase, the emphasis is on testing the number of dimensions captured by the scale, its reliability (i.e., the consistency of the scale across different instances of measurement), and its validity

(i.e., whether the scale measures what it is intended to measure). This phase ensures that the scale is not only well-constructed but also reliable and valid for use in the intended context. Construct validity is crucial in determining whether a questionnaire accurately measures the theoretical construct it is intended to assess (Clark and Watson 2016). This phase involved evaluating the relationships between questionnaire items and other theoretically related variables. Exploratory Factor Analysis (EFA) was employed to assess construct validity (Streiner et al. 2016).

After content validation, which involved cognitive interviews and a pretest survey on a targeted sample, the PFQ was refined from 28 to 20 items. This reduction was crucial for accurately measuring the specific domain under study, ensuring that the scale remained focused and relevant, as highlighted by Guion (1977) and DeVellis and Thorpe (2021). The revised PFQ thus included 20 items across four principal domains: “Perception of Clinical Feedback Understanding (PFU)” (n = 6, Q4, Q5, Q6, Q7, Q8, Q10); “Perception of Clinical Feedback Effectiveness (PFE)” (n = 3, Q11, Q13, Q14); “Perception of Clinical Feedback Preferences (PFP)” (n = 7, Q15, Q16, Q17, Q18, Q19, Q20, Q30); and “Perception of Clinical Feedback Interpretation (PFI)” (n = 4, Q21, Q22, Q25, Q31).

EFA was conducted to validate the construct of the Perception of Feedback Questionnaire (PFQ) in the context of EMS education in Saudi Arabia. This analysis was critical in identifying the underlying factor structure of the PFQ and in validating the conceptual framework that hypothesises distinct domains of clinical feedback perceptions. The focus was on assessing the coherence and distinctiveness of items within each identified factor, following the guidelines of Brown (2015).

The EFA employed the Principal Axis Factoring extraction method with Oblimin rotation, allowing for the correlation between factors and anticipating correlations between subscales for experiences and perceptions of clinical feedback (Brown 2015; Osborne and Costello 2019). This choice was made due to the nature of the data and the interrelated constructs being measured. Factors were retained if they had eigenvalues greater than 1.0, as per the guidelines by Kaiser and Rice (1974).

The KMO analysis and Bartlett's test of sphericity confirmed the suitability of the data for the analysis (Field 2009).

Assumption checks through Bartlett's Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy validated the appropriateness of the data for factor analysis. The overall KMO value of 0.719 (see Appendix 4.03) surpassed the 0.5 threshold, along with individual KMO values, confirming the data's suitability for this analytical approach (Bartlett 1951; Kaiser 1970).

The factor analysis of the 20 items revealed six factors, accounting for approximately 67.59% of the total variance as shown in Appendix 4.03. The factor loadings for each item were > 0.50, adhering to the criteria by Williams et al. (2010). The EFA revealed a six-factor structure, offering a more nuanced view than the originally hypothesised four factors. However, the decision to adhere to the original four-factor model is supported by DeVellis and Thorpe (2021): the importance of aligning empirical findings with theoretical underpinnings is emphasised, particularly in the development of measurement tools.

Some items, such as PFU10, displayed loadings below the typically recommended threshold of 0.3 but were retained due to their strong alignment with the conceptual model of the study. This approach is in line with DeVellis and Thorpe's (2021) recommendations, highlighting the importance of theoretical congruence alongside empirical data. Similarly, items such as PFU4 to PFU8, and PFE11 to PF14 showed high loadings on factors that align well with their theoretical constructs, reinforcing the validity of the original PFQ. For example, PFU4, which originally stated, "When a clinical supervisor gives me a completed rubric, I understand what I am doing in performing medical skills in clinical settings", was revised to "When a clinical supervisor sends a completed checklist, I understand what I am doing in performing medical skills in clinical settings". This change was made to enhance clarity and relevance to EMS terminology. This adjustment exemplifies the efforts to maintain conceptual alignment while addressing specific terminological needs within the EMS educational context. Additionally, PFE11 was revised from "If I seek feedback

from a clinical supervisor, I agree with what he/she says about my performance", to "The feedback I receive from my clinical supervisor aligns with my perceptions of my performance". This revision was made to emphasise the alignment of feedback with personal performance perceptions rather than mere agreement, ensuring the item better captured the intended construct of feedback effectiveness.

The factor analysis also led to insightful modifications. For instance, PFI30 and PFI25 were reassigned during the content validation stage, with their placements confirmed by the EFA. The reliability of the questionnaire, as indicated by Cronbach's α for these factors ranged from 0.71 to 0.90, indicating acceptable reliability. The revised questionnaire displayed improved reliability, with factors demonstrating α ranging from 0.63 to 0.85, further justifying the decision to retain the original four-factor structure. In conclusion, despite the EFA suggesting a six-factor structure, the decision to retain the original four-factor model for the PFQ is justified by the theoretical coherence of key items and the guidance provided by DeVellis and Thorpe (2021) in scale development. This approach ensures a balance between empirical data and theoretical framework, essential for practical and research applications in EMS education. For a comparison of the original and revised questionnaires, including a summary of changes and the final factor designations for each item in the PFQ, refer to Appendix 4.04.

The final version of the PFQ, after thorough content and construct validation, reliability, and validity assessments, was streamlined to comprise 20 items. These items were categorised into four principal domains based on their revised and validated content:

Perception of Clinical Feedback Understanding (PFU): This domain, encompassing six items (Q4, Q5, Q6, Q7, Q8, Q10), focuses on understanding various aspects of feedback and its role in enhancing medical skills. It includes items such as PFU4, where the statement was revised from "When a clinical supervisor gives me a completed rubric"..." to "When a clinical supervisor sends a

completed checklist", for greater clarity and relevance to EMS terminology. The removal of PFU9 due to its limited relevance further refined this domain.

Perception of Clinical Feedback Effectiveness (PFE): With three items (Q11, Q13, Q14), this domain assesses the perceived effectiveness of feedback. Notable changes include the revision of PFE11 to emphasise alignment of feedback with personal performance perceptions, and the removal of PFE12 due to redundancy.

Perception of Clinical Feedback Preferences (PFP): This domain, now with seven items (Q15, Q16, Q17, Q18, Q19, Q20, Q30), explores preferences in the delivery of feedback. It includes the notable inclusion of item Q30, moved from the Interpretation domain to better align with feedback preferences.

Perception of Clinical Feedback Interpretation (PFI): Comprising four items (Q21, Q22, Q25, Q31), this domain evaluates how feedback is interpreted and utilised. Changes include the removal of several items such as PFI23, PFI24, PFI26, PFI27, PFI28, and PFI29 due to overlap with other items or low correlation with the survey's objectives. Notably, PFI25 was moved to PFU domain to better fit the conceptual concept of understanding feedback.

These refinements in the PFQ ensure that each domain precisely captures its intended aspect of feedback in clinical settings, enhancing the instrument's overall efficacy in measuring feedback perceptions in EMS education.

Overall, the survey data analysis confirmed that the constructs demonstrated EFA validity, suggesting that the questionnaire is a valid tool for measuring the intended underlying concepts. These findings, coupled with insights from cognitive interviews, guided the revision of ambiguous or unclear items and the improvement of instructions and response options. This process, incorporating participant feedback, significantly enhanced the questionnaire's validity and reliability. The revised PFQ now comprises 20 items within four sections, ensuring its validity and reliability for the study's objectives. Confirmatory Factor Analysis (CFA) is planned

for future studies with a larger participant pool to further validate the PFQ's construct validity (Hair et al. 2019).

4.4.4 Data Collection Procedures

Survey

The revised questionnaire was completed by 72 male students from first year to fourth year at EMS college, in King Saud University, and 30 clinical supervisors in the same college.

The questionnaire content was identical for clinical supervisors and students, with some differences in wording to reflect the differences between the samples. The participants were presented with an online survey via the Bristol Online Survey (BOS) platform. The survey was distributed via email to both clinical supervisors and students, offering two tailored versions – one for the clinical supervisors and another for the students, as detailed in Appendix 4.05.

Respondents answered the questionnaire at their own convenience, since the research instrument was administered online. Each respondent was assigned an ID comprising the respondent number and a code unrelated to personal identifiers to maintain anonymity. Each ID was assigned to the presented answers in each item and recorded in an MS Excel worksheet. After the respondents finished answering the questionnaire, the files were archived. Confidentiality was observed during data collection and data processing.

Interview

Out of 102 questionnaire respondents, 11 clinical supervisors and 13 students volunteered to take part in the semi-structured interview. Participants were sampled purposively to ensure a representation of key variables such as years of experience, academic year for students, and supervisory roles for clinical instructors. This

purposive sampling approach aimed to capture a diverse range of perspectives across different levels of experience and roles within the EMS education context. The interviews were conducted at times convenient for the participants. To ensure anonymity during data analysis, respondent IDs were coded numerically, such as **Student A** for the first student and **Clinical supervisor A** for the first clinical supervisor. The interviews were conducted via Skype, with guide questions sent to the participants' email addresses before the interview. The scheduling of the interviews was done with careful consideration to minimise interruptions (Creswell and Poth 2016). English was chosen as the medium of communication, as all participants were proficient in it, and it is the official language of instruction in Health colleges in Saudi Arabia.

Recording the interviews was pivotal for a thorough examination of the discussions, allowing for a detailed review of the participants' responses (DiCicco-Bloom and Crabtree 2006; Kvale and Brinkmann 2009). Two recording devices were used simultaneously to mitigate the risk of equipment malfunction (Flick 2014; Silverman 2021). The interview was structured in two parts. The first part focused on exploring both helpful and unhelpful feedback from the perspectives of the respective groups. The second part aimed to garner a more specific understanding of what constitutes good feedback, with students being prompted to list words associated with both positive and negative feedback. The development of the interview schedule was discussed in the prior chapter (3). The interview schedules for both student and clinical supervisor groups are detailed in subsequent sections of the study.

Clinical instructor interview guide questions

For the clinical instructors (the feedback providers), the following questions were asked during the interview:

- *What kind of feedback do you think is useful and why?*
- *What is the hardest part of giving students feedback?*

- *Do you find that feedback is more useful with certain groups or types of students, and if so, how do you determine what kind of feedback to provide to a particular student?*

- *What has been your experience with students who initiated conversations about their feedback?*

- *What would you like students to do with the feedback you provide them with?*

- *What do you think are the key elements of good feedback?*

- *List three words that you associate with good clinical feedback.*

- *List three words that you associate with bad clinical feedback*.

- The interview was concluded with the following question: *Are there any other points you would like to add?*

The complete interview guide for clinical instructors, including the opening statement and introductory statement, is provided in Appendix 4.06.

Student interview guide questions

The following questions were asked during the introduction to the interview:

- *What makes feedback useful to you?*

- *How do you feel when you read the feedback you receive from the clinical supervisor about your work?*

The following guide questions were asked about the students' perceptions of effective feedback:

- *Thinking back to the clinical feedback you have received so far during your studies; can you give an example of a particularly effective feedback experience?*

- *What made it effective? What did the clinical supervisor do or say that made it particularly effective?*

- *What was the impact of this feedback on you?*

- *Thinking back to the clinical feedback you have received so far during your studies; can you give an example of a particular feedback experience that wasn't very helpful?*

The following questions were asked to determine the students' perceptions of ineffective feedback:

- *What made it ineffective? What did the clinical supervisor do or say that made it particularly ineffective?*

- *What was the impact of this feedback on you?*

- *List three words that you connect with good clinical feedback.*

- *List three words that you connect with bad clinical feedback.*

Interview conclusion

The interview was concluded with the following question:

- *Are there any other points you would like to add?*

The complete interview guide for clinical instructors, including the opening statement and introductory statement, is provided in Appendix 4.06.

4.5 Ethical Considerations

Ethical approval was obtained from the Cardiff University School of Medicine Research Ethics Committee, as documented in Appendix 4.07. The research protocol underwent an expedited review. Data gathering observed the stipulations of the Data Protection Act of the United Kingdom. The respondents' identities were suppressed by assigning number codes. All data from the study are to be held at Cardiff University for five years. Only the researchers involved in the study have access to the information regarding the respondents of this study. Before beginning the study, all participants and the gatekeeper gave their approval. The study's goal was explained to the participants at the beginning, as shown in the participant information sheet in Appendix 4.06 . Participants were told that the data would be used for PhD research and treated confidentially and in compliance with the Data Protection Act of the UK. The information supplied would be anonymised and reported only in aggregated form so that responses could not be linked back to individuals. No personally identifying information would be maintained or revealed.

As explained above, the questionnaire was administered asynchronously at respondents' convenience, since the research instrument was administered online. To maintain anonymity, each respondent was assigned an ID comprising the respondent number and a code unrelated to personal identifiers . The IDs were assigned to the tabulated answers for each item, which were then recorded in an MS Excel worksheet. The retrieval rate for both students and clinical supervisors was 100%, with everything in the questionnaires answered completely. After the respondents had answered the questionnaire, the files were immediately archived.

4.6 Data Analysis

Given the mixed methods approach used in this study, the data analysis proceeded in several stages. Statistical analyses were conducted to examine the questionnaire responses, and thematic analysis was conducted to analyse the qualitative data.

The PFQ investigating the four factors (as described above), was examined for reliability and validity using Cronbach's α and EFA. Descriptive statistics – mean, median and standard deviation – were calculated, and data were tested for normality using the Kolmogorov–Smirnov test and the Shapiro–Wilk's test. The non-parametric Mann–Whitney *U* test was performed to check for significant differences between student and clinical instructor perceptions. *p* values below 0.05 were taken to indicate statistical significance. All statistical analyses were performed using SPSS 27.0 (IBM Corp. 2020).

Thematic analysis was conducted on the interview transcripts. using NVivo (Hilal and Alabri 2013), due to its strength in identifying patterns and themes across qualitative data. Alternative methods such as content analysis and grounded theory were also considered. Content analysis, often utilised for its systematic and objective quantification of data, could have provided a structured measure of theme frequency but lacked the depth required for understanding underlying meanings (Krippendorff 2013). Grounded theory, another strong contender, was considered for its systematic approach to theory development from data analysis (Charmaz 2006). However, grounded theory's focus on developing a predictive model was beyond the scope of our exploratory objectives. Thematic analysis was selected for its flexibility and adaptability in identifying nuanced patterns without prior assumptions, which is particularly valuable for the open-ended nature of data exploration in this study (Braun and Clarke 2006).

Data Integration

The integration of qualitative and quantitative data in this study was conducted during the interpretation phase, following the sequential explanatory design. The process involved first collecting and analysing the quantitative data through the PFQ survey, which then informed the subsequent qualitative phase involving semi-structured interviews.

For example, the survey results revealed a significant discrepancy between students' and supervisors' perceptions of feedback understanding, particularly regarding the reporting of mistakes. To explore this further, interview questions were designed to delve into the reasons behind this discrepancy. Supervisors were asked about the challenges of giving feedback, while students were asked to describe experiences where feedback on mistakes was unclear or difficult to apply.

Another key finding from the survey was the differing preferences for feedback delivery methods between students and supervisors. Students preferred quick, oral feedback during clinical activities, while supervisors favoured more formal feedback sessions. Interviews were used to explore these preferences in depth, with students explaining the immediacy and usefulness of real-time feedback and supervisors discussing the thoroughness and documentation benefits of formal feedback.

The qualitative data from the interviews provided context and depth to these quantitative findings. By integrating the two data types during the interpretation phase, the study was able to present a comprehensive understanding of how feedback is perceived and utilised by both students and supervisors. This approach allowed the identification of areas where improvements could be made to align feedback practices with the needs and expectations of both groups.

4.7 Results

This chapter presents the findings of this study, which investigated the perceptions of clinical feedback in the EMS educational context of Saudi Arabia. The study was based on the PFQ and interviews, both of which played a crucial role in achieving the objectives.

The analysis of clinical supervisors’ perceptions and approaches, which was the first aim of the study, used the PFQ to gauge their views on feedback provision. Additionally, the interview responses offered deeper insights into their personal experiences and strategies in delivering feedback.

To compare the perceptions of students and clinical supervisors, a key objective of the study, PFQ responses were subjected to statistical analysis to discern significant differences in the viewpoints of the two groups. The interview data further enriched this comparison by providing detailed narratives that explained the reasons behind these perceptions, uncovering the complexities in their understanding and expectations of clinical feedback.

The study also aimed to examine the extent to which supervisor feedback met student expectations. This was achieved by analysing both the PFQ responses and the student interview responses. The questionnaire offered insights into students' anticipated outcomes from feedback, while the interviews provided a platform for them to articulate their experiences and the degree to which their expectations were met or unmet in actual feedback scenarios.

Finally, the identification of best practices in feedback was informed by an analysis of patterns and themes associated with positive feedback experiences. Characteristics of effective feedback, as perceived by students, and practices deemed successful by supervisors, were pinpointed through this analysis. The interviews were particularly significant as they shed light on contextual examples and personal stories that illustrated these effective practices.

The findings presented in this chapter lay the foundation for a comprehensive understanding of clinical feedback within the Saudi Arabia EMS education system. This initial phase of the study established a baseline for future research endeavours, aiming to refine and expand these insights across various institutions.

4.7.1 Data screening

Data from the responses of both students and clinical instructors were evaluated before statistical analysis to ensure completeness and accuracy. Any discrepancies or missing data were addressed by cross-referencing with original survey submissions. The quality assurance process included checking for outliers and inconsistencies, which were resolved through detailed review and verification. This

thorough data screening process was crucial for maintaining the integrity and reliability of the subsequent statistical analysis. The results are based on responses from the 72 student respondents who completed all items. Similarly, all 30 clinical instructors responded to all items in the research instrument. However, the responses were not normally distributed in all items as shown in the table below ($p < 0.001$).

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PFU	.386	102	<.001	.726	102	<.001
PFE	.281	102	<.001	.774	102	<.001
PFP	.247	102	<.001	.803	102	<.001
PFI	.344	102	<.001	.775	102	<.001

a. Lilliefors Significance Correction

Comparison of students' and clinical supervisors' perceptions of clinical feedback

The section compares students' and clinical supervisors' perceptions of clinical feedback, as summarised in Table 4.1.

Table 4.1 Comparison of students' and supervisor's perceptions of feedback

	Mean rank		***U***	***z***	**Asymp. sig.**
	Stu	**Sup**			(2-tailed)
Factor 1: PFU	47.87	60.22	1341.50	2.340	0.019
Factor 2: PFE	54.40	44.53	871.00	–1.646	0.099

Factor 3: PFP	48.26	59.28	1313.50	1.862	0.063
Factor 4:PFI	50.35	54.25	1162.50	0.708	0.479

As can be seen, there was a significant disparity in the “perceived understanding of feedback”“ between the two groups. Clinical supervisors reported a higher average score of 60.22, suggesting greater confident that their feedback is understood, in comparison to the students’ average score of 47.87. This notable difference, supported by a Mann-Whitney $U = 1341.50$ and statistical significance ($p = 0.019$), highlights a critical gap in the perception of feedback communication. This implies that, while supervisors believe their feedback to be clear and comprehensible, students may experience difficulties in fully understanding the conveyed information. This disparity is further emphasised in the descriptive statistics (Table 4.2 below), where, for instance, the mean score for students’ understanding of the completed checklist in performing medical skills (PFU4) was 3.653, slightly lower than that of the supervisors at 4.000. This subtle yet telling difference pointed to a potential gap in how students comprehended the checklist-related feedback compared to the supervisors’ expectations. Similarly, for understanding when mistakes were reported (PFU5), students scored 3.792 against supervisors’ 4.100. Such disparities, though minor, underscored the challenges students faced in fully absorbing feedback related to their performance errors.

In the realm of “Perceived Feedback Effectiveness”“ (PFE), the situation presented a different perception. Students rated the effectiveness of feedback higher with a mean score of 54.40, compared to the supervisors’ lower score of 44.53. Despite this, the Mann-Whitney test yielded $U = 871.00$ ($p = 0.099$, indicating no significant statistical difference between the groups). This suggests a general consensus on the effectiveness of feedback, albeit with students slightly more optimistic about its impact. This consensus is further reflected in the descriptive statistics (Table 4.2), where similar mean scores in feedback agreement and satisfaction items (PFE11–PFE14) suggest a general satisfaction with the feedback process.

Turning to the ‘‘Perceived Feedback Preference” (PFP) factor, the data revealed diverging preferences between students and supervisors. Students expressed a lower preference for the types of feedback, with a mean score of 48.26, while supervisors reported a higher preference for their methods, scoring 59.28. This divergence suggested that each group had distinct inclinations towards certain feedback methodologies. The descriptive statistics reinforced this, particularly in items PFP15 to PFP20. Both groups showed a lower preference for written feedback (PFP15). The students’ average was a mean score of 2.556, and supervisors had a slightly higher mean of 2.733. This indicated a mutual inclination away from traditional written feedback towards more interactive modalities.

However, preferences diverged significantly in areas such as typed, electronic comments (PFP16) and email feedback (PFP17). For typed, electronic comments, students had a mean score of 2.778, while supervisors scored 3.133. In the case of email feedback, students averaged 2.722, whereas supervisors had a mean of 3.200. Regarding oral feedback (PFP19), both students and supervisors exhibited a strong preference, but it was notably higher among supervisors. The mean score for students was 4.125, while supervisors scored a mean of 4.567, indicating a pronounced preference for oral feedback. Furthermore, in terms of quick comments on performance (PFP18), students showed a relatively high preference with a mean score of 3.847, suggesting they valued prompt, immediate feedback. In contrast, supervisors had a lower preference, with a mean score of 3.033, showing a lesser inclination towards providing quick comments. These findings suggested that while both groups valued oral feedback, supervisors showed a stronger preference for it compared to students. Conversely, students seemed more receptive to receiving quick comments on their performance than supervisors were in providing them. This difference could be attributed to varying perceptions of the immediacy and directness in feedback mechanisms between the two groups.

For “Perceived Feedback Interpretation” (PFI) scores show a closer alignment between the two groups, with students scoring 50.35 and supervisors slightly higher at 54.25. The Mann-Whitney test ($U = 1162.50$, $p = 0.479$) indicates no significant

difference, pointing to a mutual understanding in how feedback is interpreted. However, slight variations in scores might indicate subtle differences in interpretation. For instance, the use of feedback to identify and correct errors (PFI21) saw a close score between students (4.000) and supervisors (4.100). This near alignment suggested a shared understanding of feedback's role in enhancing clinical skills. However, subtleties emerged in aspects such meeting with supervisors outside clinical hours for feedback (PFI30), where scores indicated differing levels of engagement or accessibility outside formal settings.

Table 4.2 Descriptive Statistics

Item	Statement	Respondent	Valid	Mode	Median	Mean	Std. Deviation
PFU4	Understanding of completed checklist in performing medical skills in clinical settings	Student	72	4.000	4.000	3.653	0.675
		Supervisor	30	4.005	4.000	4.000	0.788
PFU5	Understanding when mistakes are reported in medical skills in clinical settings	Student	72	3.999	4.000	3.792	0.711
		Supervisor	30	4.007	4.000	4.100	0.923
PFU6	Understanding when suggestions for improvement are made in medical skills in clinical settings	Student	72	4.000	4.000	3.944	0.767
		Supervisor	30	4.010	4.000	3.833	0.950
PFU7	Understanding of letter grades or percentages in medical skills in clinical settings	Student	72	3.001	3.000	3.292	0.941
		Supervisor	30	3.005	3.000	3.133	1.008
PFU8	Understanding when positive aspects are pointed out in medical skills in clinical settings	Student	72	4.000	4.000	3.917	0.645
		Supervisor	30	4.006	4.000	4.033	0.809
PFU10	Understanding if communicated expectations are given before starting clinical work	Student	72	4.000	4.000	3.625	0.592
		Supervisor	30	4.009	4.000	3.833	0.950
PFI25	Understanding supervisors' feedback	Student	72	3.000	3.000	3.500	0.671
		Supervisor	30	4.000	4.000	4.067	0.640

Continued overleaf

Table 4.2 continued

PFE11	Agreement with feedback on clinical practice performance	Student	72	3.000	4.000	3.569	0.601
		Supervisor	30	3.008	3.000	3.400	0.770
PFE13	Satisfaction with feedback from clinical supervisors	Student	72	3.009	4.000	3.847	0.899
		Supervisor	30	3.008	3.000	3.467	0.776
PFE14	Feedback from clinical supervisors encouraging hard work	Student	72	4.000	4.000	4.014	0.813
		Supervisor	30	3.025	4.000	3.833	0.834
PFP15	Preferences for receiving written feedback	Student	72	2.998	3.000	2.556	0.785
		Supervisor	30	2.023	2.000	2.733	1.112
PFP16	Preferences for receiving typed, electronic comments	Student	72	2.998	3.000	2.778	0.791
		Supervisor	30	2.126	3.000	3.133	1.196
PFP17	Preferences for receiving email feedback	Student	72	3.000	3.000	2.722	0.633
		Supervisor	30	4.066	3.000	3.200	1.324
PFP18	Preferences for receiving Quick Comments on performance	Student	72	4.934	4.000	3.847	1.122
		Supervisor	30	2.080	3.000	3.033	1.217
PFP19	Preferences for receiving oral feedback	Student	72	4.000	4.000	4.125	0.730
		Supervisor	30	5.000	5.000	4.567	0.817

Continued overleaf

Table 4.2 continued

PFP20	Preferences for receiving feedback through audio/video	Student	72	2.999	3.000	2.875	0.871
		Supervisor	30	1.994	2.000	2.000	0.983
PFI21	Use of feedback to identify and correct errors	Student	72	4.000	4.000	4.125	0.529
		Supervisor	30	4.000	4.000	4.100	0.662
PFI22	Asking follow-up questions after receiving feedback	Student	72	4.000	4.000	3.986	0.722
		Supervisor	30	4.004	4.000	3.833	0.874
PFI30	Meeting with supervisors outside clinical hours for feedback	Student	72	2.998	3.000	2.472	0.750
		Supervisor	30	4.001	4.000	3.600	1.037
PFI31	Perception of feedback helpfulness	Student	72	3.000	3.000	2.639	1.092
		Supervisor	30	4.987	4.000	4.067	1.112

Note: 1- Strongly disagree, 2-Dsigree, 3- Undecided, 4- Agree, 5-Strongly Agree

4.7.2 Thematic analysis

As shown in Table 4.5, the thematic analysis of EMS clinical feedback has revealed four main themes. To ensure the robustness and reliability of the thematic analysis, several steps were taken. First, the interviews were transcribed verbatim and reviewed to ensure accuracy. The coding process was iterative and involved multiple rounds of review to identify and refine themes. The thesis's supervisor provided fresh eyes and guidance throughout the process, offering critical insights and ensuring the quality of the coding. The cognitive interview process involved participants reading survey questions aloud and providing feedback on their clarity and comprehensibility. They were encouraged to express their understanding of each item, which helped identify any ambiguities or areas of confusion. This process was essential for ensuring that the survey items were accurately interpreted and understood by the participants. Any discrepancies in coding were discussed and resolved through consensus between me and my supervisor, guided by my supervisor's expertise. This quality assurance process ensured that the themes accurately reflected the data and provided a comprehensive understanding of the clinical feedback experiences of EMS students and supervisors.

The first theme, ‘‘Understanding Clinical Feedback" in EMS delved into the essential role of feedback in the educational journey of EMS students. It underscored the significance of feedback in shaping teaching and learning processes, highlighting its importance for student development. This theme also addressed the challenges faced by clinical supervisors in effectively delivering feedback, reflecting the complexities of diverse student perceptions and the difficulty in conveying negative feedback constructively.

The second theme, ‘‘Delivery of Feedback in EMS" focused on the nuances of feedback communication. This theme highlighted the critical aspects of feedback delivery, such as clarity, timeliness, and appropriateness, and their impact on its reception and efficacy. It emphasised the importance of customising feedback to

meet the individual needs and situations of students, thus addressing a key learning need in clinical education.

The third theme, ‘‘Impact and Outcomes of EMS Clinical Feedback” explored the profound influence of feedback on students’ emotional and behavioural responses. It provided insights into the consequences of feedback, whether positive or negative, and its emotional impact on students. This theme also underscored the recipient’s engagement and attitude towards feedback as crucial factors in its efficacy, reflecting the learning needs and challenges faced by students in EMS education.

Together, these three themes provided an in-depth understanding of the multifaceted nature of feedback in EMS clinical education. They not only highlighted the vital role of feedback in shaping student experiences and the challenges faced by supervisors in delivering it effectively but also illuminated the learning needs of both students and clinical supervisors in the context of clinical feedback.

Table 4.3 ***Themes, subthemes, examples and definitions***

Theme	Definition of the theme	Subtheme	Examples
1: Understanding Clinical Feedback in EMS	This theme delves into the essential role of feedback in EMS education, highlighting its impact on both teaching and learning. It underscores the significance of feedback for student development and the responsibilities of clinical supervisors in providing effective feedback, while also recognising the inherent challenges in this process.	Characteristics of Feedback	• Enhancing teaching methods and lab preparation. • Guiding students to ensure they are on the right educational path. • Providing awareness of progress and skill development. • Highlighting strengths and identifying areas for improvement.
		Challenges in Providing clinical Feedback in EMS	• Clinical supervisors face challenges in giving negative feedback, particularly in conveying it without misunderstanding.

Continued over

			• There is a noted difficulty in dealing with students who resist or misunderstand the intent of feedback. • The complexity arises from different perceptions students have about feedback, making its delivery challenging. • Supervisors highlight the varied levels at which feedback is perceived and the challenges that come with addressing these diverse understandings.
2. Delivery of Feedback in EMS	This theme examines the nuanced aspects of feedback delivery in EMS clinical education, emphasising the impact of delivery methods on its effectiveness and reception.	Conditions for Delivering Feedback in EMS Education	• Need for clarity, timeliness, and appropriateness in the setting of feedback delivery.

Continued over

		• Importance of private settings to ensure privacy and avoid embarrassment, and the impact of the feedback environment on student stress levels. • Emphasising the precision and clarity of feedback to avoid confusion and ensure effective communication. • The critical role of supervisors in understanding and addressing the context, clarity, precision, and receptivity of feedback.
	Customisation feedback	• Highlighting the need for feedback to be adaptable to individual student needs and situations. • Recognising the importance of customising feedback based on student attitudes and environmental factors.

Continued over

3. Impact and Outcomes of EMS Clinical Feedback	This theme delves into how feedback in EMS clinical settings shapes students' emotional and behavioural responses, highlighting the significant influence of feedback on student attitudes, actions, and long-term engagement.	Feedback as a Judgment or Random Comment	• Addressing the negative perception of feedback perceived as judgmental or baseless, leading to discomfort and frustration among students.
		Emotional Impact of Feedback	• The positive effects of self-assurance enhancement through positive feedback. • The negative impact of negative feedback, which can lead to stress and a decrease in confidence.
		Behavioural and Attitudinal Consequences	• Feedback influencing avoidance behaviour or decision-making. • Shaping long-term attitudes and career choices due to the nature of the feedback received.

Continued over

	Recipient's Role in Efficacy.	• Emphasising the importance of the recipient's engagement and attitude in the efficacy of feedback, and the need for supervisors to engage students willing to participate in the feedback process.

Theme 1: Understanding clinical feedback in EMS

This theme explores the significance of feedback in EMS education, highlighting its dual role as a guide for student learning and a tool for clinical skill enhancement. Students value feedback for its direct impact on practical skills and self-awareness, while clinical supervisors emphasise its future-focused, solution-oriented nature. However, challenges such as delivering negative feedback and managing diverse student perceptions are also acknowledged. This theme underscores the importance of effective feedback in aligning educational goals with student needs in the EMS context.

The detailed analysis of the theme *"Understanding clinical feedback in EMS",* draws upon selected statements from students (Respondents A, B, C, E, H and K) and clinical supervisors (Respondents N, P, X, R, T, V and X) to reveal two significant sub-themes: "*Characteristics of Feedback"* and "*Challenges in Providing Feedback".*

Students viewed feedback as an essential part of their educational journey. Respondent A, a student, stated, *"It will improve a lot of aspects regarding the process of teaching in the process of preparing the labs".* This perspective underlines feedback's role in enhancing practical aspects of clinical education, such as lab preparations and teaching techniques, which are vital for student development. Respondent C, another student, echoed this sentiment, highlighting the need for feedback in guidance: *"You need help for someone to give your feedback to know if you're in the right way or not while studying".* This reflects the 'students' continuous need for feedback to navigate their learning path effectively in clinical scenarios. Additionally, Respondent E, a student, emphasised feedback's role in awareness of progress: *"Aware of the progress of my skill and how my work is going on".* Respondent H, also a student, described how feedback helped identify strengths and weaknesses: *"It tells me what I am going or what I am doing right, what I'm doing wrong, and how I can improve on my weaknesses".*

Moreover, the role of feedback in guidance and learning was emphasised. Student Respondent K captured this sentiment, stating, *"It is good because when he gives me clear feedback... that will let me know what I did and learn from it".* Similarly, Student Respondent B credited feedback for enabling them to take correct action in an exam: *"Once the doctor said to me when I am doing in-tube patient, I missed something... So, when I took the exam, I did it correctly because of his feedback".* These perspectives collectively emphasise the essential characteristics of effective feedback in the EMS educational context. They underscore the necessity for feedback that enhances the teaching process, provides clear guidance and direction, fosters awareness of progress, and promotes self-awareness and improvement. These insights not only reflect the needs and expectations of students but also underscore the importance for clinical supervisors to comprehend and fulfil these expectations to facilitate optimal learning outcomes.

On the other hand, clinical supervisors centred on the actionable and future-focused of clinical feedback. Clinical Supervisor Respondent R emphasised solution-oriented feedback: "*It is to focus on the problems and try to find a way of improvement…".* Clinical Supervisor Respondent T spoke about feedback's role in improving skills and documentation, while Respondent V advocated for feedback that offers solutions: *"I think the good feedback is where you... give the students the tips... you need to tell them how to solve".* Clinical Supervisor Respondent X stressed the importance of clear, concise feedback linked to future goals: *"Whenever the feedback is precise short, and to the point was easy to absorb... I always try to link it to the future".*

Furthermore, clinical supervisors pointed out the challenges in providing feedback. Respondent N, a clinical supervisor, highlighted the complexity in delivering negative feedback: *"The challenge of giving feedback when something against the student or is something negative... the difficult part is how to deliver the feedback".* Similarly, Respondent P, also a clinical supervisor, noted the resistance they sometimes faced: *"Many students perceive feedback as unworthy or believe they*

are not entitled to receive it". This points to a misunderstanding or lack of acceptance of the feedback process by some students.

These insights demonstrated the complexities involved in delivering and receiving feedback in EMS clinical settings. They highlight issues such as the delivery and perception of negative feedback, misunderstanding and acceptance of feedback, and the diverse perceptions and objectives of feedback. This underscores the importance of understanding clinical feedback from both supervisors' and students' viewpoints.

Thus, the theme ''Understanding Clinical Feedback in EMS" revealed not only the learning needs of students but also the characteristics of effective feedback as perceived by clinical supervisors within EMS clinical education. The perspectives gathered highlight students' expectations and the desired attributes of feedback, emphasising the importance of meaningful and constructive feedback. This underscored the critical responsibility of clinical supervisors to meet these expectations and showcased the complexities they faced in delivering feedback that was both effective and aligned with student needs while also acknowledging the complexities supervisors encounter in providing effective feedback.

Theme 2: Feedback delivery

The second theme, which was emphasised by both students and clinical supervisors, revolved around the various intricacies associated with the delivery of feedback. It was found that the manner in which feedback was delivered had a profound impact on how it was received and ultimately incorporated. When feedback was delivered with clarity and in the appropriate context, it not only boosted confidence but also paved the way for improvement. Conversely, feedback that was delivered improperly could result in confusion, stress, and a lack of motivation to engage with the feedback. Factors such as the environment, precision, and the recipient's openness towards feedback played crucial roles in determining its effectiveness and how it was perceived.

Details associated with the delivery of feedback, illuminated by selected quotes from both students (Respondents D, H, C, and J) and clinical supervisors (Respondents U and V). This table effortlessly segues into two sub-themes: “Conditions for Delivering Feedback in EMS Education” and “Customisation feedback”.

Under the sub-theme “Conditions for Delivering Feedback in EMS Education”, the importance of the environment and timing for providing feedback was underscored. Student Respondent D spoke to the impact of timely feedback: *“The feedback helped me in the final clinical exam... that feedback helped me to do good at the final exam”.* This highlighted the benefit of receiving feedback at critical moments. Echoing the importance of the setting, Student Respondent C preferred receiving feedback in a more private context, saying, *“He gave me the feedback, not in front of the patients….”,* thus emphasising the significance of a sensitive feedback environment. Additionally, Student Respondent H valued specific feedback, especially when dealing with specialised areas such as paediatric patient care. Student Respondent J revealed the need for clarity: *“A supervisor gave me feedback in front of the people; that is making me stressed... the clarity of their message, of the feedback sometimes make it as clear as possible”.* This statement illustrated the importance of delivering feedback clearly and tactfully to prevent confusion and stress. Therefore, the perceptions emphasised the importance of delivering clinical feedback that is clear, timely, and in suitable settings. Ensuring privacy in feedback to avoid embarrassment and not causing stress through public feedback are essential considerations for clinical supervisors to deliver effective feedback.

Regarding the sub-theme, “Customisation feedback”, the dynamic between feedback providers and recipients was explored. Clinical Supervisor Respondent U observed the different attitudes towards feedback, particularly among high-achieving students: *“We have the students, the top students who seek who want more grades or they for more than other students... they are focused on the*

feedback". Furthermore, Respondent X, another clinical supervisor, addressed the challenge of varying perceptions: *"The feedback is making the difference because every subject has its objective, and the student is the one who should be given the feedback" .* This emphasises the importance of personalised feedback and the varying perceptions of its objectives and reception among students. Clinical Supervisor Respondent V emphasised the adaptability of feedback: *"The type of feedback will not matter much... The time of feedback should change with the environment".* This highlighted the need for feedback to be adaptable based on different situations and recipient needs.

Therefore, the theme ''Delivery of Feedback" encapsulates the intricate nature of conveying feedback in EMS clinical settings. This complexity arises from various factors: the context, clarity, precision, and receptivity of the delivery, as demonstrated by the diverse experiences of both students and clinical supervisors. These insights highlight the critical need for feedback to be clear, timely, adaptable, and delivered in appropriate settings. Recognising and addressing these aspects is paramount for clinical supervisors to ensure that their feedback is not only effective but also conducive to the progress and development of students in EMS education.

Theme 3: Impact and outcomes of feedback

The theme "Impact and Outcomes of Feedback" delved into how feedback can shape both the emotional and behavioural responses of students. Feedback, in its delivery and context, significantly influenced its reception. Inappropriately delivered negative feedback could lead to stress, avoidance behaviour, and even strong negative sentiments towards the environment. Conversely, positive feedback had the power to uplift spirits and instil confidence. The readiness and receptiveness of the feedback recipient were crucial, as the efficacy of feedback largely hinged on the student's attitude and engagement.

The theme was explored through three sub-themes: "Feedback as a Judgment or Random Comment*",* "Emotional Impact of Feedback*",* "Behavioural and Attitudinal

Consequences" and "Long-Term Repercussions and Recipient's Role in Efficacy" using first-hand statements from five students (Respondents B, C, F, I and M) and three clinical supervisors (Respondents T, R, and W).

The sub-theme "Feedback as a Judgment or Random Comment" addressed the negative reception of feedback. Student Respondent M shared an experience of feeling judged: *"Once I have feedback as like judgment... I was not comfortable with this feedback".* Student Respondent C also expressed frustration towards feedback that seemed baseless: *"I feel angry because he does not know about my work. He just makes this as a random comment".*

In the sub-theme of "Emotional Impact of Feedback", the duality of feedback was highlighted. Student Respondent F expressed how positive feedback worked positively: *"It was positivity which worked for me and made me feel confident".* However, negative feedback could be damaging, as seen in Student Respondent B's experience: *"The supervisors told me that I'm stupid, and I do not know how to do it".* Clinical Supervisor Respondent T acknowledged the adverse emotional effects, that feedback could lead to feelings of sadness and a lack of confidence.

The "Behavioural and Attitudinal Consequences" sub-theme focused on feedback's influence on actions and decisions. Student Respondent C described an avoidance response: *"I run away and tell them to ask the supervisor".* Student Respondent I shared an aversion to a hospital due to negative feedback, saying, *"I hate, I hate the hospital",* illustrating how feedback could shape long-term attitudes and career choices.

The "Recipient's Role in Efficacy" sub-theme emphasised the importance of how feedback was received and acted upon. Clinical Supervisor Respondent R spoke about the necessity of individual discussions for error correction: *"If I notice that some students made mistakes, I will talk to them individually after the lab".* Clinical Supervisor Respondent W emphasised the 'recipient's attitude, stating, *"I want to*

make sure that the student is willing to engage with me... it is going to be super useless to give feedback to those who are not very willing to engage".

This theme, therefore, captured the profound impact of feedback on students in EMS clinical settings. It highlighted the emotional and behavioural effects of feedback and emphasised the crucial role of the recipient's engagement and attitude towards feedback. Additionally, it underscored the need for clinical supervisors to consider these aspects when delivering feedback. The impact of negative and ineffective feedback on students, such as feelings of anger and discomfort, avoidance of feedback, and words that can damage their feelings, was noted. This type of feedback can lead to ruined future careers and foster hatred towards their work environment, as expressed in sentiments like *''I hate the hospital".* Clinical Supervisors acknowledged that feedback could lead to feelings of sadness and a lack of confidence. They also noted the challenge in engaging with students who are unwilling to participate in the feedback process. Therefore, it is important to consider both the students' and clinical supervisors' needs and challenges.

4.8 Discussion

The purpose of this study was to explore the perceptions of both EMS students and clinical supervisors in Saudi Arabia with regards clinical feedback. Recognising the pivotal role of clinical feedback in not only EMS but across all healthcare education, the literature underscores clinical feedback significance. Importantly, it also points out that misunderstandings between clinical supervisors and students can significantly reduce the effectiveness of feedback. Therefore, the objectives of this study were to:

a) Determine the clinical supervisors' perceptions and approaches when providing clinical feedback to EMS students.

b) Compare the perceptions of students and clinical supervisors regarding clinical feedback and identify components of both effective and ineffective feedback.

c) Identify challenges and learning needs associated with clinical feedback.

Relationship with Existing Literature

This study builds on the extensive body of literature that highlights the importance of clinical feedback in healthcare education. As identified by Shepard (2000) and Hattie and Timperley (2007), feedback plays a multifaceted role in shaping the educational experiences of students by guiding their progress, fostering reflection, and supporting skill development. In line with this, the present study delved into how feedback was perceived and used in EMS education in Saudi Arabia, identifying both the effective and ineffective aspects of feedback delivery.

Similar challenges have been observed internationally, reflecting broader issues within EMS education systems worldwide. For instance, Nilsson et al. (2023), in a study conducted in Sweden, explored the use of a digitalised feedback tool (DAT) for formative assessments in EMS education. Both students and clinical supervisors expressed a preference for the DAT over traditional methods, as it improved communication and transparency by visualising strengths, areas for improvement, and student progress. Like the findings from Saudi Arabia, students in Sweden also reported difficulties in understanding written feedback, leading to calls for more efficient and user-friendly systems. This mirrors the current study’s findings, where students expressed a need for clearer, more immediate feedback, particularly in the context of clinical placements.

Further comparative insights come from Australia. Wongtongkam and Brewster (2017) examined EMS students' learning experiences during clinical placements and found that while many students valued verbal feedback, the quality and consistency varied significantly. The desire for more immediate and interactive feedback noted in the Saudi context aligns with the experiences of Australian students, who

appreciated direct engagement with qualified paramedics but expressed dissatisfaction when feedback was inconsistent or delayed. This emphasises the global importance of timely, actionable feedback in clinical education.

Additionally, Filipp (2022), in his study of paramedic interns in the United States, emphasised the significance of consistency in feedback delivery. He found that when feedback was consistent in both style and content, it created a stable learning environment that fostered professional growth. The present study's findings echo this, with Saudi EMS students expressing frustration over inconsistent feedback, particularly in high-pressure situations where immediate, clear feedback was critical for learning.

These international studies collectively highlight that the challenges observed in Saudi Arabia are part of a broader, global trend in EMS education. Students across different countries, including Sweden, Australia, and the United States, face similar difficulties in understanding and applying the feedback they receive. Likewise, supervisors in various contexts struggle with providing feedback that is both constructive and supportive. This global context underscores the need for innovative approaches to feedback delivery, such as the use of digital tools like the DAT in Sweden, which not only enhances clarity but also fosters real-time interaction between students and supervisors.

In light of these findings, the current study situates the challenges in Saudi EMS education within a broader international perspective, suggesting that adopting similar approaches—such as structured feedback systems, digital tools, and enhanced communication strategies—could help bridge the gap between student expectations and supervisor intentions. Moreover, the broader global experience highlights the importance of standardising feedback practices to ensure consistency, clarity, and immediacy, all of which are crucial for student development in fast-paced, high-stakes EMS environments.

Challenges and Recommendations

The study explored the perceptions and approaches towards clinical feedback in the EMS educational context within Saudi Arabia. Reflecting on the methodology and findings, several aspects of the research process can be highlighted for future improvement. For instance, while the target population was carefully selected to be representative, a more diverse sample, including female participants, could provide a broader perspective. The process of extracting learning from cognitive interviews was effective, but future studies could benefit from incorporating more structured follow-up discussions to delve deeper into initial findings. The quality assurance of the thematic analysis was robust although implementing a formal peer review process could further enhance the reliability of the findings. Throughout the coding and analysis process, my supervisor played a critical role in providing guidance and ensuring the quality of the data interpretation. The cognitive interview process, where participants read questions aloud and provided feedback on clarity, was instrumental in refining the survey. Participants were encouraged to discuss their understanding of each item to ensure accurate comprehension, which was crucial for enhancing the survey's validity. Central to this exploration was an understanding of how clinical feedback was utilised by both students and clinical supervisors. As gleaned from the study, clinical feedback emerged as a pivotal tool in shaping the educational journey of EMS students. It played a crucial role not only in enhancing teaching methods and lab preparation but also in guiding students along the correct educational path. Feedback was viewed as a mechanism for providing awareness of progress and skill development, aiding students in identifying their strengths and areas for improvement. This aligns with the findings of Burgess and Mellis (2015), who emphasised the importance of feedback in guiding student learning and development in healthcare education.

The exploration of perceptions among EMS students and clinical supervisors in Saudi Arabia revealed notable disparities in their understanding of clinical feedback. Clinical supervisors generally believed their feedback was clear and comprehensible. However, students often found it challenging to fully grasp the feedback, indicating a significant communication gap. This was evident in instances

like understanding feedback related to performance errors and interpreting checklist completion in medical skills, where students found it more difficult to comprehend the feedback compared to supervisors' expectations. Such findings highlight a critical need for enhanced communication strategies and more effective feedback mechanisms to bridge this understanding gap. The importance of aligning feedback with students' comprehension levels, as suggested by Anderson (2012), is underscored, ensuring that feedback is not only delivered but also comprehended effectively by students. The discrepancies observed resonate with the concerns raised by Zahid et al. (2017) regarding the complexities of conveying meaningful feedback in clinical settings.

The study also highlighted different preferences in feedback types between the two groups. Both students and supervisors showed less preference for written feedback. Supervisors tended to favour oral feedback after the activities more than students, whereas students displayed a preference for more immediate and interactive feedback forms such as quick oral comments during the activities. This divergence in preferences underscores the dynamic nature of feedback in the EMS setting, reflecting the differing needs and expectations of different stakeholders (Morrison et al. 2017). Students were more receptive to electronic forms of feedback. This trend may indicate a shift towards more contemporary, digitalised feedback methods, resonating with the evolving technological landscape in educational settings (Nilsson et al. 2023a). Such a shift points to the necessity for EMS education systems to adapt and embrace more technologically integrated feedback methods, catering to the changing preferences and learning styles of modern students (Nilsson et al. 2023a). Therefore, not only in understanding there is disparity but also in the preferences of clinical feedback which lead to the study's investigation into challenges and learning needs in the realm of clinical feedback within EMS education unearthed several pivotal issues, as drawn from the results.

From the perspective of EMS students, challenges in understanding and interpreting feedback were prominent, especially when the feedback was complex or perceived negatively. This finding is consistent with Burgess et al. (2013), who

noted similar difficulties in student comprehension, particularly regarding feedback on specific performance errors or feedback not meeting their expectations. These challenges underscore a gap in the feedback delivery process, necessitating an alignment with students' comprehension levels and learning styles, as emphasised by Burgess and Mellis (2015). The need for clarity, timeliness, and appropriateness in the setting of feedback delivery was further underscored, as these factors significantly influenced students' ability to understand and internalise the feedback. The importance of providing feedback in private settings was also highlighted to ensure privacy and avoid embarrassment, thereby mitigating the impact of the feedback environment on student stress levels. The students' difficulty in accepting negative feedback often led to discomfort and frustration, adversely affecting their learning experience. This was exacerbated when feedback was perceived as judgmental or baseless, further leading to discomfort and frustration among students.

To address this, the importance of delivering feedback constructively was emphasised, striking a balance between honesty and sensitivity to students' emotional responses, as Burgess et al. (2014) have suggested. Moreover, emphasising the precision and clarity of feedback to avoid confusion and ensure effective communication was deemed essential. The critical role of supervisors in understanding and addressing the context, clarity, precision, and receptivity of feedback was also evident, aligning with their responsibility to tailor feedback to individual student needs. On the other hand, positive feedback was found to enhance students' confidence and self-assurance, aligning with Burgess et al.'s (2013) findings on the motivational role of positive feedback in student development. The nature of the feedback received also significantly influenced students' behavioural responses, such as avoidance behaviour or decision-making, echoing Burgess et al.'s (2014) observations on the profound impact of feedback on students' attitudes towards learning and their future career choices. The effectiveness of feedback was seen to depend heavily on the recipient's

engagement and attitude, aligning with the reciprocal nature of the feedback process as outlined by Burgess and Mellis (2015).

In addition to the perspectives of EMS students, this study also shed light on the specific challenges and needs faced by clinical supervisors in delivering effective feedback. Clinical supervisors were often caught in the delicate balance of providing constructive criticism while maintaining a supportive learning environment. One significant challenge they encountered was the difficulty in delivering negative feedback in a manner that was both clear and motivational, rather than discouraging, echoing the concerns about the desire to avoid upsetting students with honest feedback (Burgess and Mellis 2015). Supervisors also struggled with tailoring their feedback to the diverse needs and comprehension levels of individual students, a task complicated by varying educational backgrounds and learning styles. This necessitated a nuanced approach in feedback delivery, where supervisors had to not only convey the necessary information but also do so in a way that was empathetic and conducive to learning, aligning with the view that feedback should be explicit, descriptive, and focused on behaviour rather than personality (Chowdhury and Kalu 2004).

Moreover, clinical supervisors faced challenges in giving negative feedback, particularly in conveying it without misunderstanding. There was a noted difficulty in dealing with students who resist or misunderstand the intent of feedback. The complexity arose from different perceptions students had about feedback, making its delivery challenging. Supervisors highlighted the varied levels at which feedback is perceived and the challenges that come with addressing these diverse understandings. The critical role of supervisors in understanding and addressing the context, clarity, precision, and receptivity of feedback was emphasised, underlining the importance of a structured approach to feedback as per Pendleton's model (Pendleton 1984).

Furthermore, the study highlighted the supervisors' need for more effective communication strategies, as they often perceived their feedback as clear, while

students found it confusing or inadequate. This gap indicated a need for training and resources for clinical supervisors, equipping them with skills to effectively bridge the communication and perception gap with students. Additionally, the importance of customising feedback based on student attitudes and environmental factors was recognised. The positive effects of self-assurance enhancement through positive feedback, and the negative impact of negative feedback, which can lead to stress and a decrease in confidence, were noted (Davis et al. 2006) . Feedback's influence on avoidance behaviour or decision-making, as well as its role in shaping long-term attitudes and career choices, highlighted the profound impact of feedback. Therefore, emphasising the importance of the recipient's engagement and attitude in the efficacy of feedback became critical, along with the need for supervisors to engage students willing to participate in the feedback process. Furthermore, clinical supervisors expressed a need for institutional support in creating an environment that fostered open and honest feedback, minimising the stress and misunderstanding often associated with the feedback process (Boud and Molloy 2013).

In light of these findings, there was a compelling need for EMS education to adapt its feedback mechanisms to align with the diverse needs of students. Bridging the gap between clinical supervisors' feedback preferences and students' learning needs was crucial for enhancing the educational experience. This alignment not only supported the evaluative role of feedback in assessing student performance but also maximised its potential as a tool for learning and professional development. EMS educators and institutions needed to consider these insights to refine their feedback processes and better prepare EMS students for successful careers in healthcare.

4.9 Limitations and future research

Despite its insights, several limitations should be acknowledged when interpreting the results. The research was limited to one EMS institution, the College of EMS at

King Saud University, so the results may not be representative of other EMS institutions in Saudi Arabia or beyond. Additionally, the study's sample, consisting of 72 male EMS students and 30 male clinical supervisors, lacked gender diversity. This absence limits the study's ability to capture diverse perspectives and experiences, particularly those of female students and supervisors.

Although the sample size was deemed adequate for a quantitative case study (Delice 2010), it may not fully represent the broad spectrum of experiences and perceptions that a larger and more diverse sample could provide. These limitations highlight the need for further research. Expanding the study to include multiple EMS institutions across Saudi Arabia would allow for a more comprehensive understanding of feedback perceptions, considering the unique educational contexts of different institutions and potentially enhancing feedback processes to better meet diverse student needs.

This chapter focused on clinical feedback perceptions at a specific EMS institution with male participants. The next chapter presents an opportunistic expansion of research scope due to the onset of the COVID-19 pandemic. This expansion includes a broader range of EMS institutions and more diverse participants, addressing the gaps identified in the initial phase. It also explores how clinical feedback practices have adapted during this period of global disruption, thus serving a dual purpose: building upon the initial insights while examining the resilience and adaptability of clinical feedback mechanisms in extraordinary circumstances. This extension of the research offers a richer and more comprehensive analysis of clinical feedback in both typical and crisis scenarios, marking a significant expansion of the research domain.

4.10 Conclusion

The conclusion of this study synthesised insights from the exploration of clinical feedback perceptions among EMS students and clinical supervisors in Saudi Arabia. Utilising a mixed-methods approach that integrated both quantitative and

qualitative analyses, the study provided a comprehensive understanding of the perceptions of clinical feedback in EMS education.

Key findings indicated significant differences in how EMS students and clinical supervisors perceive clinical feedback. These disparities, uncovered through both structured quantitative data and nuanced qualitative interviews, not only highlighted challenges within the existing feedback system but also underscored specific needs from both perspectives. Such challenges included disparities in feedback clarity, understanding, preferences, timeliness, balance, environment, and the impact of feedback on student learning and professional development. For EMS students, the need was for feedback that is clear, appropriately timed, and delivered in a private, non-judgmental setting to avoid embarrassment and stress, thereby enhancing their understanding and internalisation of the feedback. Clinical supervisors, on the other hand, expressed a need for more effective communication strategies to ensure their feedback is comprehensible to students, and for guidance on how to balance honesty and sensitivity in their feedback, particularly when addressing performance errors or areas for improvement.

The study significantly contributes to the broader literature in nursing, medical, and clinical skills education, with a specific focus on the EMS educational context, an area that had not been extensively explored prior to this research. By delving into the perceptions of clinical feedback within EMS education, this study fills a vital gap and presents insights that are instrumental in guiding improvements in feedback processes. Addressing the study's objectives, the findings highlight not only the challenges faced in the feedback system but also underline the specific needs of both EMS students and clinical supervisors.

The need for alignment between feedback processes and the expectations of students, coupled with the supervisors' perceptions, is emphasised as crucial. This alignment ensures that feedback is not only effective but also meaningful in enhancing educational outcomes in EMS settings. The study underscores the importance of developing feedback strategies that consider the varied

comprehension levels and learning styles of students and provide supervisors with the capability to deliver feedback that is clear, empathetic, and tailored to individual needs. Thus, addressing these challenges and fulfilling these needs is paramount for optimising the efficacy of feedback in the evolving landscape of EMS education.

Chapter 5 A Mixed-Methods Study Examining Clinical Feedback at Emergency Medical Schools in Saudi Arabia during the COVID-19 Pandemic

5.1 Abstract

Background: Clinical feedback is an important factor in the outcomes of students pursuing clinical courses as it enables them to understand the concepts taught in class and apply their knowledge in a practical clinical setting. Traditionally provided in clinical settings, the COVID-19 pandemic has resulted in the use of alternative feedback modalities, including the use of Zoom, Teams, WhatsApp, and email. Understanding how such interventions were evaluated by students and clinical supervisors might aid in determining how to improve clinical feedback in the future. More specifically, with a drive towards a more blended way of traditional teaching and online learning, it would be useful to know what should be kept, when, and how virtual clinical feedback should occur, and in which format.

Purpose of study: The purpose of this study, as outlined in Chapter 4 (Phase 1), was to address the limitations identified in the initial phase of the research and to build upon its findings in this chapter, which represents Phase 2. Chapter 5 (Phase 2) expands on the original study by including a broader participant group and new methods adapted to the context of the COVID-19 pandemic. The initial study was limited to a single EMS institution and predominantly male participants, providing a narrow perspective on clinical feedback. In contrast, this second phase expanded the research to four high-reputation EMS institutions across Saudi Arabia, incorporating a more diverse participant group that included both male and female students and supervisors. This broader approach aimed to provide a more comprehensive understanding of clinical feedback perceptions during normal and pandemic conditions, thereby addressing the geographical and demographic

constraints of the first study. Using mixed methods, including the Perceptions of Feedback Questionnaire (PFQ) and semi-structured interviews, this phase explored the perceptions, experiences, and challenges of clinical feedback, directly linking and expanding upon the previous research.

Methods and results: The study employed mixed methods, using the PFQ questionnaire adapted to assess feedback during COVID-19. This study adheres to the Good Reporting of a Mixed Methods Study (GRAMMS) framework (O'Cathain et al, 2008) to ensure comprehensive and transparent reporting of mixed methods research. The framework provides detailed guidance on justifying, designing, implementing, and reporting mixed methods studies. Participants from four EMS institutions included 376 students and 83 clinical supervisors. Data analysis was conducted using SPSS version 27, with descriptive statistics and the Mann–Whitney *U* test, chosen due to the non-normal data distribution. The results showed no significant differences between students and supervisors in understanding, interpretations, or preferences for clinical feedback during the pandemic. However, students rated the effectiveness of online feedback more favourably than supervisors. Semi-structured interviews with 32 supervisors and 60 students identified various challenges and needs. These included communication barriers, impacts of social distancing on practical learning, time constraints in feedback delivery, technological challenges, and concerns about feedback quality. Additionally, there was an acknowledgment of the challenges in adapting to online feedback, alongside a recognition of its benefits, particularly in terms of flexibility and accessibility. However, the findings also highlighted the need for more interactive, timely, and personalised feedback methods, suggesting that not all expectations regarding feedback methods were met. The interviews also revealed diverse adaptations, preferences, and challenges in clinical feedback during the pandemic.

Conclusion: This study addressed the limitations of the first phase by expanding its scope and including a diverse participant group. It provided a nuanced

understanding of the adaptability, positive aspects, challenges, and future preferences in clinical feedback during the pandemic. Despite the challenges, online methods were largely effective in maintaining the educational process. However, the study also highlighted a gap in understanding exactly how these needs and challenges can be effectively addressed. While the research illuminated the challenges and needs in clinical feedback, the specific elements of need and strategies for addressing them remain somewhat unclear. This realisation underscores the necessity for further research and dialogue to refine feedback methods and enhance learning experiences in EMS education, particularly in the context of Saudi Arabia.

5.2 Introduction

Clinical feedback is an important aspect of EMS education (Wilson 2013). This is because the feedback given to students by their clinical supervisors provides a vital connection between the real-world and educational environment through clinical settings, practice, and skills labs in paramedic programmes. (Biggs and Tang 2007) assert that feedback is critical for students to study and apply different concepts, thus improving the learning process. It enhances students' development by offering them direction, self-esteem, confidence, and self-reflection, and enormously elevates their learning (McKimm 2009; Fotheringham 2011). High-quality feedback is a major component of student development. This motivates and enables learners to improve their behaviours, skills, and knowledge. Without effective feedback, paramedic students are prone to make similar mistakes without being cognisant of their mistakes (Wilson 2013).

The new coronavirus disease (COVID-19) had quickly spread to almost every country in the world (Hopkins 2020). It led to widespread shutdowns across various sectors, including education and industry, the full impact of which became evident globally. The United Nations Educational, Scientific, and Cultural Organisation had monitored the pandemic's effect on education, reporting that by April 2020,

approximately 1.579 billion learners had been impacted by the closure of educational institutions, affecting 90.2% of the global student population (UNESCO 2020). The COVID-19 pandemic profoundly affected student paramedics: It shifted lectures and tutorials to online learning platforms and caused the suspension of practical sessions and all forms of clinical placement (Perkins et al. 2020).

The transition of paramedicine to online learning presented significant challenges for students due to the practical nature of the field. The inability to attend in-person lectures, tutorials, and practical sessions disrupts the traditional learning routines, leading to potential difficulties in acquiring experience, knowledge, and practical skills (Hubble and Richards 2006). This disruption required students to exert more cognitive power in order to engage in online learning sessions (Miller et al. 2011). Additionally, the lack of face-to-face practical sessions hinders paramedic students' development, as real-time scenarios and constructive feedback from peers and academic staff are crucial for their learning (Michau et al., 2009). The absence of hands-on practical sessions also affects the consolidation of theoretical knowledge and the development of a systematic approach to patient management processes, which are essential for visual and kinaesthetic learners in health and medical programmes (Michau et al. 2009).

Furthermore, the lack of in-person interaction and inability to receive feedback on clinical skills can lead to feelings of isolation and anxiety among students, potentially impacting their mental health and academic performance (Michau et al. 2009). This is supported by the findings of a study that demonstrated the importance of peer feedback in online learning for improving the quality of discourse and learning outcomes (Van Popta et al. 2017). Moreover, the shift to online learning requires students to cultivate willpower and resist distractions, particularly in the absence of immediate monitoring by instructors (Van Popta et al. 2017). The literature also emphasises the effectiveness of formative online feedback in fostering student engagement, improving achievement, and enhancing the motivation to learn (Pishchukhina and Allen 2021).

Despite these challenges, there are potential benefits and effectiveness in online instruction. Studies by Guidera (2003), Perera-Diltz et al. (2018), Ramadhani and Hafifah (2022) have shown that online instruction can enhance written communication skills, self-directed learning, and facilitate student feedback. In professional health education, clinical feedback is typically defined as specific information comparing a trainee's performance with a standard, intended to improve performance. While the importance of feedback, whether in-person or online, is widely acknowledged, the nature of clinical feedback in remote environments remains less clearly defined. Given these global challenges in EMS education, it became crucial to determine the level of understanding, expectations, preferences, interpretations, and challenges among students and clinical supervisors of EMS with the clinical feedback that they received under COVID-19 pandemic restrictions to the traditional modes of EMS education.

5.3 Study Rationale

The overall purpose of this PhD was to investigate the experiences and perceptions of clinical feedback from the perspectives of the clinical supervisors providing it and students in EMS colleges across Saudi Arabia. This study aimed to improve clinical feedback in EMS education in Saudi Arabia. The first phase of this PhD programme was conducted prior to the COVID-19 pandemic and considered clinical feedback at a particular EMS institution in Saudi Arabia. This case study provided an opportunity to pilot the research tools and pave the way forwards for the PhD. Building upon those findings, the research was extended to four further EMS institutions in Saudi Arabia. In addition, in light of how the world responded to the COVID-19 pandemic, revisions were made to the study protocol to reflect the changing clinical education landscape.

The aim of this chapter is to examine the following:

1. To examine and compare the perceptions of understanding, effectiveness, preferences, and interpretations of clinical feedback among EMS students and clinical supervisors.

2. To explore and investigate the challenges and needs related to clinical feedback as experienced by both EMS students and clinical supervisors.

3. To determine whether some changes in clinical feedback practices necessitated by the COVID-19 pandemic are perceived positively and should be continued post-pandemic, thereby using the pandemic as an opportunity to evaluate and potentially refine the feedback process.

4. To gather insights on what can be learned from the shift in clinical feedback methods during the COVID-19 pandemic and how these learnings might influence future practices in EMS education, especially in the context of unexpected disruptions or similar scenarios.

5.4 Methodology

5.4.1 Research design

The study uses both quantitative and qualitative methods to gain a comprehensive understanding of participants' perceptions of clinical feedback. The quantitative aspect involved a survey, as outlined by Willig and Rogers (2017), which is instrumental in examining, testing, and validating the findings by operationalising research constructs. Creswell et al. (2007) and Morgan (2018) emphasise that this approach impartially evaluates numerical data, providing a quantifiable, structured, and predictive analysis based on empirical evidence. Complementing this, the semi-structured interviews offered deeper insights into the experiences and viewpoints of participants, enriching the understanding of the quantitative data and providing a more holistic view of the study's outcomes.

To ensure comprehensive and transparent reporting, this study adheres to the GRAMMS framework (O'Cathain et al. 2008), as detailed in the checklist provided in Appendix 5.01.

5.4.2 Sample and Procedure

The quantitative component involved a survey using the Perceptions of Feedback Questionnaire (PFQ), adapted to assess feedback during the COVID-19 pandemic. This study was conducted at four EMS institutions in Saudi Arabia. Three of the participating EMS colleges were government institutions, whereas one was a private institution. The researcher was eager to involve the largest EMS government colleges in Saudi Arabia, since these institutions will provide larger sample sizes, thereby producing more accurate results (Andrade, 2020). These institutions include King Saud bin Abdul-Aziz University for Health Sciences (KSAU-HS), which has both male and female students; Imam Abdulrahman Bin Faisal University (IAU), which has only male students; and Prince Sultan College for Emergency Medical Services (PSCEMS), which has only male students. Al-Ghad International Health Sciences Colleges (AICHS) is Saudi Arabia's largest private EMS institution that includes both male and female students. Although there are no major differences in curriculum or teaching methods between government and private universities, the choice of these institutions was also influenced by their geographic distribution, allowing for a more representative sample of the EMS student population across different regions of Saudi Arabia.

Recruitment

To ensure the inclusion of a diverse participant group, a variety of recruitment methods were employed, targeting both male and female participants across all years of study. These methods included direct email invitations, announcements through institutional communication channels, and coordination with academic departments to reach potential participants. After making direct contact with the scientific research departments at the four faculties to obtain approval to conduct

the research by providing a summary of the study and research information, approval was obtained and information was given to access the clinical supervisors and students at these four faculties. All clinical supervisors and students in all years of the study received an email invitation to complete the online questionnaire.

An invitation to complete an online questionnaire was sent to all clinical supervisors and students in all years of study through email. Participants were also invited to take part in an interview and were asked to select the most suitable day and time while adhering to the new COVID-19 pandemic guidelines. The recruitment process was carefully designed to maximise participation while ensuring ethical standards were maintained, including voluntary participation, informed consent, and the ability to withdraw at any stage without consequence. The interviews were conducted face-to-face while respecting social distancing rules and related guidelines at a place convenient to the participants within the college. However, if a participant's circumstances made this difficult, the interview was conducted by another method, such as Skype or a phone call.

A total of 376 EMS students and 83 clinical supervisors completed the questionnaire, including 317 male and 59 female students in their first to fifth years, and 63 male and 20 female clinical supervisors (for a full break down, see Table 5.1 and Table 5.2). The sample size was considered acceptable for a quantitative study (Delice 2010). The diversity in the sample, both in terms of gender and academic year, was essential to ensure that the findings reflected a wide range of perspectives on clinical feedback during the pandemic. The careful balance between sample size and composition allowed for a robust analysis that captured differences in gender, institutional type, and other variables of interest.

Additionally, efforts were made to address potential barriers to participation, such as technological access for completing online surveys and interviews. For instance, participants who lacked reliable internet access were offered the option to complete interviews via phone calls, ensuring inclusivity in data collection.

Table 5.1 Students' demographic data

Gender		Frequency	Percentage
	Female	59	15.7
	Male	317	84.3
Grade level			
	Lower average students	4	1.1
	Average students	77	20.5
	Good students	249	66.2
	Top of the class students	46	12.2
Study institution			
	IAU	85	22.6
	KSAU-HS	120	31.9
	PSCEMS	141	37.5
	AICHS	30	8.0
Study year			
	Year 1	14	3.7
	Year 2	79	21.0
	Year 3	120	31.9
	Year 4	79	21.0
	Year 5	84	22.3
Experience receiving feedback before COVID-19			
	Yes	362	96
	No	14	4

Table 5.2 Supervisors' demographics

Gender		Frequency	Percentage
	Female	20	24.1
	Male	63	75.9
Age			

	18–25 years	12	14.5
	26–35 years	46	55.4
	36–45 years	15	18.1
	46–55 years	10	12.0
Current institution			
	PSCEMS	30	36.1%
	KSAU-HS	23	27.7%
	Al-Ghad college	18	21.7%
	IAU	12	14.5%
Work years			
	1–5 Years	49	59.0
	6–10 Years	22	26.5
	11–15 Years	10	12.0
	More than 20 years	2	2.4

Complementing the PFQ, semi-structured interviews were conducted to add depth. A total of 32 clinical supervisors and 60 students participated in these interviews, including 63 male and 20 female clinical supervisors, and 317 male and 59 female students. The selection of participants for interviews was based on their willingness to provide more detailed insights into their experiences with clinical feedback, ensuring a balanced representation of perspectives across different institutions and academic levels. These interviews were conducted either face-to-face, via Zoom, or phone calls, according to the participants' convenience and adhering to COVID-19 guidelines. Participants were provided with the interview questions in advance to allow for thorough preparation and to ensure that the discussions were focused and productive. The interviews explored topics such as the impact of the pandemic on work, adaptation strategies, coping with changes, meeting student expectations, challenges in providing feedback, and identifying good practices for future clinical education. The interviews were carefully recorded to ensure accuracy and later scrutinised for thorough qualitative analysis.

5.4.3 Research instruments and data gathering

Methods

A mixed methods approach was used, integrating quantitative data from a revised questionnaire and qualitative insights derived from semi-structured interviews. The mixed-methods approach was selected to capture a comprehensive understanding of clinical feedback during the pandemic, combining the statistical power of quantitative analysis with the nuanced insights that qualitative methods provide.

Survey

The quantitative component of the study involved the use of a revised version of the Perceptions of Feedback Questionnaire (PFQ). To adapt to the evolving needs of clinical feedback, particularly in response to COVID-19, the questionnaire from study one (19 items) was revised, beginning with a thoroughly evaluation for its construct validity and reliability. In this revised format, the 17 Likert-scale items were carefully edited to suit the new online feedback context. The questionnaire was again examined for content validity, with feedback from five EMS Clinical Supervisors. Their insights were invaluable in refining the questions, ensuring that they clearly and directly addressed the current feedback methods. This process also helped to ascertain face and content validity.

Two items were either revised or removed to eliminate redundancy and irrelevance: For instance, Perceptions of Feedback Preferences Items 1 and 2 were removed because their content overlapped with a more comprehensive item and to avoid fatigue. Specifically, *“I prefer to receive online feedback via the comment section in Microsoft Office Word for evaluating my performance in clinical settings”* was removed as well as *“I prefer receiving online feedback comments through platforms like Turnitin regarding my performance in clinical settings”.*

The reason for deleting both items was that they essentially repeat the content of a more inclusive item irrespective of the platform used, which states: *"I prefer to receive online feedback via typed, electronic comments on my work and performance in clinical settings".*

The questionnaire was then piloted with 6 students and 3 clinical supervisors, who were considered to be from the target population of this study. The pilot test was crucial for identifying any ambiguities or difficulties in understanding the questions, and adjustments were made based on the feedback received during this phase.

Participants responded to each item on a Likert scale that measured their level of agreement with the statements presented over five options: 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree. The questionnaire content was almost identical for clinical supervisors and students, with a few differences in wording that reflected the differences between samples (see Appendix 5.02). It consists of four sections that investigate the perception of participants regarding clinical feedback during the COVID-19 pandemic as follows:

1) Perceptions of Clinical Feedback understanding (PFU), $n = 6$
2) Perceptions of Clinical Feedback effectiveness (PFE), $n = 4$
3) Perceptions of clinical feedback preferences (PFP), $n = 4$
4) Perceptions of clinical feedback Interpretation (PFI), $n = 3$

An open-ended question was included to allow participants to share their personal experiences with online clinical feedback during the pandemic. The following open-ended questions were used.

***Clinical supervisors' open-ended question*:** What suggestions would you share with your students concerning what to do with the online clinical feedback offered during the pandemic?

Students' open-ended question: What suggestions do you have for your clinical supervisor regarding the provision of online clinical feedback concerning your performance given during the pandemic?

These open-ended questions were designed to capture a broad range of experiences and insights, allowing participants to provide detailed narratives that could uncover themes not anticipated in the structured sections of the questionnaire.

Complementing the questionnaire, semi-structured interviews were conducted to provide deeper insights. These interviews offered an avenue for respondents to articulate their experiences and perceptions in greater detail, adding depth to the results with crucial information and rich descriptive examples (DeJonckheere and Vaughn 2019). The semi-structured format was chosen to balance the need for consistency across interviews with the flexibility to explore individual experiences in more depth, depending on the responses provided.

Participants were recruited to interview by an invitation letter attached at the end of the survey, asking them whether they would like to take part in the interview to further voice their perceptions regarding their experiences of clinical feedback during the pandemic. This provided participants with opportunity to discuss what worked and what may have not worked so well, potential challenges and the way forward regarding online clinical feedback.

Semi-structured interview

To further examine the similarities and differences in the perceptions of students and supervisors regarding online clinical feedback, respondents who completed the questionnaire were invited to participate in a semi-structured interview. Thirty-two clinical supervisors and 60 students were interviewed individually.

The interviews were conducted via Zoom or telephone at a time convenient to the respondents. These modes of communication were selected to accommodate the varying levels of comfort and access to technology among participants, ensuring that all could participate regardless of their location or circumstances. The interview schedule was sent to the respondent's email address prior to the interview, and participants were asked to choose the most convenient time for their interviews. Creswell and Poth (2016) clarified that care should be taken during interviews to limit interruptions. Both factors were considered in this study. The interviews were conducted in English, since most of the participants could communicate in English. English is the official teaching language of instruction in colleges in Saudi Arabia.

Recording the interviews allowed the topics and the progression to be scrutinised more thoroughly, making it possible to carefully review the participants' answers later (DiCicco-Bloom and Crabtree 2006; Brinkmann and Kvale 2018). Two recording machines were used simultaneously in case one failed during the recording (Flick 2014; Silverman 2021). This approach ensured that no data was lost and that the accuracy of the transcripts was maintained, which is critical for the reliability of qualitative analysis.

The interview schedule was crafted to provide a comprehensive understanding of the experiences of students and clinical supervisors during a challenging period, offering invaluable insights for shaping future educational strategies and addressing evolving needs in clinical settings. The development of the interview schedule was informed by the preliminary findings from the quantitative data, ensuring that the questions were relevant and would yield rich, meaningful data. The following sections outline the interview schedule for students and clinical supervisors.

Clinical instructor interview guide questions

For the clinical supervisors, the following questions were asked during the interviews:

- *Reflecting on the past few months of your role as a clinical supervisor or as a faculty member, in which way(s) did the pandemic impact your work?*
- *What did you have to do differently?*
- *How did you cope with the changes that took place?*
- *Do you think that students' expectations of clinical feedback were met? Please provide examples and details.*
- *What were you able to do as a clinical supervisor to ensure that the students' needs were met, and how did you provide them with clinical feedback?*
- *With these changes in place, have you encountered any challenges or barriers to providing clinical feedback to your students? Please provide some examples and details.*
- *Reflecting on your experiences as a clinical supervisor during the pandemic, what suggestions do you have on how clinical feedback can be improved in the current situation?*
- *Reflecting on your experiences as a clinical supervisor during the pandemic, have you observed any good practices and examples of clinical feedback that can be carried forward once face-to-face teaching can be resumed?*
- *If you had to describe your experience of providing clinical feedback during the pandemic in three words, what would they be?*

The interview concluded with the following question: *Are there any other points you would like to add?*

The complete interview guide for clinical supervisors, including the opening statement and introductory statement, is provided in Appendix 4.05.

Students' interview guide questions

The following questions were used to obtain responses from students regarding their perceptions of the pandemic's impacts and challenges to their studies:

- *Reflecting on the past few months, in what ways did the pandemic impact your studies?*
- *Reflecting on the past few months, in what ways did the pandemic impact the way you received clinical feedback?*
- *What was done differently?*
- *How did you cope with the changes that took place?*

The interview concluded with the following question: *Are there any other points you would like to add?*

The complete interview guide for students, including the opening statement and introductory statement, is provided in Appendix 5.03.

5.5 Ethical considerations

Adherence to stringent ethical considerations was paramount to ensure the protection and confidentiality of all participants. Consent for participant access was obtained from the involved colleges, and ethical approval was granted by the Research Ethics Committee of Cardiff University School of Medicine, detailed in Appendix 5.04.

Prior to starting the study, informed consent was secured from all participants and gatekeepers, documented in Appendix 5. The informed consent process was carefully structured to ensure that participants fully understood the nature of the study, the extent of their involvement, and their rights, including the right to withdraw at any point without penalty. This information was provided in clear and accessible language to ensure comprehension across different educational levels. The study's objectives were clearly communicated to participants, assuring anonymity and emphasising the confidential handling of responses in accordance with the UK Data Protection Act (DPA). To preserve confidentiality, respondents' identities were anonymised through the assignment of number codes, incorporating respondent number and a code unrelated to personal identifiers. These codes were

used consistently throughout the analysis and reporting phases to protect participant identities.

The questionnaire was made available online, allowing respondents to complete it asynchronously during their free time, ensuring privacy and convenience. Participants were informed that their responses would be kept confidential and that aggregated data would be used for analysis to prevent the identification of any individual responses. Additionally, in the qualitative component of the study, the researcher established a rapport of trust with participants, as underscored by (Israel and Hay 2006). This rapport was crucial in facilitating honest and open responses from participants.

Throughout the semi-structured interviews, every effort was made to ensure that participants understood the questions, which were tailored to their educational and cultural backgrounds, aligning with the guidelines suggested by Brinkmann and Kvale (2018). Special attention was given to the language and phrasing of questions to avoid any potential misunderstandings or discomfort, and participants were encouraged to seek clarification whenever needed. The dignity and perspectives of the respondents were respected at all times, and their viewpoints were not evaluated but rather acknowledged as honest assessments of their experiences. Participants were reminded that there were no right or wrong answers, and their responses were treated with the utmost respect and consideration.

By merging these ethical considerations, the study upheld the highest standards of research ethics, respecting participant confidentiality and dignity, and ensuring the integrity of the research process in its entirety.

5.6 Data analysis

The analysis of both quantitative and qualitative data in this study was conducted in a manner that ensured the methods complemented and enhanced each other, providing a comprehensive understanding of the research questions.

Quantitative Analysis:

The questionnaire responses were examined for reliability and validity using Cronbach's α and exploratory factor analysis. Descriptive statistics were calculated using the mean, median, and standard deviation. Normality was tested using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Additionally, statistical differences between the perceptions of students and clinical instructors were examined using the non-parametric Mann–Whitney U test and Student's t-test, with a significance criterion set at $p < 0.05$.

Qualitative Analysis:

The interviews were transcribed verbatim to capture the exact language and meaning of the participants' responses. To ensure accuracy, the recordings were compared with the transcripts, addressing potential inaccuracies as recommended by Creswell and Poth (2016). Alternative qualitative analysis methods such as content analysis and grounded theory were considered. Content analysis, which involves a systematic coding and categorising approach to exploring large volumes of data, could have provided a different form of data reduction and inference (Krippendorff, 2013). Grounded theory could have been appropriate for developing systemic theories and was considered for its strength in constructing theoretical frameworks based on empirical data (Charmaz, 2014). However, thematic analysis was selected for its flexibility and suitability for identifying, analysing, and reporting patterns (themes) within data, particularly useful in studies that aim to explore a broad range of perspectives and experiences (Braun and Clarke, 2012). This method accommodates a rich, detailed, and complex account of data, crucial for understanding the nuanced perceptions of feedback in this educational context. The thematic analysis, following the framework of Braun and Clarke (2006), involved familiarising with the data through repeated readings, generating initial codes, searching for themes, and refining these themes to accurately reflect the data. NVivo software was used to organise and analyse the qualitative data efficiently.

The analysis methods for both the quantitative and qualitative data were designed to complement each other. While the quantitative analysis provided a structured, numerical understanding of the participants' perceptions, the qualitative analysis offered deeper insights into these perceptions, exploring the nuances and complexities that numbers alone could not convey. By triangulating the findings from both methods, the study achieved a more holistic view of the research outcomes. The qualitative data enriched the interpretation of the quantitative results, and the quantitative data provided a broad context that framed the qualitative insights.

5.6.1 Thematic analysis

The interviews were transcribed verbatim, resulting in substantial repetition. The verbatim transcription was critical to preserving the authenticity of participants' responses, ensuring that the data remained true to the original expressions and meanings conveyed during the interviews. Inaccuracies often arise when transcribing interviews (Brinkmann and Kvale 2018), including faults in listening, poor sound quality and misunderstandings, which can affect validity. Therefore, the recordings was compared to the transcripts to ensure accuracy and that the meaning was not altered (Creswell and Poth 2016). This comparison process involved a meticulous review where each transcript was checked against the original audio recordings, and any discrepancies were corrected to ensure the integrity of the data. In addition, gaps in speech were included, but suggested expressions of emotion were eliminated. This decision was made to maintain a focus on the content of the responses rather than the delivery, ensuring that the analysis was grounded in the substantive data rather than inferences about emotional tone.

The thematic analysis procedure followed a systematic approach to ensure the credibility and trustworthiness of the findings.

The thematic analysis procedure is shown in Figure 5.1

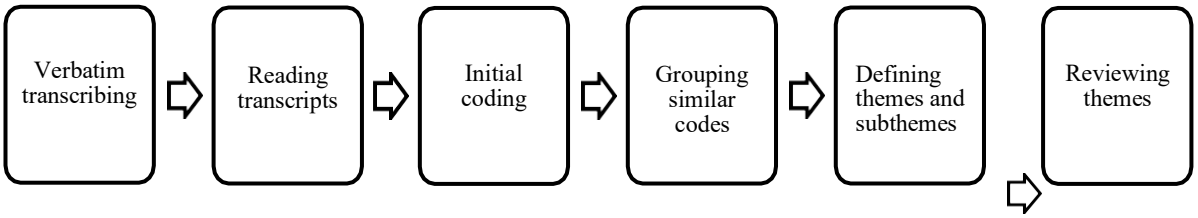

Figure 5.1Thematic analysis process (Braun and Clarke 2006)

The process of familiarising with the interview data involved multiple focused readings of the transcripts to jot down initial ideas and notes for the coding process, in line with the approach recommended by (Braun and Clarke 2006) , and identifying commonalities with an incredibly active approach as described by (Sayer 1992). During this phase, the researcher took detailed notes and highlighted key passages that seemed significant, which later informed the coding process. The analysis then transitioned into a structured methodology consisting of several key steps: Initial code generation involved identifying significant phrases or segments within the transcripts and labelling them with codes that succinctly described their content or meaning. This was followed by searching for themes, where codes were collated into potential themes by grouping related codes that shared common ideas or concepts. This step was conducted iteratively, with themes being revisited and refined as new insights emerged during the analysis. This step was iterative, involving refining and redefining the themes to best represent the data. The process proceeded with reviewing themes to ensure they formed a coherent pattern and accurately reflected the coded extracts, which involved reassessing both the coded data and the overall dataset to verify their meaningfulness and comprehensiveness. This review process also included seeking feedback from the research supervisor to ensure that the themes accurately represented the data and were not unduly influenced by the researcher's biases or assumptions. Finally, each theme was clearly defined and named to accurately capture the essence of the data within each theme. The final definitions of the themes were then cross-checked with the original data to ensure that they captured the full range of meanings conveyed by

participants, maintaining a strong connection between the data and the analysis. To support and organise this complex process, NVivo (Version 12) software was employed, which facilitated efficient data organisation and retrieval for further analysis, thereby enabling a systematic approach to thematic analysis (Jackson and Bazeley, 2019). NVivo also provided tools for visualising the relationships between codes and themes, which aided in identifying patterns and drawing more nuanced conclusions from the data.

5.7 Results

The quantitative analysis was conducted by summarising the Likert scale rating using frequency distribution, and the mean value was used to draw conclusions on each scale level of agreement. Supervisors' and students' perceptions of clinical feedback were compared using the Mann–Whitney *U* and Student's *t*-tests. These tests were selected due to their suitability for handling non-parametric data, providing a robust comparison between the two groups.

5.7.1 Data screening

Data screening involved a thorough process to check for any inconsistencies, missing values, or outliers that could potentially skew the results. Cronbach's alpha was calculated to assess internal consistency, while normality was tested using the Kolmogorov-Smirnov and Shapiro-Wilk tests. These tests were crucial in determining whether the data met the assumptions required for subsequent statistical analyses, such as the Mann-Whitney U test and t-tests.

Table 5.3 Cronbach's alpha and normality tests

	Cronbach's α	Kolmogorov–Smirnov			Shapiro–Wilks		
		statistic	df	*p*	statistic	df	*p*
PFU	0.82	0.13	459	0.001	0.92	459	0.001
PFE	0.88	0.17	459	0.001	0.87	459	0.001
PFP	0.81	0.11	459	0.001	0.95	459	0.001
PFI	0.75	0.08	459	0.001	0.97	459	0.001

The results of these tests are detailed in Table 5.3. The internal consistency (Cronbach's alpha) for the constructs measured ranged from 0.75 to 0.88, indicating good reliability. However, the normality tests indicated that the data were not normally distributed ($p < 0.001$), necessitating the use of non-parametric tests for further analysis. In all four cases, $\alpha > 0.70$, indicating good internal consistency (Field 2009). A preliminary evaluation of the data established that it is reliable and that further analysis can be conducted without excluding any factor or item from the study. The factors were not normally distributed; thus, non-parametric tests were used to further analyse the data.

5.7.2 Exploratory Factor Analysis (EFA) and Reliability Testing

The EFA was conducted as an initial step to explore the underlying structure of the questionnaire items. This involved examining the factor loadings and communalities to ensure that each item contributed meaningfully to the constructs being measured. Exploratory factor analysis was performed to determine the validity of factor structure and Cronbach's α was calculated to assess their reliability (Tavakol and Dennick 2011). The decision to retain items in the analysis was based not only on their statistical performance (e.g., factor loadings exceeding 0.30) but also on theoretical considerations and the relevance of the items to the study's objectives.

The overall Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.896, indicating a high suitability for conducting factor analysis as shown in Appendix 5.05. This value suggests that the patterns of correlation among variables were

sufficiently strong to warrant a reliable factor analysis (Kaiser and Rice 1974). Bartlett's Test of Sphericity also supported the appropriateness of factor analysis, showing a significant result ($\chi^2 = 4284$, df = 136, $p < 0.001$).

Factor Loadings and Variances

Principal axis factoring, complemented by an oblimin rotation, was employed for factor extraction. Oblimin rotation was chosen because it allows for the possibility that factors may be correlated, which was expected given the interrelated nature of the constructs measured in this study. Detailed factor loadings for each item can be found in Appendix 4.03. According to Field (2009), each questionnaire item's factor loading should surpass the 0.30 threshold for inclusion in the analysis. All communalities exceeded this benchmark, suggesting that each variable shared significant common variance with others. Collectively, the four factors accounted for 64.3% of the variance in the dataset. Despite some PFI items not loading on the same factor, the theoretical foundation underpinning the questionnaire items was considered more significant than the EFA results, leading to the decision to keep all items in the dataset.

Having established the factor structure and reliability of the PCF through EFA, the study progressed to a more definitive phase of analysis: confirmatory factor analysis (CFA) to validate and confirm the structure of the questionnaire within the context of EMS. CFA was conducted using maximum likelihood (ML) estimation, building upon the initial insights gained from the EFA. This step is critical in solidifying the construct validity of the questionnaire, ensuring that the identified factors accurately represent the underlying dimensions of perceptions of clinical feedback in EMS. The CFA's emphasis on model fit and factor loadings provided a rigorous test of the questionnaire's structural integrity, which is essential for its application in real-world EMS settings.

Confirmatory Factor Analysis of the PFQ

In validating the structure of the Perceptions of Feedback Questionnaire (PFQ) within the realm of EMS, the CFA played a pivotal role. The CFA involved testing the fit of the hypothesised model to the data, using indices such as the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) to assess model adequacy. Utilising the Maximum Likelihood (ML) estimation method, this CFA was conducted as a critical step following an initial EFA.

To appraise the model's fit, several tests were employed, starting with $\chi^2 = 275.094$ (with 59 degrees of freedom), significantly improving upon the baseline model's 2540.159 (with 78 degrees of freedom), thus indicating a markedly better fit ($p < 0.001$), as per Brown (2015). This significant improvement in fit indices indicated that the refined model provided a more accurate representation of the data structure. For an in-depth view of these results, refer to Appendix 5.06.

Table 5.4 outlines key model fit statistics and evaluation indices from the CFA of the PFQ. Detailed statistics are available in Appendix 5.06:

Table 5.4 Summary of Model Fit Statistics and Evaluation Indices

Measure	Value
Chi-square (X^2) for Factor Model	275.094
Degrees of Freedom (df)	59
P-value	< .001
Comparative Fit Index (CFI)	0.912
Tucker-Lewis Index (TLI)	0.884
Standardised Root Mean Square Residual (SRMR)	0.045
Goodness of Fit Index (GFI)	0.982

Further analysis included additional fit measures. The Comparative Fit Index (CFI) and the Tucker–Lewis Index (TLI) both surpassed the acceptability threshold of 0.90, indicating a good model fit as per Hu and Bentler (1999), detailed in Appendix 5.06.

The Root-Mean-Square Error of Approximation (RMSEA) stood at 0.099, which, though marginally above the ideal threshold of 0.08, remained within an acceptable range as per Steiger (2007). Further, the Standardised Root-Mean-Square Residual (SRMR) was recorded at a favourable 0.045, well below the standard of 0.08, as noted by (Kline 2023). These measures are comprehensively outlined in Appendix 5.06.

Within the PFQ, particularly in the PFU construct, the items demonstrated strong factor loadings ranging from 0.705 to 0.892. This indicated an effective representation of these items within their respective constructs, as discussed by Gorsuch (1997). Additionally, the inter-factor correlations, ranging between 0.207 and 0.841, reflected significant relationships among the questionnaire's dimensions, aligning with Jöreskog (2007), as highlighted in Appendix 5.06.

5.7.3 Descriptive Analysis

The descriptive analysis aimed to explore and compare how EMS students and their clinical supervisors perceive clinical feedback across four dimensions: understanding, effectiveness, preferences, and interpretations. This analysis began with a quantitative survey that provided an overview of the trends in responses and was followed by more in-depth exploration through qualitative interviews. The survey used Likert-scale responses to capture these broad trends in perception.

Comparative Analysis of Students' and Supervisors' Perspectives on Feedback

The study aimed to explore and compare how EMS students and their clinical supervisors perceive clinical feedback, focusing on understanding, effectiveness, preferences, and interpretations.

Table 5.4 presents this comparative analysis. In understanding clinical feedback, students showed a slightly higher mean score of 3.90 (median 4.00, SD 0.78), compared to the supervisors' mean of 3.71 (median 4.06, SD 1.00). The *p* value of 0.37 indicated no significant statistical difference overall. Students demonstrated

greater understanding in areas such as feedback on reporting mistakes and suggestions for improvement. In contrast, their understanding was comparatively lower when feedback was provided in the form of a letter grade or percentage.

Significant differences were observed in the perception of feedback effectiveness. Students rated it higher, with a mean of 4.14 (median 4.33, SD 0.85), versus supervisors' mean of 3.76 (median 4.00, SD 0.99). The *p* value of less than 0.001 confirmed the statistical significance of this difference. Students demonstrated more favourable ratings in several key areas. They were more in agreement with the feedback received, showed greater satisfaction with the online feedback provided, and perceived the feedback as more instrumental in fostering hard work and enhancing performance improvement, compared to the supervisors. These insights highlighted a more positive view of the role and influence of feedback among students when contrasted with supervisors' perceptions.

Regarding interpretations of clinical feedback, both groups shared similar views, with students reporting a mean of 3.44 (median 3.43, SD 0.75) and supervisors a mean of 3.43 (median 3.57, SD 0.88), and a *p* value of 0.33 indicating no significant difference. Detailed insights showed variations in certain areas, such as students' frequency in asking questions for clarification and their engagement with supervisors outside of practice hours.

Differences were also evident in feedback format preferences. Although the overall preference scores showed no significant difference ($p = 0.74$), with students having a mean of 3.19 (median 3.20, SD 0.97) and supervisors a mean of 3.20 (median 3.40, SD 0.92), detailed item analysis revealed distinct preferences. Students showed a higher preference for receiving clinical feedback in written, audio and video feedback, more than supervisors who preferred face-to-face feedback .

Overall, the study's findings provided a comprehensive overview of the differences and perceptions of clinical feedback among EMS students and clinical supervisors during the pandemic. Both groups exhibited a strong understanding of clinical

feedback, with no significant statistical differences noted. However, when it came to the effectiveness of feedback, students tended to view feedback as a more direct contributor to their learning and skill enhancement, supervisors had differing expectations regarding the impact of their feedback on students' performance, motivation and satisfaction. In interpretation of feedback, students showed more engagement by frequency asking questions for clarification and engagement with their supervisors outside of practice hours. Moreover, preferences for feedback delivery methods showed clear divergence: students showed a stronger preference for receiving feedback in written, audio, or video formats. In contrast, supervisors leaned towards traditional, face-to-face methods of feedback delivery. Overall, the perceptions of clinical feedback during pandemic were positive among students more than clinical supervisors.

Table 5.5 Descriptive statistics and test of differences between students' and clinical supervisors' perceptions of online clinical feedback

		Mean	N	Median	SD	SE	Mann-Whitney U Statistic	*p*
Understanding of online clinical feedback	Students	3.90	373	4.00	0.781	0.0404	14332	0.371
	Supervisors	3.71	82	4.06	1.002	0.111		
Effectiveness of online clinical feedback	Students	4.14	373	4.33	0.845	0.0437	10994	<.001
	Supervisors	3.76	83	4.00	0.995	0.109		
Interpretations of online clinical feedback	Students	3.44	374	3.43	0.750	0.0388	13036	0.333
	Supervisors	3.43	75	3.57	0.881	0.102		

Perceptions	Students	3.19	37	3.20	0.96	0.050	15156	0.736
Preferences			4		9	1		
of online	Supervisor	3.20	83	3.40	0.92	0.101		
clinical	s				4			
feedback								

5.7.4 Thematic analysis

This section presents the analysis of the transcribed semi-structured interviews. This method enabled an in-depth exploration of the perceptions of EMS clinical supervisors and students regarding their experiences with clinical feedback during the COVID 19 pandemic. By asking participants about their experiences in both giving and receiving feedback during this period, the study aimed to explore and investigate the challenges and needs related to clinical feedback as experienced by both EMS students and clinical supervisors during pandemic.

The qualitative interviews provided crucial insights that complemented the survey results. While the survey highlighted broad trends and differences in perceptions, the interviews delved into the nuances, revealing the specific challenges and preferences that shaped participants' experiences with clinical feedback. The qualitative data enriched the quantitative findings by explaining the underlying reasons for the divergence in perceptions of feedback effectiveness and the preferred feedback formats. This deeper understanding allowed for a more comprehensive interpretation of the data, highlighting areas where quantitative findings could be further explained or enriched by qualitative insights.

Additionally, this study focused on exploring how the shifts in activity restrictions and behavioural norms, prompted by the COVID-19 pandemic, have impacted the delivery and reception of clinical feedback. The analysis sought to identify both the immediate and longer-term effects of these changes on educational practices and outcomes. It aimed to investigate the adjustments in perceptions and practices

related to clinical feedback in response to these changes. These adjustments were examined in light of the broader shifts in educational environments, with a focus on how they might inform future practices in a post-pandemic world. Another objective was to assess whether the modifications in clinical feedback practices, necessitated not by the pandemic itself but by the resulting changes in clinical and educational environments, are viewed as positive and warrant continuation post-pandemic. This forward-looking aspect of the analysis aimed to identify best practices that could be retained or adapted for future use, ensuring that the lessons learned during the pandemic continue to benefit educational practices in the long term.

The study also aimed to gather insights on what can be learned from the shift in clinical feedback methods during the COVID-19 pandemic and how these learnings might influence future practices in EMS education, especially in the context of unexpected disruptions or distances learning. This is particularly relevant as the world increasingly relies on technology and distance learning.

Table 5.6 presents a comprehensive overview of the themes that emerged in this study, reflecting the experiences of students and clinical supervisors in paramedic education during the covid-19 pandemic.

Table 5.6 Themes, subthemes, examples, and definitions

Theme	Definition of the Theme	Subtheme	Examples
1) Challenges and Needs for Clinical Feedback During the Pandemic	This theme addresses the challenges and impacts faced by clinical supervisors and students in providing clinical feedback during the pandemic, particularly in adopting new approaches such as distance learning and the hurdles associated with these changes.	Clinical Feedback Challenges During the Pandemic	- Lack of training and preparation for online clinical feedback. - Difficulties in engaging students in online clinical feedback. - Lack of time and resources. - Technical issues during online feedback sessions.
		Needs Associated with Clinical Feedback During the Pandemic	- Improved communication between supervisors and students. - Personalised feedback (privacy considerations). - Timely feedback provision. - Structured and constructive clinical feedback.
2) Positive Aspects and Preferences for Clinical Feedback	This theme examines the beneficial aspects and preferred methods of online feedback during the COVID-19 pandemic, as seen from	Enhancement of Independent Learning Skills	- Increased self-dependence and self-discipline among students and clinical supervisors.

During the Pandemic	the perspectives of EMS students and clinical supervisors.		- Better pre-preparation, time management, and accessibility for clinical feedback.
		Educational Adaptations and Technological Skills Improvement	- Splitting students into smaller groups for laboratory work. - Improvement in clinical supervisors' technological skills.
		Flexible and Convenient Clinical Feedback Methods	- Use of hybrid clinical feedback methods. - Accessible and revisitable feedback sessions.
3) Clinical Feedback Practices to Continue Post-Pandemic	This theme explores students' and supervisors' views on continuing certain clinical feedback methods and educational practices after the pandemic, focusing on adapted ways of providing feedback in a post-pandemic context.	Educational Strategies	- Dividing students into smaller groups. - Pre-clinical practice laboratory preparation.

Theme one: Challenges and needs for clinical feedback during the pandemic.

The theme explored the challenges and emerging needs for clinical feedback within the context of the COVID-19 pandemic. It highlighted the critical shift from traditional in-person interactions to remote and digital communication methods, emphasising the adjustments that were required in the delivery and reception of

feedback. The importance of effective feedback in enhancing clinical skills, fostering student self-awareness, and adapting to rapidly changing educational environments was underscored.

The analysis delved deeply into Clinical Feedback Challenges During the Pandemic, drawing insights from a diverse range of respondents, including students and clinical supervisors from various institutions. These included nine students from all the EMS institutions (Respondents 18, 16, 21, 3, 44, 54, 5, 6, 37) and seven clinical supervisors from all the EMS institutions (Respondents 1, 7, 30, 9, 6, 2, 5). This analysis revealed two significant sub-themes: “Clinical Feedback Challenges During the Pandemic” and “Needs Associated with Clinical Feedback During the Pandemic”.

Subtheme one: Clinical feedback challenges during pandemic

Lack of prior preparation for online clinical feedback

The COVID-19 pandemic brought significant difficulties and challenges to clinical feedback, and the situation was particularly acute at the onset of the pandemic. The abrupt transition from in-person to remote interactions led to numerous issues, predominantly in the domain of technology and online platforms such as Zoom meeting and Blackboard. The primary challenge was adapting to these platforms for the delivery of feedback, undertaken without prior preparation or orientation regarding their use. Supervisor 1 from Institution 4 remarked, “*At the initial phase of COVID-19, the swift shift from face-to-face to online teaching was taxing due to the suddenness of the change, and the situation compelled us to adopt platforms like Zoom meeting and Blackboard for teaching and feedback dissemination, all without adequate preparation.”* Another perspective was offered by Supervisor 7, who reflected on the struggle with technology, stating, *“COVID-19 unveiled my substantial deficiencies in employing technology for feedback provision via online platforms”.* This situation revealed the challenges faced by clinical educators in quickly adapting to online feedback methods without prior preparation.

Difficulties in engaging students in distance online clinical feedback

Engaging students in online feedback during the pandemic presented notable challenges, especially due to external distractions such as mobile phones. Student 18 from Institution 2 elaborated on this, stating, *"Distractions are a lot like using the phone. So, students need self-discipline to help them concentrate. You are totally free to turn off the mic, use your phone, or do whatever you like.".* This issue was also recognised by clinical supervisors, who found it challenging to engage students in an online setting. Supervisor 30 from Institution 4 shared their insights, *"...And you cannot tell if they are listening to you or not, and you cannot enforce them to open their cameras due to their privacy rights as they are at their homes.".*

The significance of delivering feedback in a quiet and comfortable environment was underscored by other supervisors. They often encountered issues such as noise and distractions in the students' environments. Supervisor 9 from Institution 2 described the difficulties faced, *"During delivery of feedback, I barely hear from students due to the noise and people around them, which made it difficult to deliver feedback."* The preference for face-to-face feedback over online methods was a common sentiment among clinical supervisors. They observed that students tended to be more concentrated and engaged in a face-to-face setting, leading to better absorption of feedback. The constraints imposed by COVID-19, however, necessitated the adoption of online feedback methods. Supervisor 6 from Institution 3 commented on this shift, *"...Due to the constraints and rules of education during COVID-19, we had to deliver feedback online, but face-to-face is more effective and understandable.".* This view was echoed by students as well, with Student 16 from Institution 2 noting, *"When it is online, there are a lot of distractions, but in face-to-face, you have nothing but the doctor to focus on."* . The shift to online clinical feedback underscored the struggle to keep students focused with external distractions, revealing a clear preference for the more engaging face-to-face interaction.

Lack of time and resources

The onset of COVID-19 brought about a sudden shift in educational systems, transitioning to distance learning. This change, coupled with the large number of students, led to significant challenges in providing timely and effective feedback. Student 21 from Institution 3 expressed this concern, stating, *"The feedback I received during the pandemic was not clear or direct because my supervisor had many students, so he could not attend to each one individually.".* This sentiment was echoed by other students who felt the feedback they received was insufficient. Student 3 from Institution 1 remarked, *"Honestly, my communication with doctors is limited, but I try to ask my colleagues to look at things from another perspective."* . Additionally, Student 44 from Institution 3 highlighted the issue of delayed responses, *"We receive it late. If I ask a question, the answer might be delayed. Thus, time was a barrier.".*

Even as situations began to return to pre-COVID conditions, with constraints and social distancing measures, certain problems persisted. Student 23 from Institution 3 noted, *"Social distancing resulted in labs being cancelled. Without labs, some skills were explained instead of practised."* The issue of time-related constraints was further emphasised by Student 48 from Institution 4, *"As I told you, it's about time. In the lab, there is limited time because we are divided now, and you must finish, so the next group can come, and the feedback will be brief.".*

Clinical supervisors attributed these challenges to a lack of facilities and manpower. Supervisor 2 from Institution 1 justified, *"We don't have sufficient facilities to teach the way we did previously, especially with more students.".* The combined impact of limited resources and time constraints during the pandemic has been evident in the difficulties of providing effective feedback.

Technical issues in online feedback

The transition to online feedback was not without its technical challenges, as experienced by both students and supervisors. Student 2 from Institution 1 highlighted one of the key uncontrollable factors, stating, *"Some things are uncontrollable, like when there is an internet interruption.".* This issue reflects the broader range of technological hurdles that emerged in the shift to online learning.

Supervisor 5 from Institution 4 elaborated on these challenges, noting the impact on student engagement and expectations. They explained, *"Technical issues have arisen because of students' inability to attend university and the launch of online classes with so many students, dampening students' expectations.".* Technical difficulties, particularly with internet connectivity, were a common experience among students and supervisors in the online feedback system.

Subtheme two: needs associated with clinical feedback during pandemic

During the pandemic, students emphasised the importance of maximising their interaction with instructors, particularly through enhanced communication during office hours. Student 54 from Institution 4 articulated this need, *"To be very honest, if I don't grasp something, I go to the instructor during office hours. The feedback given virtually should be in videos or audio, and it should not be delayed.".*

Another key need identified was the desire for interactive and personalised feedback. Students expressed a preference for feedback to be delivered in person and privately, such as during office hours. Student 5 from Institution 1 conveyed this preference, *"I would like it if there was always feedback. For example, if the doctor can speak with the student and tell him, for example during in-office hours, the mistakes and the improvement required so the student will not forget it at all, and they have time.".* Student 6, Institution 1 *"To improve feedback, doctors should discuss the feedback in an online meeting and take the time needed for every point.".*

Additionally, students recognised the need for feedback to be constructive and structured, acknowledging the varying quality of feedback received. Student 37 from Institution 3 reflected on this aspect, stating, *"I thought that the feedback should be constructive or standardised for every student." .* This highlights the students' desire for standardisation and constructiveness in the feedback process, ensuring consistency and quality across all feedback sessions. Students identified key needs in clinical feedback during the pandemic, including the desire for feedback to be more interactive and personalised, like during office hours and stressed the importance of feedback being constructive and following a standardised format for all students.

Theme two: positive aspects and preferences

This theme explored the positive aspects and preferences that emerged in clinical education during the COVID-19 pandemic. It highlighted the enhancement of independent learning skills among students and clinical supervisors, emphasising the adoption of self-dependence and self-discipline. The theme also underscored improvements in pre-clinical practice preparation, time management, and accessibility for clinical feedback, facilitated by the shift to the new online learning environment.

The analysis delved into two subthemes: "Enhancement of Independent Learning Skills" and "Educational Adaptations and Tech Skills Improvement" drew upon the experiences of students and clinical supervisors from various institutions. Students (Respondents 32, 8, 45, 22, 11) and clinical supervisors (Respondents 6, 8, 4) shared insights into how, over the course of the pandemic, there was a notable increase in self-discipline and self-directed learning. They observed that the organisation and effectiveness of online clinical feedback significantly improved as time went on, with clinical supervisors increasingly using platforms such as Blackboard and WhatsApp for more effective communication. Additionally, the theme detailed how students were split into smaller groups for laboratory work to

comply with COVID-19 preventive measures, which not only adhered to safety guidelines but also facilitated a gradual return to in-person education, ensuring more focused attention from supervisors to each student group.

Subtheme one: enhancement of students' and clinical supervisors' self-dependence, self-discipline

During the Covid-19 pandemic, students involved in distance learning demonstrated an increase in self-discipline and self-learning, utilising online resources. Student 32 from Institution 3 remarked, *"Personally, I watched YouTube videos. When I studied cardio, then the pandemic came… so I looked on YouTube and watched videos"*. Additionally, there was a notable rise in students actively seeking clarifications when needed. Student 8 from Institution 1 stated*, "I ask questions more frequently to clarify, which was big for me to understand.".* The increase in self-discipline and self-learning, as well as the rise in active questioning by students, highlights a shift towards more independent learning practices during the pandemic.

Pre-preparation, time management, and accessibility for clinical feedback

The organisation of online clinical feedback was notably improved, as clinical supervisors had sent invitations and prescheduled times to students. Student 45 from Institution 4 reflected, "*In the past, the clinical supervisor could have just requested in general terms such as ''some students need to do this and that, but today, the clinical supervisor can send an individual email to each student or hold a Zoom discussion."* . This change in approach was confirmed by Supervisor 6 from Institution 3, who mentioned utilising multiple platforms: "*Using Blackboard, WhatsApp and meeting with students in Zoom every month.".* This organised system led to time-efficient feedback methods a point underscored by Supervisor 8 from Institution 2: *"It's one of the benefits of doing electronic feedback since it reduces the amount of time you have to spend explaining it to students".*

Furthermore, this scheduling and time management not only saved time but also significantly increased accessibility. It was particularly beneficial for students in rural areas and those with busy supervisors. Student 22 from Institution 3 shared their positive experience: *"We had more feedback, even from the supervisors in the fields*". Student 11 from Institution 2 illustrated the enhanced accessibility to supervisors: "*By using questions on WhatsApp, we send him the report and receive feedback".*

During the Covid-19 pandemic, when preventive precautions against Covid-19 were reduced, students and supervisors partially resumed in-person work in labs and attended colleges for practical sessions, while theoretical lectures remained online. To optimise time, practical videos were sent before classes. Supervisor 4 from Institution 2 observed the benefits of this approach: *"As a result, unlike the previous year, when students' expectations were low since they just watched the videos online, this year, students can see the films online, study them and then come to the lab to practice them. This contrasts with last year when they only watched it on the internet".* This method allowed students more time for hands-on training and practice. The improvements in the organisation of online clinical feedback, as reflected in the use of multiple communication platforms and more structured scheduling, led to more time-efficient and accessible feedback methods during the pandemic.

Subtheme two: educational adaptations and tech skills improvement

Splitting students into smaller groups for laboratory work

When the preventive measures against the Covid-19 epidemic were eased, students returned to the medical laboratories to practice their medical skills. However, they had to adhere to certain preventive measures, such as wearing masks and maintaining physical distancing. To facilitate this, educational institutions split students into smaller groups within the medical laboratories. This division was one of the key decisions made to adapt to the changing circumstances. The

rearrangement of class schedules and formats was a significant aspect of this adaptability. Supervisor 30 from Institution 4 detailed this approach: *"We decided to divide each batch in half again so that if there are 20 kids, we will have 10 in one hour and 10 in the next. As a result, we returned to face-to-face education rather than online education, and the response has been extremely positive".* This shift allowed for a return to in-person education, which was met with a very favourable response.

This restructuring resulted in supervisors being able to focus more closely on each student. Student 16 from Institution 2 described the experience: *"We were divided into groups, and doctors could focus more on each student, which is a good thing".* This change in the educational setup not only complied with the necessary health precautions but also enhanced the quality of the educational experience by allowing for more individualised attention from supervisors.

Clinical supervisors' technological skills improvement

The delivery of online feedback through various online platforms played a significant role in enhancing the technological skills of clinical supervisors. Supervisor 1 from Institution 4 encapsulated this development: *"I believe we all learned a lot during the COVID-19 pandemic using technology like Blackboard, Zoom meetings, and Microsoft Teams. I believe many of us developed in this field".* This statement highlights the learning curve and skill enhancement experienced by the supervisors in adapting to and utilising these digital tools effectively.

Theme three: clinical feedback practices that should continue after the pandemic

The theme explores effective clinical feedback practices and educational strategies that emerged during the COVID-19 pandemic, with recommendations for their continuation post-pandemic. The analysis delved into insights drawn from a diverse range of respondents, encompassing both students and clinical supervisors from

various institutions. These individuals were represented by students from three EMS institutions (Respondents 2, 17, 13, 14, 24) and clinical supervisors from the same three EMS institutions (Respondents 4, 7, 30). This in-depth analysis unveils two significant sub-themes: “Educational Strategies”“ and “Flexible and Convenient Clinical Feedback Methods”.

Subtheme one: Educational Strategies

Divided students to small group

Supervisor 7 from Institution 2 described an effective strategy employed during the COVID-19 pandemic: *“We are dividing the students into groups of eight students with one instructor, which is working out well during COVID-19. However, we will continue after COVID-19”.* This small group session approach, successful during the pandemic, is proposed to be continued post-COVID-19 due to its effectiveness in providing focused attention to each student. Supervisor 30 from Institution 4 also confirmed the positive impact of dividing students into groups, mentioning “*the response has been extremely positive*.”

Furthermore, the effectiveness of this method was not only noticed by the supervisors but also by the students. Student 17 from Institution 2 observed significant benefits from this approach: *“we noticed more consideration from supervisors in the lab and receiving immediate feedback to correct my mistakes.”.* This feedback indicates that smaller groups not only facilitated better supervision but also allowed for more personalised and prompt feedback, crucial for the learning process in clinical settings.

Pre-Clinical Practice Lab Preparation

Supervisor 7 from Institution 2 emphasised the significance of pre-lab preparation, stating, *“Each student has enough time for hands-on practice because he has prepared himself before coming to the lab. There was a lot of good communication*

between the students and us during this time.". This method, involving the distribution of preparatory materials to students prior to lab sessions, enabled them to utilise lab time more effectively for hands-on practice and to receive clinical feedback. This preparation significantly enhanced the overall learning experience.

Additionally, Supervisor 4 from Institution 4 corroborated this improvement, noting the benefits of sending materials in advance: *"We send videos before the lab, so students come to the labs and no need for further explanation which saves us time of explanation and gives time for feedback and to correct their mistakes in applied medical skills".* This practice of pre-lab preparation, including the provision of instructional videos, allowed for a more efficient and focused lab experience, emphasising the practical application of skills and the provision of timely feedback.

These methods, which proved to be effective during the COVID-19 pandemic, have been suggested for continuation post-pandemic. They represent a shift towards a more efficient and student-centred approach to clinical education, ensuring that students not only are better prepared and more engaged during their practical lab sessions but also give enough time for clinical supervisors to provide and correct their performance through feedback .

Subtheme two: flexible and convenient clinical feedback methods

Accessible and revisitable clinical feedback

Student 13 from Institution 2 appreciated the permanent availability of feedback: *"When it is a voice note, it is good because it is available all the time; I can get back to it after a month… if it was a voice note or a recorded video, I could go back to it."*. The use of digital tools for feedback provided students the flexibility to revisit it as needed. Furthermore, Student 24 from Institution 3 highlighted the ease of contacting busy supervisors: *"Using WhatsApp, or Zoom, or email allowed us to contact supervisors who are busy and replied to us when they have time asking questions or seek clarification for feedback.".* The availability and flexibility of clinical

feedback in digital formats, as acknowledged by students underscores the convenience and effectiveness of these tools in enhancing communication with busy supervisors.

Hybrid clinical feedback methods

The pandemic highlighted the effectiveness of hybrid clinical feedback methods, particularly due to their flexibility. Student 14 from Institution 1 shared insights on this approach: "*Yes, there is online feedback for subjects in our field, such as ventilators. Even if face-to-face teaching resumes in the future, we can continue with online feedback later. Maybe I will be late for lectures or subjects and can receive feedback online. It is a good practice for some subjects, not all".* This emphasised the advantage of maintaining online feedback mechanisms alongside traditional in-person methods post-pandemic. The flexibility to access feedback online, regardless of physical presence or time constraints, proved to be an effective and preferred model for students and educators alike. The continuation of this hybrid approach is seen as beneficial for accommodating diverse learning needs and schedules.

5.8 Discussion

Main Findings

The COVID-19 pandemic had a profound impact on academic institutions across Saudi Arabia, particularly in EMS education, which relies heavily on practical training and real-time feedback. This study explored the perceptions of both students and clinical supervisors regarding clinical feedback during this period, examining differences in understanding, effectiveness, preferences, and interpretations. The findings highlighted significant challenges and adaptations made in response to the pandemic's restrictions, such as the shift from in-person to online feedback.

A key outcome of the study was the difference in satisfaction between students and supervisors concerning feedback. Students generally expressed a higher level of satisfaction, particularly with the online feedback, while clinical supervisors were less convinced of its effectiveness. Furthermore, students rated feedback as a major motivator for their academic progress, whereas supervisors seemed to underestimate its motivational power. This divergence suggests a potential misalignment in expectations and perceptions between the two groups.

In addition, the study identified that while both students and supervisors shared a common understanding of clinical feedback, differences emerged in preferences for feedback formats. Students demonstrated a stronger preference for digital formats—written, audio, and video feedback, whereas supervisors favoured traditional, face-to-face feedback methods. This suggests that students, particularly the younger generation, are more adaptable to digital tools and online learning environments.

Discussion in Relation to Existing Literature

The findings from this study align with existing literature on the significance of feedback in EMS education, particularly during periods of disruption such as the COVID-19 pandemic. The importance of feedback as a tool for student development has been well-established (Biggs and Tang, 2007; McKimm, 2009; Fotheringham, 2011; Wilson, 2013). This study adds to this body of work by demonstrating how online feedback, necessitated by the pandemic, was perceived differently by students and clinical supervisors.

The pandemic created a unique challenge in transitioning to online learning environments, which has been widely discussed in the educational literature (Van Popta et al., 2017; Perkins et al., 2020). Research has shown that feedback in such contexts is critical for maintaining student engagement and performance (Pishchukhina and Allen, 2021). This aligns with the findings of this study, where students reported that online feedback played a significant role in motivating them

to improve their skills and knowledge. Moreover, the shift to online learning platforms such as Microsoft Teams and Zoom created a new landscape in which feedback became more challenging to deliver effectively (Miller et al., 2011).

The adaptation to online learning in paramedic education, particularly the reliance on feedback, resonates with the work of Michau et al. (2009), who stressed the importance of practical, real-time feedback in clinical education. In the absence of face-to-face interaction, students in this study faced difficulties in receiving the hands-on feedback that is traditionally associated with paramedic training. Similar challenges were reported by Hubble and Richards (2006), who highlighted the importance of practical sessions for consolidating theoretical knowledge. These disruptions, especially in EMS education where practical skills are paramount, created gaps in the feedback process, particularly when feedback was limited to online formats.

The challenges highlighted in this study echo those found in other countries' EMS education systems during similar periods of disruption. For instance, Nilsson et al. (2023) in Sweden examined the use of DAT for formative assessments in EMS education. Both students and clinical supervisors in their study found the tool to be beneficial for enhancing communication and transparency, which helped students visualise their strengths, areas for improvement, and progress. This parallels the findings in this study, where students in Saudi Arabia preferred digital feedback formats, particularly during the pandemic when traditional in-person feedback became less feasible. The shift toward digital platforms for feedback delivery is not unique to Saudi Arabia but reflects a global trend in EMS education.

In Australia, Wongtongkam and Brewster (2017) investigated how out-of-hospital clinical experiences influenced student learning outcomes. They found that students valued verbal feedback and clinical experiences, though the quality and consistency of feedback varied. This mirrors the findings in this study, where Saudi EMS students expressed frustration with inconsistent feedback, particularly during high-pressure situations. The global need for more structured and consistent feedback

delivery is evident across both studies, highlighting the importance of adapting feedback methods to meet the evolving needs of EMS students worldwide.

Similarly, Filipp (2022) in the United States emphasised the importance of consistent feedback for paramedic interns. His study showed that consistent delivery in both style and content of feedback created a stable learning environment for students. This aligns with the experiences of Saudi EMS students in this study, who reported difficulties with inconsistent feedback during the pandemic. The need for clear, actionable feedback is a common theme across international EMS education systems, further underscoring the relevance of these findings in a broader global context.

Moreover, Moodley (2016) in South Africa pointed out that students often struggled with negative feedback and found that the absence of structured feedback systems negatively impacted their confidence. This observation resonates with the findings of this study, where Saudi EMS students reported similar struggles with interpreting and responding to feedback, particularly in an online environment. These international perspectives illustrate a common challenge in EMS education globally—the need for effective, structured feedback systems that support student growth and development.

The literature also supports the notion that feedback is a critical component of student development and can significantly influence learning outcomes. Hattie and Timperley (2007) noted that specific, detailed feedback is more effective than grades or percentages, a finding echoed in this study. The students' preference for feedback that provided suggestions for improvement and corrections, rather than letter grades, suggests that qualitative, descriptive feedback helps students better understand their mistakes and take corrective action. This is particularly important in medical education, where clinical decision-making relies heavily on reflective practice (Van De Ridder et al. 2008). Moreover, Schüttpelz-Brauns et al. (2016) emphasised the need for effective training in interpreting feedback, especially in complex formats such as logbooks, a point that aligns with this study's finding that

students struggled with interpreting numerical feedback like letter grades and checklists.

The technological shift in feedback delivery during the pandemic also brings attention to the findings of Guidera (2003), Perera-Diltz et al. (2018), and Ramadhani and Hafifah (2022), who explored the role of digital platforms in enhancing written communication and self-directed learning. These studies suggested that digital tools can facilitate a more flexible feedback process, allowing students to revisit feedback at their own pace, a notion supported by the students in this study. Furthermore, Bearman et al. (2021) noted that students who are familiar with digital tools find online feedback to be a useful replacement for in-person feedback, a trend that was observed here, particularly among younger students.

The effectiveness of feedback was another critical element explored in this study. The literature shows that effective feedback is not only about the content but also about how it is delivered (Hattie and Timperley, 2007). Students in this study reported higher satisfaction with online feedback, perhaps because it offered more flexibility and was easier to revisit, especially for those who had limited access to in-person supervision. This aligns with the findings of Van Popta et al. (2017), who demonstrated that formative online feedback fosters student engagement and improves academic performance, particularly in online learning environments.

A significant issue highlighted by this study was the variation in feedback preferences between students and supervisors. This disparity aligns with previous research that suggests supervisors and educators often prioritise face-to-face interaction for feedback delivery, viewing it as more personal and impactful (Killingback et al., 2019). However, during the pandemic, students expressed a preference for written, audio, or video feedback, which allowed them to revisit comments and suggestions at their convenience. This mirrors the findings of Michau et al. (2009) and Hattie and Timperley (2007), who found that students tend to benefit more from detailed, structured feedback rather than brief, in-person comments that may be harder to retain and act upon.

The challenges faced by clinical supervisors in delivering effective feedback during the pandemic also resonate with the work of Kuhlmann Lüdeke and Guillén Olaya (2020), who pointed out that providing quality feedback in an online environment requires both technological proficiency and an understanding of how to engage students in meaningful ways. Clinical supervisors in this study struggled with these aspects, particularly at the onset of the pandemic when they had limited time to adapt to new technologies. The issues of technological barriers, such as poor internet connections and unfamiliarity with digital platforms, also reflect findings by Flick (2014) and Silverman (2021), who noted the importance of ensuring that both educators and students are well-equipped to handle digital learning environments.

Finally, the literature underscores the importance of smaller class sizes and individualised feedback for improving learning outcomes (Sondergaard and Thomas, 2004). The division of students into smaller groups during the pandemic was initially a logistical necessity, but it had the positive effect of allowing supervisors to provide more personalised feedback, a practice that students appreciated and that aligns with the findings of this study. This shift towards smaller groups and more focused attention mirrors the recommendations made by Bearman et al. (2021), who advocate for a blended learning model that combines online and face-to-face interactions to maximise the effectiveness of feedback.

Recommendations for Practice and Further Research

In light of the findings, several practical recommendations emerge. First, institutions should continue to leverage digital tools for feedback, particularly platforms like WhatsApp, Microsoft Teams, and Zoom, which have proven effective in maintaining communication during the pandemic. These tools offer flexibility for both students and supervisors, especially when in-person interactions are limited.

Second, it is important for EMS programs to invest in ongoing technological training for clinical supervisors. As noted by Kuhlmann Lüdeke and Guillén Olaya (2020), the success of online learning and feedback is contingent not only on the availability of

digital tools but also on the ability to use them effectively. Therefore, providing supervisors with structured training programs on how to give feedback through online platforms is essential for maintaining the quality of education during periods of disruption.

Third, a blended feedback model combining face-to-face and online methods should be adopted moving forward. While face-to-face feedback remains critical in clinical education, particularly for practical assessments, the flexibility of online feedback—such as video recordings and written comments—can complement traditional methods, offering students the opportunity to revisit feedback as needed.

Further research should focus on longitudinal studies to assess the long-term impacts of the shift to online feedback. While this study captured the immediate challenges and adaptations during the pandemic, it would be beneficial to examine how these changes influence student learning and performance over time. Additionally, future research could explore the development of standardised, digital feedback protocols to ensure consistency and quality across institutions.

Strengths of the study

One of the key strengths of this study was its mixed-methods approach, which allowed for a comprehensive analysis of clinical feedback during the pandemic. The combination of quantitative data from the PFQ and qualitative insights from semi-structured interviews provided a holistic understanding of both the numerical trends and the nuanced experiences of participants. This dual approach enriched the findings and ensured a deeper exploration of the subject.

Another strength lies in the diverse sample used in the study, which included both male and female students and supervisors from four of the top EMS institutions in Saudi Arabia. This diversity in sample composition added robustness to the study's results, allowing for more generalisable conclusions.

Despite these strengths, there are some challenges discussed further in the Limitations section of this chapter. For example, the use of online surveys and interviews during the pandemic, while necessary, may have limited the depth of engagement from participants. Some respondents may have felt uncomfortable sharing their true experiences in a virtual setting, and technical issues such as internet outages may have hindered participation.

5.9 Limitations

This research focused on the perspectives of clinical supervisors and students in EMS colleges across Saudi Arabia about clinical feedback during the COVID-19 pandemic. A significant strength of the study is its coverage of the top four EMS institutions in Saudi Arabia, recognised for their academic excellence. The study utilised a mixed methods to gather comprehensive insights from both clinical supervisors and students on the topic during the pandemic period. An observable aspect was the lower response rate from female students and supervisors compared to their male counterparts. However, this is reflective of the smaller female presence in the EMS field and not a limitation of the study. Due to the high demands placed on EMS supervisors during the pandemic, fewer interviews could be conducted than originally planned. There is also a possibility that respondents may have been cautious in their responses to some questions, concerned about potential repercussions from supervisors.

As the exploration of clinical feedback during the COVID-19 pandemic concludes in this Chapter, showcasing the adaptability and resilience of EMS education in Saudi Arabia under crisis, the thesis is moving forward, the study will employ a Delphi study methodology in Chapter 6 to address broader challenges, needs, and quality assurance in clinical feedback within EMS education. While the current study's findings mainly provide insights into learning needs, challenges, and some adoption strategies, the upcoming chapter will propose practical strategies and a supportive framework to improve clinical feedback delivery.

Drawing on insights from the first two phases, the upcoming chapter will propose practical strategies and a supportive framework to improve clinical feedback delivery. It will involve a panel of EMS experts from Saudi Arabia, leveraging their expertise to develop a holistic view of training needs, continuous support, and quality assurance for effective clinical feedback. This phase not only amalgamates learnings from earlier chapters but also aims to translate them into concrete guidelines and tools. The emphasis will be on establishing formal educational training, workshops, mentorship programmes, and peer observation systems, as well as fostering collaboration among all Saudi EMS institutions. The final phase is thus dedicated to applying the gathered insights to elevate the quality and impact of clinical feedback in EMS education.

5.10 Conclusion

This study delved into the perspectives and procedures related to clinical feedback among EMS students and clinical supervisors in Saudi Arabia during the COVID-19 pandemic. The primary objective was to uncover any disparities in perceptions, adaptability, challenges, and requirements that emerged during this period. The emergence of the pandemic necessitated a rapid shift from traditional, in-person instructional methods to digital platforms, presenting a myriad of obstacles and opportunities for both educators and students.

The findings revealed a general consensus between students and supervisors regarding the nature of clinical feedback. However, notable differences in understanding and preferences regarding feedback formats were observed. Students exhibited a greater understanding and appreciation for feedback related to reporting mistakes and suggestions for improvement, as opposed to feedback presented in numerical forms such as letter grades or percentages. This indicated a misalignment between what supervisors considered effective feedback and what students found comprehensible and useful.

In terms of the effectiveness of feedback, the results demonstrated a clear disparity in perceptions. Students rated the effectiveness of feedback higher than their supervisors, viewing it as a significant motivator for their educational advancement. Conversely, supervisors were less convinced about the motivational impact of their feedback. Furthermore, the study underscored the effectiveness of certain strategies, such as dividing students into smaller groups and pre-lab preparations, which facilitated better feedback and more focused attention on students. These practices, developed as adaptive responses to the pandemic, were identified as potentially beneficial for continuation in post-pandemic educational settings.

The study has highlighted several critical needs and challenges in the context of clinical feedback in EMS education, with broader implications not only for the current COVID-19 period but also for future crises or transitions to online education, especially in a rapidly evolving technological landscape. One of the primary challenges identified is the preference for individualised feedback by EMS students, which can be resource-intensive to deliver effectively. Students expressed the importance of receiving timely feedback to enhance their learning experience, which can be logistically challenging, especially when dealing with a large number of students.

The study identified a difference in the feedback preferences of clinical supervisors and students, with the former showing a preference for face-to-face feedback while the latter demonstrated a greater receptiveness to online feedback. Balancing these preferences can pose a complex challenge. Effectively managing a large student population, whether in clinical settings or online, requires efficient resource allocation, including the appropriate assignment of clinical instructors, the provision of technological infrastructure, and the availability of sufficient support staff. The study also highlighted technical issues, such as connectivity problems or difficulties in accessing online platforms, as significant barriers to effective feedback, particularly during the COVID-19 pandemic. It is important to address these challenges to ensure the continuity of education. The study recommended a blended learning model that combines face-to-face and online feedback methods.

The COVID-19 pandemic underscored the importance of having contingency plans and crisis management strategies in place. Preparing for future crises, whether health-related or driven by technological changes, is imperative. Effective communication channels between students, instructors, and administrators are essential to address feedback-related issues. Ensuring that all stakeholders are well-informed and have access to necessary resources is crucial. The pandemic showcased the benefits of asynchronous learning, allowing students to access materials and feedback at their own pace. Incorporating flexible learning options can cater to diverse learning styles and preferences. By recognising these needs and challenges, EMS education can better adapt to current circumstances and prepare for future uncertainties. Addressing these issues will require careful planning and a proactive approach to ensure the quality of clinical feedback remains consistent and effective.

A key finding from the study phases was the emergence of differing needs and perceptions between students and clinical supervisors. This disparity highlighted the necessity for a structured approach to feedback that accommodates the unique needs and preferences of both groups. To address this, the subsequent chapter implemented a Delphi study was crucial. This approach involved gathering insights from a wide range of stakeholders, including students, supervisors, and EMS education experts, to collaboratively identify the core issues and potential solutions. The Delphi method, known for its consensus-building capability, facilitated a deep understanding of the needs and expectations of both students and supervisors, paving the way for more effective feedback strategies.

Chapter 6 Addressing the training needs of clinical supervisors in Emergency Medical Services (EMS) education in Saudi Arabia: A Delphi Study on clinical feedback

6.1 Abstract

Background: Clinical feedback is a critical component of educational and practical training in Emergency Medical Services (EMS). The previous two phases for this PhD revealed challenges and needs related to clinical feedback in EMS education in Saudi Arabia. This study builds upon these findings and aimed to identify and propose a strategy at a national level to address these needs and to support EMS institutions in developing a supportive framework for clinical supervisors that promotes effective delivery of clinical feedback. The participants included an expert panel of deans, directors, and clinical supervisors across EMS education in Saudi Arabia, with a prerequisite of experience in EMS clinical supervision or faculty support roles for clinical feedback.

Methods: This study employed a merged-method approach using a modified Delphi methodology across three rounds. The study adheres to the CREDES (Criteria for Reporting Delphi Studies) guidelines, which ensure rigorous reporting in Delphi studies. In the first round, interviews were conducted with questions developed based on the findings of the previous two studies. The second and third rounds used online surveys via Bristol Online Survey (BOS), which were developed from a thematic analysis of the round one interviews. The survey consisted of 73-items divided into three categories: clinical feedback training needs and support, ongoing support and quality assurance, and clinical feedback guidelines and tools. Twelve EMS experts participated in the first round, 39 in the second, and 38

completed the third round. A consensus threshold of 75% was established, with items reaching this agreement deemed accepted or rejected.

Results: Consensus was reached on 66 out of 88 items across the three categories: 1) Clinical Feedback Training (44 out of 59 items); 2) Clinical Feedback Quality Assurance (11 out of 13 items); and 3) Guidelines and Tools for Improving Clinical Feedback (11 out of 16 items).

Conclusions: Participants agreed on how prior clinical feedback challenges and needs can be best addressed through training, support, and guidelines, emphasising the importance of formal educational training and workshops, mentorship, peer observation, and ongoing support for clinical supervisors. Simulated scenarios are essential for realistic, risk-free clinical feedback training. The need for collaboration among all Saudi EMS institutions for quality assurance was highlighted, emphasising shared responsibility in ensuring clinical feedback quality.

6.2 Introduction

This study represents the culmination of a PhD project aimed at enhancing clinical feedback within EMS education in Saudi Arabia through the lens of the CF-FIT model, which emphasises the critical roles of feedback, receptance, and context in educational outcomes. Previous phases of this project explored clinical supervisors' and students' perceptions of clinical feedback across various EMS institutions in Saudi Arabia, employing questionnaires and semi-structured interviews. These explorations identified significant challenges and training needs among clinical supervisors and students , particularly in the areas defined by the CF-FIT model: the nature of feedback provided, the receptance of feedback by students, and the contextual factors influencing feedback effectiveness.

A significant finding was the discrepancy between clinical supervisors' and students' perspectives on clinical feedback quality. While supervisors believed they

provided high-quality feedback, students often disagreed. Students identified issues with the current EMS clinical feedback, such as lack of clarity, insufficient detail, and difficulties in understanding and accepting the feedback. Clinical supervisors acknowledged that the lack of structured feedback might be the primary reason behind students' dissatisfaction, as not all students received consistent feedback. Recognising this gap, the majority of clinical supervisors expressed a need for training and support that will help them in their role as clinical supervisors and to enhance their ability to provide effective clinical feedback to students. However, what is less clear from these studies is how these needs can best be addressed. Numerous researchers have underscored the need to establish an educational strategy that supports clinical supervisors in addressing challenges related to teaching students and providing clinical feedback (Ivers et al. 2012; Morrison et al. 2017; Eaton-Williams et al. 2020; Wilson et al. 2022). This study therefore aims to understand and reach agreement on what strategies and measures can be developed and implemented to support clinical supervisors and ensure they are prepared for this role.

Adult learning theory was essential in this study, recognising that both EMS experts participating in the consensus panel and the clinical supervisors they represent are adult learners, each contributing unique experiences and perspectives (Goldman 2011; Gordon-Pershey and Walden 2013; Mukhalalati and Taylor 2019). Involving EMS experts with a deep understanding of the field's challenges ensured that the proposed guidelines and support interventions were relevant. Adult learning theories emphasise the importance of learner-centered, self-directed, and experiential approaches in education and professional development, particularly relevant when working with adult learners such as EMS experts (Mukhalalati and Taylor 2019). Incorporating these principles in the study facilitated the development of clinical feedback guidelines and support interventions catering to the specific needs and contexts of clinical supervisors in EMS education. Furthermore, the Delphi technique used in this study aligned well with adult learning theory principles, encouraging collaboration, reflection, and critical thinking among panel members

(EMS experts). The Delphi technique's iterative process fostered dialogue and consensus-building, enabling experts to meaningfully draw upon their experiences and expertise.

6.3 Study rationale

The primary aim of this study was to identify an agreed educational strategy at a national level in Saudi Arabia that will support institutions in the development of a supportive framework for clinical supervisors, facilitating effective clinical feedback delivery. To achieve this objective, the study sought to reach a consensus among an expert panel of EMS professionals across Saudi Arabia regarding the components and implementation of such a strategy and interventions that will address the needs identified in the previous two studies. This was achieved by determining and reaching consensus on experts' perception of:

- The requirement for training and support interventions for effective delivery of clinical feedback
- The bodies that should be responsible for developing and providing training and ongoing support interventions
- The components necessary for inclusion in such training and support interventions to ensure that clinical supervisors are appropriately trained for giving clinical feedback
- The bodies that should be responsible for developing, quality assuring and providing clinical feedback standards for EMS education in Saudi Arabia
- The preferred format for presenting and offering training and support intervention

6.4 Methodology

6.4.1 Research design: Delphi study

In this study, the Delphi method was chosen to achieve consensus among EMS professionals regarding clinical feedback training and support measures and interventions for clinical supervisors in EMS education in Saudi Arabia. The Delphi method was selected because it allows clinical supervisors, who are considered EMS experts, to share their insights without meeting in person, functioning as a virtual decision-making process (Okoli and Pawlowski 2004). The collective decision-making technique of the Delphi method consistently produces superior results compared to individual opinions when expert input is necessary (Okoli and Pawlowski 2004). The Delphi method has been utilised in various healthcare contexts to identify consensus on educational needs and curriculum planning at both postgraduate and undergraduate levels (Gharibi and Tabrizi 2018; Lim et al. 2022). It is essential to understand the different forms of the Delphi method, each tailored to specific research needs:

1. **Classical Delphi** involves multiple rounds of questionnaires with controlled feedback, typically used for forecasting and decision-making in areas such as technology and public policy (Dalkey and Helmer, 1963; Rowe and Wright, 1999). Although valuable, this method's emphasis on anonymity and extensive rounds was not aligned with the study’s focus on practical, context-specific recommendations in EMS education.
2. **Modified Delphi**, the approach selected for this study, offers flexibility by potentially reducing the number of rounds and incorporating qualitative data such as interviews (Okoli and Pawlowski, 2004; Keeney, Hasson, and McKenna, 2001). This adaptability made it particularly suitable for addressing the unique needs of EMS education in Saudi Arabia, ensuring a thorough understanding of clinical feedback needs.

3. **Policy Delphi** is designed to explore a broad range of opinions on complex policy issues, without necessarily achieving consensus (Turoff, 1970; de Loe, 1995). Given the study's objective to reach consensus on training and support needs, this approach was not considered appropriate.
4. **Real-Time Delphi** is a digital adaptation that allows for rapid consensus-building through continuous online interaction, making it ideal for scenarios requiring quick decision-making, such as crisis management (Gordon and Pease, 2006; Hsu and Sandford, 2007). The study's requirement for deliberate and reflective input made this method less suitable.
5. **Decision Delphi** focuses on decision-making or solving specific problems, commonly used in strategic planning and organisational contexts (Sackman, 1974; Loo, 2002). While decision-making was an element of the study, the primary goal was to establish broad consensus on educational strategies and guidelines, rather than reaching immediate decisions.

To ensure the highest standard of methodological rigour, the study adhered to the **CREDES (Criteria for Reporting Delphi Studies) guidelines** (Jünger et al., 2017). These guidelines provide a structured checklist for transparent and thorough reporting of Delphi studies, ensuring that the research process is transparent, replicable, and credible. This adherence enhances the study's contribution to EMS education and establishes a strong foundation for future research and implementation (see Appendix 6.01).

Other reporting standards, such as the **RAND Corporation Guidelines**—well-suited for policy development and complex analysis—and **Linstone and Turoff's Handbook on the Delphi Method**, which offers extensive theoretical and practical insights into various Delphi study types (Dalkey and Helmer, 1963; Brown, Cochran, and Dalkey, 1969; Linstone and Turoff, 1975), were considered. However, CREDES was chosen due to its specific focus on ensuring comprehensive and structured reporting, which aligns closely with the academic and educational objectives of the study.

The interviews and questionnaire distributed to participants was based on a list of challenges compiled from the previous studies conducted for this PhD. The Delphi research process involved experts completing a series of interviews and questionnaires until consensus was achieved or opinions remained consistent between rounds (Diamond et al. 2014).

6.4.2 Study Sample

The Delphi method involves recruiting a group of knowledgeable individuals who are considered experts in the subject matter under investigation, with the aim of achieving a consensus on the topic of interest (Baker et al. 2006). According to Sinclair et al. (2016), the representativeness of a panel in a Delphi study is determined by the quality of the panel, rather than the statistical representativeness of the sample size. According to Clayton et al. (2006), a Delphi study requires a minimum of five experts. However, recent Delphi studies in the fields of curriculum development and public health, such as those conducted by Moynihan et al. (2015), Salmon and Tombs (2018), Guan et al. (2019), and Wattanapisit et al. (2019), have demonstrated that a panel size of at least 20 is considered sufficient.

The expert panel for this study was carefully selected based on specific criteria to ensure that participants possessed the necessary expertise and experience in EMS education and clinical supervision. The criteria for panel selection necessitated prior experience in clinical supervision within EMS or in a capacity that supports faculty at EMS institutions. This experience was deemed indispensable in furnishing the requisite knowledge for the provision of expert opinions. The final panel consisted of 39 EMS professionals, including deans, directors, and clinical supervisors, who were recruited from various regions of Saudi Arabia. These experts were chosen for their extensive experience in EMS clinical supervision, academic roles, and their involvement in the development and implementation of clinical feedback systems. The characteristics of the panel included a diverse range of roles within EMS education, such as senior lecturers, programme directors, department heads, and quality assurance officers, which ensured a comprehensive perspective on the

issues under investigation. EMS deans, directors, and clinical supervisors from various regions of Saudi Arabia were invited to take part in the study.

6.4.3 Instruments and Procedure

Round 1

Based on the researcher's previous connections established in the two prior studies conducted at the five largest EMS educational institutions in Saudi Arabia, communication with numerous stakeholders and clinical supervisors was facilitated via social media platforms, such as WhatsApp and email. Upon inviting participants to join an interview in the first round, they were asked to select a suitable day and time. Consent was obtained from participants during this round. Participants were also informed that their contact information would be retained to receive links for the subsequent two rounds of questionnaires.

A total of twelve EMS educators were interviewed. This group comprised of three senior lecturers and course coordinators who were responsible for clinical setting coordination, four programme directors who were responsible for managing an EMS programme, two department heads who held higher-level positions with more responsibility, two EMS quality assurance department heads, and one vice dean of clinical training.

The questions for these interviews were based on the findings from the two previous studies and aimed to obtain participants' views on how best to address the four areas of perceived challenges and needs including content, use, methods and impact of clinical feedback (see Figure 1) The interview schedule included an opening statement that introduced the researcher and provided a brief overview of the study (see Appendix 6.03). It also included an introductory statement that defined clinical feedback for the purpose of the interview. Questions were grouped into four main categories:

1. Participant demographics: questions related to the participant's gender, age, current institution and role, and years of experience as a clinical supervisor of EMS students.

2. Training and development: questions related to the importance of clinical feedback, the participant's learning process, and responsibilities for ongoing support and quality assurance, as well as training and support provided to clinical supervisors and responsibility for quality assurance, development, and training.

3. Standardised guidelines and resources on clinical feedback: questions related to the potential usefulness of resources to support clinical supervisors and preferences for the format and responsible organisation.

4. Supporting faculty and addressing challenges associated with clinical feedback: A series of questions seeking suggestions on addressing various challenges related to feedback content, use of feedback, methods of giving feedback, and the impact of feedback, as well as the participant's opinions on whether training, resources, or both would be the best approach for addressing these challenges. The interview concluded with an opportunity for participants to add any additional points they deemed relevant.

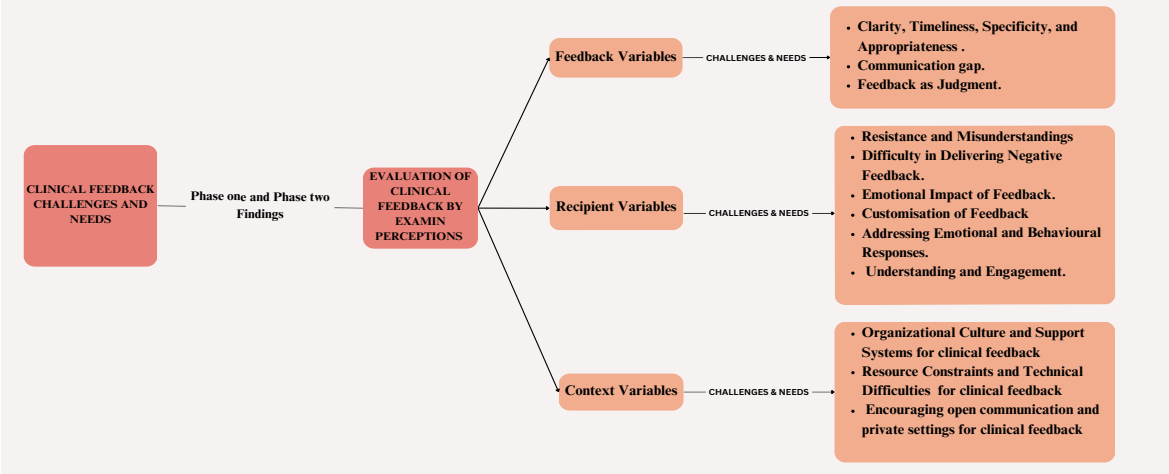

Figure 6.1 Flowchart outlining how the themes and findings from the first and second studies influenced the development of the third study.

Before initiating the first round of interviews for the study, a pilot study with two clinical supervisors was conducted to check for clarity and quality of the interview questions. Most questions were found to be clear though one participant commented on a lack of clarity in a question from part 2, “Training and Development,” which read, *“Do you think clinical supervisors should be provided with ongoing support and development on the provision of clinical feedback? If yes, what should this entail? If not, why? How would you suggest that they develop instead?”* The question was rephrased to *“Do you believe that clinical supervisors should receive continuous support and professional development specifically focused on providing clinical feedback? If so, what elements should be included in this support and development? If not, could you explain your reasoning and suggest*

alternative methods for their development in this area?" the other participants found the revised question to be clearer.

The interview schedule was sent to the respondents' email addresses in advance, and they were asked to choose the most convenient time for the interview. Interviews were conducted in English, as it is the official language of instruction in EMS colleges in Saudi Arabia. Interviews were recorded to allow for a more detailed examination of the themes and progression, enabling subsequent evaluation of the participants' responses. Due to the importance of the accuracy of the audio recordings for the credibility of the study, two recordings were made simultaneously: one via a Zoom meeting recorder and one on a separate recording device. This approach ensured that accurate and reliable data was collected for analysis (Brinkmann and Kvale 2018). Utilising both a Zoom meeting recorder and a recording device allowed for redundancy and minimised the risk of data loss (Silverman 2021).

Round 2

This round involved the development of a Delphi survey that was created on the basis of results from round 1 and hosted on the Bristol Online Survey (BOS) platform (refer to Appendix 6.05). Informed by the themes identified in Round 1, the questionnaire was divided into four parts, consisting of a total of 81 questions, each addressing a specific aspect of clinical feedback:

1. Demographic Information including age, role, years of experience in delivering clinical feedback, and years of teaching EMS education (n = 7).

2. Training Needs for Clinical Feedback focusing on the areas where training is required to improve clinical feedback (n =47).

3. Ongoing Support and Assessment of Clinical Feedback addressing the continuous assistance and evaluation processes necessary for clinical feedback (*n* = 11).

4. Clinical Feedback Guidelines and Tools exploring the different guidelines and instruments used for effective clinical feedback (*n* = 16).

The table below illustrates an example of how the second-round survey was developed from the interview themes and participants' responses in the first round:

Table 6.1 Show an example how the round 2 survey items developed.

Round One 1 Interview Analysis	Quotes	Relevant Subtheme	Round two survey To what extent do you agree or disagree with the following statements?
Theme 1: Initial training	*"I always give support to the clinical supervisors. But in terms of training, we they have not received anything". EMS Stakeholder No. 9* *"I haven't had any official or formal training to give a student feedback and I don't think it ever existed here. I haven't had any training programmes in Saudi Arabia or elsewhere in the world, to be honest". EMS Stakeholder No. 3*	Formal training at the start of role	The best way for me to prepare for this role as a clinical feedback provider is to receive formal training in clinical feedback.

This method had been used in several modified Delphi studies related to health care (Oostendorp et al. 2015; Pezaro et al. 2015). Pilot testing of the survey was conducted with four EMS clinical supervisors to ensure that the questions elicited accurate information (content validity) and consistently obtained the same

information from each respondent (reliability). The pilot study also helped assess the questions' clarity, consistency, and readability (Watkins et al. 2014). Based on the feedback received, the questionnaire was modified. Two statements were reordered to avoid potential confusion. Participants had noted that the statements *"How to provide specific feedback"* and *"How to provide detailed feedback"* had similar meanings, which could lead to ambiguity in respondents' answers. To address this issue, the statements were reordered and separated to ensure they did not appear immediately after one another.

Participants were asked to rate items using a five-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree). Additionally, an open-ended question was included to enable participants to clarify their ratings, offer suggestions for improvement, propose additional items, or provide further comments. This approach was deemed advantageous as it allowed participants to articulate their experiences and knowledge more comprehensively and lucidly (Creswell and Poth 2016).

The survey was sent to who participated in round one and to all EMS colleges and departments, including six institutions in Saudi Arabia, as well as the administration department. The individuals involved in this round included 39 experts who assumed diverse positions within their respective academic institutions. These positions included one dean, three programme directors, twelve department heads, two clinical supervisors, two coordinators, sixteen lecturers and instructors who provided instruction and guidance to students in clinical laboratories or other clinical settings, and two respondents who selected the "Other" category. One of these individuals identified as a "Doctor", while the other specified "Vice Dean for Clinical Affairs''. The inclusion of a wide array of roles in the study indicates that the research encompassed various tiers of EMS establishments, thereby offering a comprehensive outlook on the implementation of clinical feedback training methodologies.

Round 3

In line with the Delphi method, each study round builds on the previous one, incorporating feedback and continuing until consensus is achieved or opinions remain consistent (Diamond et al. 2014). The third round refines the questionnaire based on the second round's responses, focusing on areas of disagreement or where further clarification was needed, with the aim to reach consensus (See appendix 6.06). Keeney et al. (2006) argue that as many rounds as needed should be conducted to achieve consensus or until the "law of diminishing returns" applies. Since consensus was not reached, continuing the process was crucial. A minimum of two rounds is necessary for feedback and revision of responses. Thus, the third round was imperative to gather necessary information and reach consensus. The questionnaire was sent to the same group of participants that took part in round 2.

The third round maintained the same structure as the second round but continued to refine and focus the areas of discussion based on participant responses. During the second round, five out of 16 suggestions required clarification, with three participants providing unclear or incomplete responses. Clarification emails were sent to these participants to obtain additional information and ensure the accuracy and reliability of the data.

Two participants provided clarifications that were added to the third-round questionnaire. For instance, one participant recommended that "employers" should be responsible for training clinical supervisors on clinical feedback and clarified that "employers" referred to hospital staff and university faculty, with specific academic or clinical departments representing them. Another participant suggested that clinical feedback training programmes should cover both theoretical foundations and practical skills. The remaining three responses that required clarification, including "enough time and staffing", "Experience Enthusiasm" and "To be a true Professor", were also included in the third-round questionnaire. However, the participant did not provide clarification on these items, and they were included in the new questionnaire pilot to ensure participants' understanding of the responses.

This iteration of the survey was piloted with four EMS clinical supervisors, who provided feedback on the questionnaire to enhance its clarity and comprehensibility.

All four participants in the pilot study gave feedback on the three unclear items, leading to their removal. To ensure that participants have a comprehensive understanding of the results from round 2, a personal PDF document created and sent to each participant. The document contained the consensus percentage for each of the developed 74 items without the demographics items as it was collected in round 2, along with the individual responses from each participant, and 14 new items generated from the open-ended questions in the second-round 13 from theme belong and added to the “Clinical Feedback Training and Development Needs of Clinical Supervisors” section, and one was added to the “Ongoing and Quality Assurance” section, increasing the total number of items to 88. The agreement percentages provided a clear indication of the consensus level on each item among the participants (Keeney et al. 2011). This step encouraged reflection and validation, allowing participants to critically assess their previous positions in light of the collective perspective.

6.5 Ethical considerations

This study was approved by the Cardiff University School of Medicine Research Ethics Committee, as documented in Appendix 6.02. Compliance with the United Kingdom Data Protection Act was ensured during data collection, with participants’ identities protected by the use of numerical codes. The study data were maintained by Cardiff University for a period of five years, and access to these data was restricted exclusively to researchers participating in the study.

Before the research commenced, informed consent was obtained from all participants and their respective guardians. This consent was predicated on a thorough account of the study’s aims, emphasising that the data collected would contribute to a PhD thesis and would be treated with utmost confidentiality in

accordance with the UK Data Protection Act. As stipulated by the General Data Protection Regulation (GDPR), personal data is deemed to be information that relates to an identifiable living individual, who can be identified directly or indirectly, particularly through the use of an identifier. This type of data may include information such as an individual's name, address, email address, and date of birth.

To ensure confidentiality and anonymity, participants were assigned unique codes and their names and affiliated institutions were not disclosed. Consent forms were used to obtain formal consent from participants for subsequent contact during the second and third phases of the study. The processing of participants' personal data was conducted in accordance with relevant regulations. After the study, all collected data were anonymised and reported in a consolidated manner, ensuring that individual responses could not be traced back to specific persons.

To ensure the anonymity of respondents, each participant was assigned with respondent number and a code unrelated to personal identifiers to maintain anonymity. The answers to each item were recorded and assigned a corresponding identifier, which was then entered into an Excel worksheet. Upon submission of the questionnaires by the respondents, the corresponding files were promptly archived.

6.6 Analysis

In round one of the Delphi study, thematic analysis was employed to analyse the interview data. This approach, as detailed by Bazeley and Jackson (2019), was chosen for its robustness in identifying and organising themes that closely reflect the insights and language of the participants, with NVivo software facilitating this process. Alternative methods such as content analysis and grounded theory were considered. Content analysis, focusing on the frequency and relationships of keywords and phrases within the data, offers a quantitative lens that could provide a different perspective on the responses (Krippendorff, 2013). Grounded theory, suitable for developing a theoretical model directly from the data, provides a

structured approach to theory generation that could have informed subsequent rounds differently (Charmaz, 2014).

Thematic analysis was selected over these alternatives for several reasons. First, its flexibility and adaptability in handling diverse data types make it particularly suitable for the exploratory nature of the first round of a Delphi study, where the breadth and depth of participant responses are to be captured comprehensively. Thematic analysis allows for a detailed and nuanced interpretation of data, crucial for interpreting complex expert opinions and experiences in the context of clinical feedback, without the constraints of aligning with a prescriptive theoretical framework as required in grounded theory, or the quantitative focus of content analysis.

Thematic analysis, as outlined by Bazeley and Jackson (2019), effectively captures and organises complex ideas into coherent themes, which inform the construction of subsequent rounds of questionnaires. This method ensures that foundational data are comprehensively explored and that the themes developed are deeply rooted in the original expressions and meanings of the participants.

In round 2, despite the lack of consensus on the best approach, the agreement threshold method, commonly used in Delphi studies, was adopted (Diamond et al., 2014). Consensus was defined as 75% of participants scoring an item as “Agree” (score = 4) or “Strongly Agree” (score = 5). The results were analysed, ranked based on the agreement threshold, and used to construct the third-round questionnaire.

In the third and final round of the Delphi study, a comprehensive approach was employed to refine and build consensus on items that had not reached agreement in previous rounds. However, the items that did not reach consensus by this round were omitted from the final model. This ensured that the findings were not only the result of careful consideration over multiple rounds but also reflective of a robust and collective agreement among the participants.

6.7 Results

6.7.1 Round 1

Six major themes were identified including: (1) Initial training, (2) Ongoing training and support, (3) Management and quality assurance of clinical feedback, (4) Resources, (5) Values and attitudes of clinical supervisors towards feedback, and (6) Management and aligning students' and supervisors' expectations of clinical feedback. The results from each theme are discussed below and integrated to provide a comprehensive understanding of the factors affecting clinical feedback in EMS education. For a full table detailing the qualitative analysis, refer to Appendix 6.04.

Theme 1: Initial training

This theme focuses on how and whether clinical supervisors prepare for their roles as educationalists and clinical feedback providers. For example, participant 9 emphasised the lack of formal training initially, stating, *"We always give support to the clinical supervisors, but in terms of training, they have not received anything"*. Other participants noted that they relied on self-learning and using external resources to compensate for the lack of formal education. As stated by participant 6, *"At the beginning of my job as a clinical supervisor, I started to read and learn by myself about the importance of feedback and how to conduct it."* Additionally, some participants sought help from senior colleagues or peers to gain experience in providing feedback, as stated by participant 1 *"At the beginning of my career, if somebody asked me to teach normal delivery to students, I would have requested assistance from other faculty who had experience in conducting those courses because I did not have the required skills".*

Theme 2: Ongoing training and support

This theme emphasises the importance of continuous training, support, and evaluation to improve clinical supervisors' skills in providing feedback. Participant 7 suggested organising workshops and regular meetings to foster improvement, stating, *"With the help of a senior colleague, we can set up a friendly workshop and hold regular meetings to enhance clinical supervisors' feedback skills".* Another approach for ongoing training and support is individual reflection and personal evaluation of clinical feedback. Participant 10 highlighted the need for self-assessment and comparison with others to enhance one's performance in providing clinical feedback, mentioning, "*I think the best way is to compare myself with others. At the end of the course, I need to have an evaluation and compare it to other courses, because every instructor is going to have a different score in the evaluation".*

Moreover, the theme underscores the value of discussions amongst colleagues regarding individual performance. Participant 3 highlighted the importance of group discussions, moderation, and peer observations in improving clinical feedback, saying, *"You can have a group discussion after everyone has demonstrated their clinical skills, a friendly group discussion. Provide feedback like, "Hey, Mr. X, you did this, you did that. Excellent. Be positive. But if I were you, I would do this and this and this", "Mr. B, you did this, you did that. Such exchanges can help improve their feedback skills".*

Theme 3: Management and Quality Assurance of Clinical Feedback

This theme focuses on various approaches to ensuring the quality of clinical feedback provided by clinical supervisors. Participants emphasised the importance of incorporating quality assurance into the management system to ensure the quality of clinical feedback. Another approach is ongoing and centralised evaluation of clinical feedback. This method involves collecting student feedback to assess the quality of clinical feedback provided by clinical supervisors. Participant 4

mentioned, *"The chairperson will know how the instructors deliver a quality level of instruction in giving clinical feedback and assess the content in general".* Furthermore, some participants suggested benchmarking against set standards for clinical feedback, comparing their performance to established standards to ensure they are on the right track. As stated by participant 10, *"To work as supervisors, we need to compare ourselves to other institutions using key performance indicators (KPIs)".*

Sharing and exchanging knowledge with other EMS colleges about clinical feedback was another approach and participants discussed the benefits of learning from other EMS programmes to find the best solutions for providing high-quality clinical feedback. As stated by participant 11, *"We base these programmes on other references like King Saud University, National Guard, or institutes outside the Kingdom. So, having references to inform our decisions was a problem for us".* Participant 9 further emphasised the potential role of quality assurance management by external bodies such as Saudi health specialists or the Saudi EMS Association, *"At the national level, quality assurance should be in charge. For example, in Saudi Arabia, we need individuals from the Emergency Medical Association to act as gatekeepers … collaborated with the Saudi Health Specialists Commission to standardise guidelines or provide support and training, like courses for clinical coordinators… I believe the Saudi Commission for Health Specialists should take the lead in this. The other level at the university should be the Clinical Affairs Department, with the programme director being in charge... these external organisations should set and manage the quality and standards of clinical feedback".* However, other participants emphasised that quality assurance management should be handled at an institutional level. As expressed by Participant 11, *"We have designed three committees for this, like an issues committee inside the department, what we call the Clinical Committee in the college, and a separate quality assurance unit. So, we have three committees to follow up on these issues. But the most critical one is the assurance and the fundamental training committee inside the department".*

Theme 4: Resources

This theme emphasises the significance of various aspects in EMS clinical feedback, including a standardised feedback system, funding and training, increased manpower and coordinators, and different guideline formats. As mentioned by participant 3 *"So having standardised feedback system, we'll put everything in the right place".* Similarly, participant 8 suggested that *"…there should be a feedback system and we should also follow it and give the feedback based on their feedback and if it is needed".*

The need for funding and training was also highlighted, with participants noting the deficiency of training in clinical feedback due to insufficient funds. Participant 9 pointed out, *"Always give the support to the clinical supervisors. But in terms of training, they have not received anything regarding the costs".* Participant 11 elaborated on the issue, stating, *"It's regarding the budget for training and improvement. We can train every six months or three months, but in the private sector, it's difficult".* The shortage of manpower and coordinators was identified as a critical factor in managing resources and providing effective feedback. Participant 11 also highlighted that *"Considering the shortage of manpower in academics or academic staff, it is a situation and depends on each university and each department and the number of sets available…This is a very important issue regarding the lack of manpower and all institutes, especially in my institution".*

Participants expressed varying preferences for clinical feedback guideline formats, with some preferring paper formats, while others preferred digital formats. Participant 9 said, *"The handbook should be in different forms. What I prefer, personally, is a paper format".* In contrast, participant 8 noted, *"There should be like a handbook. Okay, nowadays it is technology based. So, we need to have create an electronic book also".*

The limitations of existing checklists and scoring systems were discussed, and participants expressed the need for additional training and support to make them

more effective. Participant 7 commented, *“In Saudi Arabia, the good thing is that they have standard tools known as checklists already established. But at the same time, it limits our capacity of generating or improvising feedback or customising feedback or making some innovative approval providing some innovative feedback”.* Similarly, participant 1 highlighted a need to *“Train clinical supervisors on how to give feedback based on the checklist”.*

Participants also had different preferences for the type of guidelines, with some preferring a handbook, others preferring a set of instructions, and some opting for recommendations. Participant 9 stated, *“I believe guidelines are more important, supported by a handbook”,* whereby participant 10 preferred a set of instructions, explaining, *“Because it’s gonna be easier. It’s gonna give me what I should follow, like a handbook, not like a book because the book, I need to read everything”.* Participant 5 suggested recommendations, saying, *“I think it should be called recommendations. Instructions are something you have to follow strictly. Recommendations are better. You need to provide people with the ability to judge for themselves”.* Moreover, the theme suggests that providing opportunities for dialogue and discussion among students and clinical supervisors is vital for resolving problems related to clinical feedback, as noted by participant 11 “*We try to solve this issue by focusing on using the focus group, like I told you, who’s in this subject. We will use three people from Class A, Class B, Class C, Class D, like this and from the other group that was like this”.*

Participants emphasised the importance of training students to comprehend the purpose of feedback, accept constructive criticism, and actively engage with it. One participant noted, *“Students should be taught how to receive and process feedback as an integral part of their education, enabling them to grow and improve”* participant 8. Effective communication between students and clinical supervisors was also highlighted as crucial in the feedback process. This includes providing psychological support to address concerns such as embarrassment or reluctance in receiving feedback. As one participant stated, *“Open communication between the*

student and the supervisor is essential for an efficient feedback process" (participant 4).

Participants elaborated on the value of group discussions in facilitating feedback. They suggested that after completing their clinical skills, students should engage in friendly group discussions where they can receive and discuss feedback openly. As suggested by participant 3, *"Hey, Mr. X, you performed these tasks well. Excellent job! Stay positive. However, if I were you, I would consider doing this and that differently".*

Theme 5: Values and attitudes of clinical supervisors towards feedback

In this theme, participants emphasised the critical role of clinical feedback as an essential educational tool in clinical practice, helping students advance and refine their skills. To ensure the effectiveness of this process, it is crucial to motivate and incentivise clinical supervisors through rewards and training opportunities, thereby nurturing a steadfast commitment to providing valuable feedback.

As stated by participant 8, "Students can learn more skills they can use. The more time and effort devoted to the skills they are lacking will help them develop and improve. That's why feedback is crucial". However, improving clinical feedback requires increased commitment and motivation on the part of the educators. Participant 8 explained, "Motivation is an essential tool to encourage clinical supervisors' support. One way to achieve this is by providing incentives". This participant further elaborated "We need them to commit. Commitment is key. Agreements related to payment or incentives in the form of training can help facilitate this".

Theme 6: Management and aligning students' and supervisors' expectations of clinical feedback.

This theme stresses the significance of training students to comprehend the purpose of feedback and how to receive it effectively. As expressed by participant 4 *"This can be solved by providing training sessions to the students to understand what feedback is and that it is okay to receive negative feedback".* Similarly, participant 9 stated "*We advise students how to be open-minded and accept the feedback. So, I believe in training and education".*

Addressing issues such as embarrassment or shyness when receiving feedback, participants suggested providing psychological support to help students manage their reactions and emotions. Participant 5 underlined the value of communication, stating, *"Talk to them, at least for a few minutes and develop rapport. Explain to them what they're supposed to be doing today".* Lastly, participants accentuated the necessity of fostering mutual understanding between students and clinical supervisors regarding feedback expectations. Participant 12 remarked, "*We need to train students and clinical supervisors on what each expects from the other, and we also need to grasp what everyone else expects to get the satisfactory level of clinical feedback".*

6.7.2 Round 2

Following round 1, the Delphi survey was developed containing 74 items and derived from the themes identified in the first round as shown in Figure 2 below. The survey was sent to a total of 63 EMS educators whose email addresses were provided alongside consent to contact them in previous studies. Out of the 63 invitees, 39 (6 female and 33 male) EMS professionals from Saudi Arabia, experienced in supervising clinical groups of students in hospitals, ambulance departments, or simulation labs, volunteered to participate. The majority of participants (38.5%) were aged 30-39, followed closely by those aged 40–49 (30.8%), with 17.9% being aged 20-29, and the smallest group (12.8%) being aged

50–59. Over 90% of participants held either a master's degree or a PhD or equivalent, indicating their high level of academic qualifications.

Concerning experience in instructing students, 35.9% had been doing so for 6–10 years, followed by 30.8% with 1–5 years of experience and four had over 16 years of experience. In terms of providing clinical feedback to students, the largest group (18 participants) had 1–5 years of experience, followed by those with 6–10 years (9 participants). Only one participant had less than one year of experience, and 4 had over 16 years of experience. The participants had diverse experience in instructing students and providing clinical feedback, which could provide valuable insights into best practises for clinical feedback training in the EMS field.

The majority of participants in this study (n = 20) were employed at Prince Sultan College for EMS, with the second largest group (n = 6) working at King Saud bin Abdulaziz University for Health Sciences. A smaller number of participants worked at Umm Al Qura University in Makkah, Al Ghad International Colleges, Imam Abdulrahman Bin Faisal University, and Prince Sultan Military College of Health Sciences, with 2, 8, 1, and 1 participant(s), respectively. One participant selected "Other", indicating that they worked at King Khalid University.

The items that reached the consensus definition (75% agreement or above) in this study were selected, resulting in 46 items. Additionally, 14 new items were suggested in this round, as illustrated in Figure 2. Based on the participants' responses, several areas achieved a high level of agreement, while others required further discussion and exploration. These areas will be discussed in detail in the discussion chapter.

6.7.3 Round 3

The survey was once again sent to all participants who completed round 2, adhering to the same procedures and methods. The Delphi survey, which was based on the interviews from the first round and further integrated the 14 new items suggested in the open-ended questions from the second round, was utilised.

Participants were once again asked to rate items on a five-point Likert scale. They were also given the opportunity to expand on their ratings or suggest additional items via an open-ended question. Thirty-eight out of the initial 39 participants completed the survey.

Consensus was attained on an additional 18 items, bringing the cumulative number of items with consensus to 66 out of 88. These items were distributed among three categories: Training for Clinical Feedback, Quality Assurance of Clinical Feedback, and Guidelines and Tools to Improve Clinical Feedback, as shown in Figure 2.

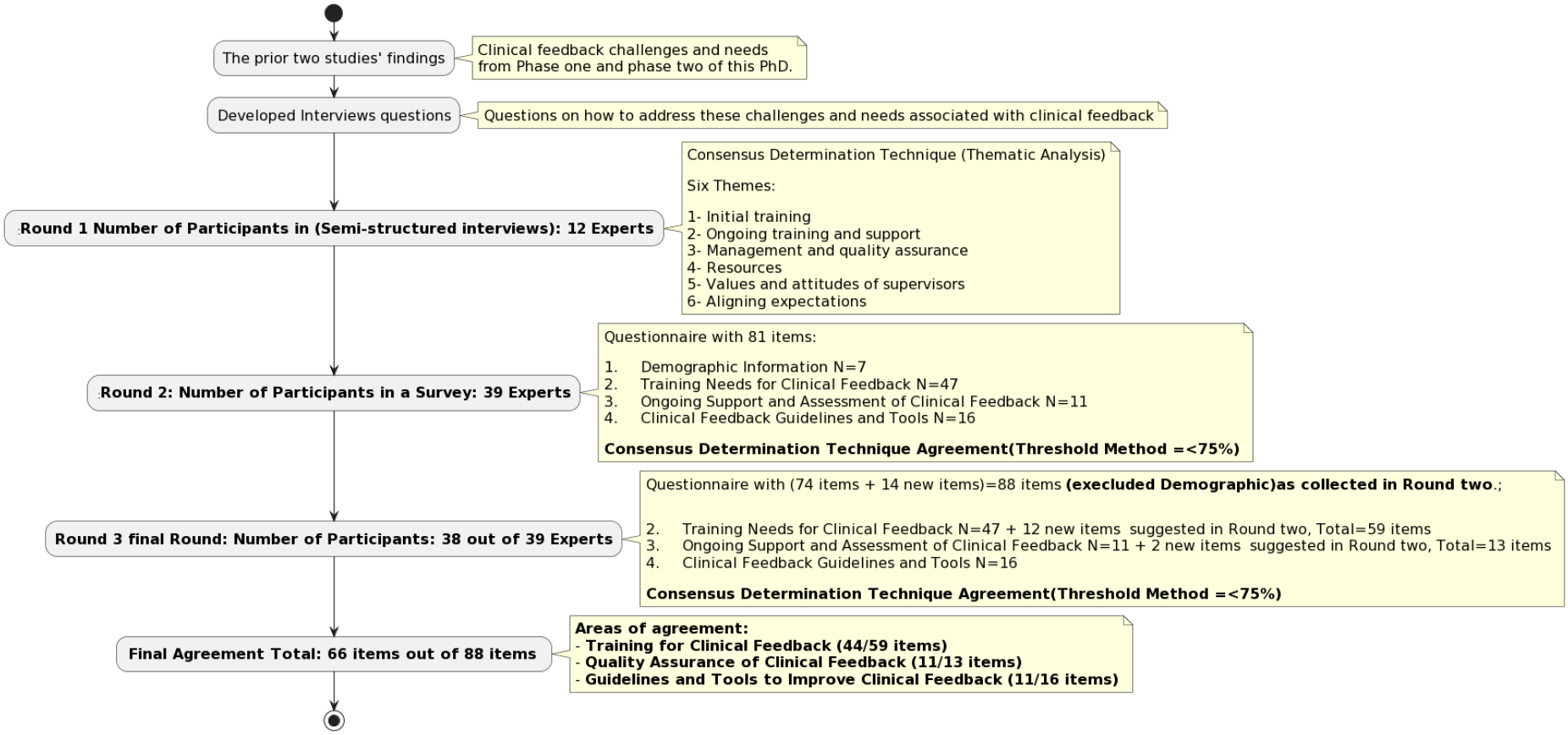

Figure 6.2 Delphi flowchart of the development and the consensus results of the three rounds

6.8 Discussion

This study aimed to identify the best strategies for addressing the challenges and needs of EMS education with regards to clinical feedback by proposing an educational strategy to be applied at a national level in Saudi Arabia. All the needs and challenges were identified in prior phases of this PhD, which was conducted in the highest reputation EMS colleges in Saudi Arabia and were identified by conducting survey interviews with clinical supervisors and both male and female students. The study aimed to achieve consensus on experts' opinions about the best ways to address the revealed challenges and needs in the contents, use, methods, and impact of clinical feedback in EMS clinical supervisors and students, and they stressed the importance of establishing training, support, and quality assurance to solve these challenges and address these needs. This formed and structured a strategy to solve these challenges and needs in EMS colleges. The proposed strategy to solve these challenges and address these needs suggested training and support strategy, clinical feedback quality assurance, and finally, resources and tools that would enhance the quality of clinical feedback provided to students.

The objective was to reach consensus not only on how to solve clinical feedback challenges but also to reach consensus on all the components and details of which formed a clear strategy. The results of a three-round Delphi study, involving expert feedback, offer insightful perspectives on EMS professionals' views regarding the best educational strategies to meet identified educational needs and challenges of clinical supervisors. The findings will be discussed in the following subsections, which include initial training, ongoing training and support, management and quality assurance of clinical feedback, resources, the values and attitudes of clinical supervisors towards feedback, the alignment of students' and supervisors' expectations, and the theoretical and practical implications of the study.

Initial Training:

The study highlighted the high value placed by participants on comprehensive educational training. This includes formal training on both teaching and clinical feedback, as well as engaging in specialised workshops focused on clinical feedback, with a significant consensus of 87.2% in the second round and 89.0% in the third round for both items 1 and 2 in Table 6.1. These findings align with research conducted by Filipp (2022) in the United States, where paramedic interns benefited significantly from structured training programmes that focused on consistency in feedback delivery. Additionally, Edwards (2019) in Australia highlighted the need for structured professional development and mentoring for clinical supervisors, which is crucial in ensuring the delivery of high-quality feedback. These training methods were acknowledged as essential in providing clinical supervisors with the necessary theoretical knowledge and practical skills for high-quality feedback delivery. Furthermore, the study emphasised the importance of simulated scenarios in training, receiving a 97.4% agreement in the third round (item 8). This is in line with findings from Nilsson et al. (2023) in Sweden, where experiential learning using digital tools was shown to improve communication and the overall quality of feedback

Conversely, there was less consensus on self-directed learning, with only 56.4% consensus in the second round and 55.3% in the third round (item 13). This indicates a need for EMS educators to provide clear instructions and guidelines, considering the unique nature of their work. This research underscored the importance of comprehensive initial training for clinical supervisors, preparing them with the requisite skills and knowledge for effective feedback. Such extensive training is vital to ensure that clinical supervisors are adequately prepared to provide feedback that enhances learning and fosters the development of professional competencies in students (Boehler et al. 2006).

Participants also shared their perspectives on the ideal duration of clinical feedback training, with a consensus favouring a flexible approach, tailored to the specific

needs of each training provider, rather than a fixed timeline. An impressive 94.8% of participants suggested that the training length should be determined locally, based on the content of the course and whether it is an introductory or refresher course (item 43). This finding opposes a one-size-fits-all approach to clinical feedback training in the EMS context, suggesting the need for flexibility and adaptability in training design (Bullock et al. 2015). Diversity in opinions regarding the specific duration of clinical feedback training was also evident.

Interestingly, there was no consensus among participants regarding a specific duration for clinical feedback training. Opinions varied between a one-day training event, a half-day event, and training no longer than two hours. This showed that EMS providers may have diverse educational needs and preferences, necessitating a flexible and individualised approach to clinical feedback training (Cook et al. 2012).

The study results revealed a surprising lack of consensus about the involvement of the Saudi Commission for Health Specialties and the Saudi Society of Emergency Medicine in administering quality assurance. Only 36.9% of participants agreed with their involvement, as seen in Table 6.1 (items 46 and 47). Conversely, the EMS college or department was viewed as the most appropriate entity for this role, with 86.0% agreement (item 44). This may be due to the belief that members of the EMS college or department, who have a more direct connection to and understanding of the educational processes and challenges faced by clinical supervisors, are better suited to manage quality assurance (Alamri 2017). This also indicates that participants perceive the roles of the Saudi Commission for Health Specialties and the Saudi EMS Society as more focused on broader healthcare and professional issues, rather than specifics of EMS education.

Table 6.2 Clinical feedback Training and Development Needs of Clinical Supervisors

Items numbers	*Best type of training (Items)*	*Consensus Percentage round 2 (N = 39)*	*Round 3 Agreement (N = 38)*	*Final Decision of agreement*
1	Completing a formal educational training on teaching including clinical feedback	87.2%	89.0%	YES
2	Attending workshops specific on clinical feedback	87.2%	89.0%	YES
3	Attending regular meetings to discuss clinical feedback	82%	83.5%	YES
4	Receiving compulsory training	66.6%	76.3%	YES
.5	Receiving optional training	61.6%	65.8%	NO
6	Receiving remotely delivered training	60.5%	52.7%	NO
7	Receiving face-to-face clinical feedback training	74.4%	84.2%	YES
8) New Item from R2	Attending simulation workshops on clinical feedback	-	97.4%	YES

Items numbers	***Best way to learn giving feedback (items)***	***Consensus Percentage round 2 (N = 39)***	***Round 3 Agreement (N = 38)***	***Final Decision of agreement***
9	Learning by observing a senior and more experienced colleague	69.2%	73.7%	NO
10	Learning through discussions and instructions with a senior and experienced colleague	87.2%	88.5%	YES
11	Observing and learning from peers	69.2%	73.7%	NO
12	Learning from external resources (e.g., the internet, books, and other health care)	71.8%	78.9%	YES
13	Being self-directed and learning independently	56.4%	55.3%	NO
14) New Item from R2	Gaining knowledge and experience through hands-on practice in delivering feedback through simulated scenarios	-	92.1%	YES

Item Number	*Training programme contents (Items)*	*Consensus Percentage round 2 (N = 39)*	*Round 3 Agreement (N = 38)*	*Final Decision of agreement*
15	How to provide specific feedback	79.5%	81.0%	YES
16	How to customise and individualise feedback	84.6%	86.0%	YES
17	How to give feedback when teaching in groups	79.2%	80.5%	YES
18	How to provide constructive clinical feedback	89.7%	91.0%	YES
19	How to speak openly and enable dialogue with students	87.1%	88.5%	YES
20	How to engage in dialogue with students	89.7%	91.0%	YES
21	How to train students about the purpose of feedback	79.5%	81.0%	YES
22	How to manage students' expectations of clinical feedback	89.7%	91.0%	YES
23	How to train students on the importance of receiving and accepting feedback	87.2%	88.5%	YES
24	How to ensure students understand supervisors' expectations when receiving clinical feedback	82%	83.5%	YES
25	How to provide detailed feedback	82.1%	83.5%	YES

26	How to ensure that students understand what to do with the feedback that has been provided	87.2%	88.5%	YES
27	How to manage students' emotions and reaction to clinical feedback.	82.1%	83.5%	YES
28	How to manage time to deliver feedback to large numbers of students	82%	83.5%	YES
29) New Item from round2	Student opinions on feedback given to them	-	85.5%	YES
30) New Item from round2	Student opinions on feedback process	-	63.1%	NO
31) New Item from round2	Providing practical experience and promoting a positive attitude towards implementing feedback effectively	-	89.5%	YES
32) New Item from round2	Training should include theoretical aspects of clinical feedback as well as practice	-	84.2%	YES

Items number	*Frequency of training items*	*Consensus Percentage round 2 (N = 39)*	*Round 3 Agreement (N = 38)*	*Final Decision of agreement*
33	Once only (at the beginning of the role)	36.9%	28.9%	NO
34	Once at the start of the role and then once a year, in a formal refresher course	59.4%	52.6%	NO
35	Once only at the start of role and thereafter only if and when the need arises	43.2%	31.6%	NO
36	always available as online module done independently	73.4%	79.0%	YES
37) New Item from round2	Training should always be given at the start of instructing role.	-	78.4%	YES
38) New Item from round2	When students' evaluation highlight that an instructor is not performing well training should be offered.	-	92.1%	YES

Items number	*Length of Training*	*Consensus Percentage round 2 (N = 39)*	*Round 3 Agreement (N = 38)*	*Final Decision of Agreement*
39	A one-day training event	56.4%	52.6%	NO
40	A half day training event	43.6%	47.4%	NO
41	No more than a couple of hours training	48.8%	50.0%	NO
42) New Item from round 2	Depend on the materials presented and whether it is a first or refresher course	-	92.2%	YES
43) New Item from round 2	Length of time should be determined locally by training provided	-	94.8%	YES

Items number	*Responsible for the training*	*Consensus Percentage round 2 (N = 39)*	*Round 3 Agreement (N = 38)*	*Final Decision of agreement*
44	EMS college or department	84.2%	86.0%	YES
45	All Saudi EMS institutions	66.7%	71%	NO
46	Saudi EMS association	42.1%	47.4%	NO
47	Saudi Commission for Health	50%	36.9%	NO
48) New Item from round 2	Specific academic department	-	91.8%	YES

Items number	*Type of Training*	*Consensus Percentage round 2 (N = 39)*	*Round 3 Agreement (N = 38)*	*Final Decision of agreement*
49	to offer regular training and workshops	84.6%	86.0%	YES
50	to meet with clinical supervisors on regular basis to review their provision of clinical feedback	73.7%	86.8%	YES
51	to allow clinical supervisors to self-evaluate on their performance	68.4%	76.3%	YES
52	to conduct one formal evaluation of the provision of clinical feedback to identify areas that may need improvement	78.9%	80.5%	YES
53	to enable clinical supervisors to self-reflect and identify areas of improvement and training needs	79.5%	81.0%	YES
54	to enable discussion and dialogue between clinical supervisors to reflect on their provision of clinical feedback	82%	83.5%	YES
55	to provide opportunities to observe and learn from a senior or more experienced colleague on providing clinical feedback	84.6%	86.0%	YES
56	to offer students ongoing support on how to overcome embarrassment or shyness when receiving feedback	84.6%	86.0%	YES

57	to offer students ongoing support on how to make the most of clinical feedback	89.8%	91.0%	YES
58)New Item from round 2	Consider the students' ability to evaluate feedback and instructors who require additional training.	-	89.5%	YES
59)New Item from round 2	Providing sufficient time and staffing for clinical supervisors	-	97.4%	YES

Ongoing Training and Support:

Ongoing training and support play a crucial role in enhancing the feedback skills of clinical supervisors (Junod Perron et al. 2013). The study indicates the value of regular meetings focused on clinical feedback, with 82% of participants in the second round and 83.5% in the third round affirming their usefulness (Table 6.2, item 3). This mirrors findings by Rose et al. (2015) in Australia, where ongoing real-time feedback sessions between students and supervisors were found to be particularly effective in developing clinical skills. Similarly, Wongtongkam and Brewster (2017) in Australia found that regular feedback sessions significantly improved student learning outcomes. Face-to-face training sessions were similarly valued, receiving an agreement of 74.4% in the second round and 84.2% in the third round (Table 6.2, item 7). The research further emphasises the importance of providing continuous support to students, a theme also highlighted by Filipp (2022), who noted that consistent feedback delivery plays a crucial role in the holistic development of paramedic interns. The study highlights a consensus on the need for ongoing training, specifically focused on clinical feedback (Table 6.2, items 49–59). Such training and support empower clinical supervisors to refine their feedback

skills and remain abreast of evolving educational and clinical demands (Cantillon and Sargeant 2008).

Management and Quality Assurance of Clinical Feedback:

The expert consensus underscores the importance of a standardised feedback system, integrating clinical feedback into existing quality assurance management structures, and establishing specific benchmarks for feedback. This aligns with research by O'Meara et al. (2014) in Australia, which identified the need for standardised feedback mechanisms in paramedic education to ensure consistency across different learning environments. The agreement rates for incorporating clinical feedback into the existing quality assurance management system were 84.7% in the second round and 86.0% in the third round (Table 6.3, item 60). Additionally, 84.7% in the second round and 86.0% in the third round of participants highlighted the necessity of knowledge exchange among EMS colleagues to establish shared feedback standards. Similar findings were echoed in the study by Boyle et al. (2008) in Australia, where structured feedback systems with clear objectives were found to enhance the quality of the feedback provided to paramedic students. The study highlights the critical importance of quality assurance in clinical feedback, including setting specific standards for feedback quality (Table 6.3, item 62) with an 82% agreement in round 2 and 83.5% in round 3. Sharing knowledge among EMS professionals is identified as essential for enhancing the quality of clinical education (Andersson et al. 2019). The discussion also highlighted the importance of setting specific feedback standards, with an 82% agreement rate, to uphold feedback quality (Nicol and Macfarlane-Dick 2006). Sharing Knowledge among EMS colleagues was identified as a pivotal strategy to enhance the quality of feedback.

Table 6.3 Ongoing support and quality assurance of clinical feedback

Items	*Ensuring high standards of quality feedback (items)*	*Consensus Percentage round 2 (N=39)*	*Round 3 Agreement% (N=38)*	*Final Decision of agreement*
60	Incorporating clinical feedback into the existing quality assurance management system	84.7%	86.0%	YES
61	Positioning the review and evaluation of clinical supervisor feedback in the current evaluation strategy	79.5%	81.0%	YES
62	Benchmarking the provision of set standards of clinical feedback	82%	83.5%	YES
63	Sharing and exchanging knowledge amongst all EMS colleagues and creating shared standards	84.7%	86.0%	YES
64	Offering incentives to clinical supervisors, such as payment or free training and invitations to conferences in order to motivate clinical supervisors to give quality feedback	82.1%	83.5%	YES
65	Providing incentives and opportunities that will make supervisors more committed to provide quality feedback	76.9%	78.5%	YES
66	To provide opportunities to observe and learn from a senior or more experienced colleague on providing clinical feedback	84.6%	86.0%	YES

67	Giving students an opportunity to provide ongoing evaluations of their satisfaction with clinical feedback	87.2%	88.5%	YES
68	Using evaluation data to identify support needs regarding clinical feedback	89.7%	91.0%	YES

Items number	***Responsibility of clinical feedback quality assurance (items)***	***Consensus Percentage round 2 (N=39)***	***Round 3 Agreement% (N=38)***	***Final Decision of agreement***
69	the EMS college or department	80.4%	82.0%	YES
70	the Saudi Commission for Health Specialties	66.7%	68.4%	NO
71	the Saudi EMS association	46.1%	42.1%	NO
72) New Item from R2 #	all the Saudi EMS institutions in collaboration	-	97.3%	YES

Resources

The study highlights the critical role of resources in defining the quality and effectiveness of clinical feedback within EMS education. This is consistent with the findings of Nilsson et al. (2023) in Sweden, where digital tools such as the Digitalised Assessment Tool were found to enhance the transparency and quality of feedback by providing clear, visual representations of student progress. Table 6.4 reveals challenges such as inadequate funding and a shortage of clinical supervisors, underlining the resource limitations in providing high-quality feedback. The need for increased resources was also identified in Filipp (2022) in the United States, who highlighted that both financial and personnel resources are essential to maintaining the quality of feedback and ensuring that supervisors are adequately supported in their roles. The consensus among participants indicates these constraints as significant barriers, with 79.5% agreement in round 2 and 81.0% in round 3 for increasing the number of clinical supervisors (item 76) and 81.6% in round 2 and 83.0% in round 3 for more funding to attend training (item 75).

Potential solutions discussed include augmenting personnel and enhancing financial resources for educational initiatives. The proposal to expand the responsibilities of clinical feedback coordinators was particularly noted, with 89.5% agreement in round 2 and 90.5% in round 3 (item 77). The importance of checklists in improving feedback quality was emphasised, which necessitates dedicated resources for their development, maintenance, and modification (item 78).

A significant majority of participants (89.8% in round 2 and 91.0% in round 3) agreed on the importance of having a standardised feedback system (Table 6.4, item 73). This system demands substantial resources, including the creation of structured guidelines, supervisor training, and ongoing maintenance for consistency. Specialised supervisor training is critical for effective feedback, requiring significant investment in financial, time, and human resources (Table 6.4, item 74).

Specialised training for supervisors is essential for effective feedback, necessitating considerable resource allocation. This includes not only financial but also time and human resources. The study highlighted the need for enhancing the availability of training, especially digitally, with 88.7% in round 2 and 90.0% in round 3 advocating for digital formats (item 80). This entails allocating resources towards the development and maintenance of digital platforms and content creation.

Collaboration among EMS institutions is seen as a key strategy for pooling resources. This includes sharing resources, expertise, and best practices, fostering more comprehensive and effective guidelines and tools. Such collective responsibility is crucial for continuous improvement and shared learning in the EMS field.

Table 6.4 Enhanced Clinical Feedback Guidelines and Tools

Item Number	*Enhancing Clinical Feedback Through*	*Consensus Percentage round 2 (N=39)*	*Round 3 Agreement% (N=38)*	*Final Decision of agreement*
73	Having a standardised feedback system and guidance	89.8%	91.0%	YES
74	Having more training with a specific focus on clinical feedback	84.6%	86.0%	YES
75	Having more funding to attend training	81.6%	83.0%	YES
76	Increase the number of clinical supervisors who can provide clinical feedback	79.5%	81.0%	YES
77	Have better coordinators of clinical feedback	89.5%	90.5%	YES
78	Having checklists that are more flexible to enable more varied ways of giving feedback	84.6%	86.0%	YES
79	Having more training on how to use checklists and guidelines	89.7%	91.0%	YES

Items numbers	*Recommended Format for Providing Clinical Feedback Guidelines*	*Consensus Percentage round 2 (N=39)*	*Round 3 Agreement% (N=38)*	*Final Decision of agreement*
80	digital	88.7%	90.0%	YES
81	paper	61.5%	65.8%	NO
82	handbook	52.9%	52.6%	NO
83	a set of instructions	64.1%	68.4%	NO
84	a set of recommendations	74.3%	76.3%	YES

Items numbers	*Responsibility in Implementing Clinical Feedback Guidelines*	*Consensus Percentage round 2 (N=39)*	*Round 3 Agreement% (N=38)*	*Final Decision of agreement*
85	the EMS college or department	78.9%	80.0%	YES
86	all the Saudi EMS institutions in collaboration	82%	83.5%	YES
87	the Saudi EMS association	59%	60.5%	NO
88	the Saudi Commission for Health Specialties	71.8%	71%	NO

Values and attitudes of clinical supervisors towards clinical feedback

The participants reached consensus on the importance of supervisors' values and attitudes towards feedback, particularly their ability to provide detailed, constructive, and timely feedback as can be seen in Table 6.2 (items 15 to 32). They recognised the value of effective communication, student engagement, and managing student emotions in delivering high-quality feedback. This is consistent with the findings of Lane (2014) in Australia, where paramedic students emphasised the need for clinical educators to be approachable, knowledgeable, and clear in their feedback. Additionally, Moodley (2016) in South Africa found that students often felt demotivated by negative feedback, highlighting the importance of managing student emotions, a key component also stressed by participants in this study. Furthermore, Carver (2016) in Australia noted that constructive and timely feedback plays a significant role in building student confidence and enhancing their clinical learning experience. The use of student-centric feedback models and continuous evaluation of student satisfaction were identified as beneficial strategies. The attitudes and values that clinical supervisors hold towards feedback significantly impact its quality. Offering incentives such as remuneration or conference invitations was considered an effective motivator for supervisors to deliver high-quality feedback (Deci et al. 2001) (Table 6.3). However, while incentives can be beneficial, they may not be sufficient to promote sustained behavioural changes. The effectiveness of the feedback process also depends significantly on its quality (Sargeant et al. 2015).

Management and aligning students' and supervisors' expectations of clinical feedback

The participants emphasised the need to align the expectations of students and supervisors regarding clinical feedback. This aligns with O'Meara et al. (2015) in Australia, where communication gaps between students and instructors often led to misaligned expectations, impacting the effectiveness of feedback. Wongtongkam

and Brewster (2017) in Australia also found that students' perceptions of feedback differed from their supervisors', with students preferring immediate and interactive feedback, while supervisors leaned towards traditional methods. They suggested that training initiatives should focus on educating students about supervisors' expectations, managing individual student expectations, and maximising the benefits derived from the feedback received. Providing students with opportunities for ongoing assessments and integrating their viewpoints into the feedback process were considered crucial for cultivating a positive learning environment. A significant finding of this study was the need to harmonise the expectations between students and supervisors concerning clinical feedback. The participants agreed that enabling students to regularly evaluate their satisfaction with clinical feedback could enhance the overall quality of the feedback process (Nicol and Macfarlane-Dick 2006) (Table 6.3, item 68). Similarly, Filipp (2022) in the United States found that consistent feedback, both in terms of style and content, was crucial in ensuring that students could understand and apply the feedback they received, reflecting the need for alignment between student and supervisor expectations.

6.8.1 Theoretical and Practical Implications:

This study findings formed an overall educational strategy to enhance clinical feedback and address its the challenges and learning needs in EMS in Saudi Arabia. In EMS internationally, Edwards (2019) in Australia proposed a similar approach, highlighting the importance of structured professional development, mentoring, and feedback standardisation in improving clinical supervision. Nilsson et al. (2023) in Sweden also stressed the value of using digital tools to support national strategies, ensuring transparency and consistency in feedback processes. Educational strategy encompasses a range of modern approaches such as self-directed lifelong learning, critical reflection, and research (Lambert and Glacken 2005). In clinical education, the importance of educational strategies lies in addressing challenges and needs. For instance, in nursing, understanding the obstacles against clinical education can lead to better recognition of the challenges, finding solutions, and

enhancing learning quality (Shadadi et al. 2018) . Effective teaching strategies in clinical education are crucial for balancing patient care and education, emphasising the significance of teachable moments and feedback from learners (Amouzeshi and Daryazadeh 2019). Additionally, Feedback literacy is an important aspect of educational strategies, enabling health professions learners to make sense of information from various sources and use it to enhance their work or learning strategies (Tripodi et al. 2021).

The study's in-depth analysis of the specific challenges and needs in EMS education in Saudi Arabia regarding clinical feedback provides a foundation for a national-level strategy. This strategy, rooted in extensive research including surveys and expert opinions, promises to enhance the quality of EMS clinical education for both supervisors and students. As shown in international EMS contexts, particularly in Filipp (2022) in the United States, comprehensive training programmes that integrate theoretical knowledge with practical skills in clinical feedback are essential to improving the feedback system. Such strategies should include simulated practical scenarios to enhance hands-on experience, as highlighted by Nilsson et al. (2023) in Sweden. The strategy addresses the need for comprehensive training programmes which integrate theoretical knowledge with practical skills in clinical feedback, as emphasised by (Al Wahbi 2014). The study underscores the critical role of initial training for clinical supervisors. With high consensus on the need for formal training in clinical feedback and specialised workshops. These programmes should include components such as effective communication, student engagement, emotional management, and simulated practical scenarios, which are aligned with principles of experiential learning and adult education.

The diversity in opinions regarding the duration of clinical feedback training highlights the need for a flexible, tailor-made approach. This flexibility allows for adaptation to the specific requirements of each training provider and individual learning needs, challenging the notion of a standardised training duration. This approach could be more effective in addressing the varied educational backgrounds and experiences of clinical supervisors.

The study suggests that EMS colleges or departments are seen as the most appropriate entities for managing quality assurance in clinical feedback, rather than national bodies like the Saudi Commission for Health Specialties. This implies a more localised and specialised approach to quality assurance, potentially leading to more effective and context-specific solutions. This aligned with Seyfried and Pohlenz (2020) supports the idea that EMS colleges or departments (local level) are better suited for managing quality assurance in clinical feedback, and that ongoing training and support are essential for ensuring the competence of clinical supervisors.

The importance of ongoing training and support is clear, indicating that continuous professional development is vital for clinical supervisors. This continuous training ensures that supervisors remain competent in providing high-quality feedback and adapting to evolving educational and clinical demands.

The consensus on incorporating clinical feedback into existing quality assurance structures implies a need for standardised feedback systems. This standardisation could enhance consistency and effectiveness in feedback delivery, ensuring it meets set benchmarks and quality standards.

The study highlights the critical role of resources, including funding, personnel, and training materials, in the quality of clinical feedback. The implication here is that significant investment is needed in these areas to ensure the effectiveness of clinical feedback strategies. This includes the development of digital training platforms, which received strong support in the study. Recognise the need for adequate resources in educational effectiveness.

The consensus on the importance of supervisors' values and attitudes towards feedback indicates that these factors significantly impact the quality of feedback. This finding implies that beyond training and resources, attention must also be paid to cultivating positive values and attitudes among clinical supervisors.

The need to align students' and supervisors' expectations about clinical feedback suggests that training should not only be focused on supervisors but also include educating students. This dual focus can enhance the overall effectiveness of the feedback process, ensuring that it meets the educational needs of students while being delivered effectively by supervisors. This reflects the growing recognition of the interactive nature of the feedback process, emphasising the need for mutual understanding and collaboration between students and supervisors in healthcare education.

The study's emphasis on collaboration among EMS institutions for resource sharing and knowledge exchange implies a need for a collective approach to EMS education. This collaborative effort can lead to more comprehensive and effective educational strategies, benefiting the entire EMS community in Saudi Arabia.

6.9 Limitations and Suggestions for Future Research

The study, while providing valuable insights into the training and support needs of clinical supervisors in EMS education within Saudi Arabia, presents some limitations. The primary limitation is the geographical focus on Saudi Arabia, which may restrict the generalisability of the findings to other regions with different EMS systems, cultural contexts, and educational frameworks. The unique characteristics of EMS education in Saudi Arabia, influenced by factors such as organisational structures (Khattab et al. 2019), educational standards (AlShammari et al. 2018) , cultural dimensions (Alanazy et al. 2021), and workforce dynamics (Al-Wathinani et al. 2023), highlight the need for context-specific approaches to EMS management and education in Saudi Arabia. Nevertheless, it is important to recognise that this study is the third phase of a Ph.D. thesis, and earlier phases involved clinical supervisors and students, offering a broader range of perspectives than this phase alone provides. The study's strength lies in its comprehensive approach, utilising a robust methodology and engaging a well-qualified expert panel. The findings provide a solid foundation for developing targeted educational strategies, although

the implementation and generalisability of these strategies will need to be tested in varied contexts.

Another limitation is related to the methodology chosen due to the COVID-19 pandemic. The Delphi method was selected because it allows for remote, asynchronous participation, which was crucial during the pandemic. However, if there had been no such constraints, focus groups and group discussions might have been more beneficial. These methods could have provided richer information, as the experts would have had the opportunity to hear each other's opinions directly, potentially leading to more nuanced insights and a deeper exploration of the issues. The lack of direct interaction among participants in the Delphi method might have limited the depth of discussion that could have been achieved in a more interactive setting.

First and foremost, there is a need for empirical studies focused on evaluating the effectiveness of proposed of the educational strategy as suggested by this study. These studies should aim to evaluate how the various components of the strategy, including training contents, duration, frequencies, feedback delivery methods, quality assurance mechanisms, and clinical feedback guidelines contents and type, impact the performance of clinical supervisors. It is essential to gather objective data that can validate the effectiveness of this educational strategy and ensure its practical relevance and efficacy.

Future research should also It is important to evaluate the implemented educational strategies, such as clinical training programmes, to ensure that they effectively achieve their learning goals and adapt to changing healthcare demands (Ragsdale et al. 2020; Vamos et al. 2023).

Furthermore, an important research direction involves studying how these educational strategy influence students' performance in clinical practice. This area of study should focus on analysing the development of specific skills, decision-making processes, and overall clinical competencies. Such research can provide a

direct link between training improvements and enhanced clinical performance, which is the ultimate goal of these educational endeavours.

In addition to immediate skill and performance improvements, longitudinal studies are essential to understand the long-term effects of this educational strategy implementations on students' confidence and readiness for patient care. These studies should aim to correlate the enhancements in training and feedback with increased levels of student confidence, competence, and, ultimately, the quality of patient care they provide. This long-term perspective is critical for ensuring that training interventions have lasting and meaningful impacts on EMS practice.

Finally, gaining insights from both students and clinical supervisors after the implementation of this educational strategy is indispensable. Research in this area should focus on understanding the practical challenges, benefits, and experiences of both groups following the adoption of these new educational strategy. This feedback will be invaluable for continuous refinement and enhancement of training methods, ensuring they remain responsive to the needs of both educators and learners in the EMS field.

By exploring these research areas, future studies can significantly contribute to the evolution of EMS education, aiming to create a virtuous cycle of improvement where advanced training leads to better feedback, improved student performance, and, ultimately, higher standards of patient care.

6.10 Conclusions

The study identifies potential components of an educational strategy aimed at enhancing clinical feedback within EMS education in Saudi Arabia, with the ultimate goal of improving EMS training and patient care. This strategy includes structured training programmes and workshops for clinical supervisors, emphasising the importance of mentorship and peer coaching. Regular meetings and discussions are recommended to provide ongoing support and keep supervisors informed of the

latest research and best practices. The strategy also suggests integrating simulated scenarios into training for practical, risk-free experience. Additionally, it calls for collaborative efforts among EMS institutions in Saudi Arabia for quality assurance in clinical feedback, underlining the necessity of regular evaluations and feedback mechanisms for supervisors. This comprehensive approach is designed to raise the standard of clinical feedback in EMS education, contributing significantly to the enhancement of EMS training and patient care in the region.

The thesis has now achieved the culmination of its third and final phase, having rigorously explored and addressed the diverse training needs and the development of an educational strategy for clinical feedback in EMS education in Saudi Arabia. This phase, grounded in the Delphi study methodology, not only enriches the understanding of clinical feedback but also sets a precedent for systematic improvement in EMS educational practices.

The focus in the next chapter – Chapter 7 – will be to gather together the insights from all phases for an in-depth discussion. This next chapter is dedicated to summarising the key findings from each phase, reflecting on their theoretical and practical implications, and acknowledging the limitations encountered. It also looks forwards to exploring directions for future research, drawing upon the comprehensive body of knowledge established here. Chapter 7, therefore, is not just a conclusion but a critical synthesis and reflection, aiming to encapsulate the full scope and impact of this research on the EMS education landscape.

Chapter 7 Discussion

The aim of this thesis was to examine and improve EMS clinical feedback in Saudi Arabia. As has been found across a diverse array of studies, the important role of clinical feedback in clinical feedback across various medical and healthcare specialties cannot be overlooked (Carless 2006; Cushing et al. 2011; Thomas and Arnold 2011; Al-Haqwi et al. 2012; Murdoch-Eaton and Sargeant 2012; Barnett and Molzon 2014; Giles et al. 2014; Douglas et al. 2016; Papastavrou et al. 2016; Jamshidian et al. 2019; Woo and Li 2020). The importance of clinical feedback was particularly underscored in EMS, where the sensitive nature of work demands immediate feedback, often under intense pressure (Morrison et al. 2017; Wilson et al. 2022; Nilsson et al. 2023a). This contrasts with other healthcare disciplines where feedback might be provided in non-emergency situations.

Building on this consensus, the review also brought to light that unclear or ineffective clinical feedback not only could negatively impact students' performance but also their confidence, motivations, and self-esteem in clinical training and their future patient care (Clynes and Raftery 2008; Burgess and Mellis 2015; Groves et al. 2015; Iskander 2015; Serçekuş and Başkale 2016). This issue was observed across various medical and health specialties, but it was especially pronounced in EMS due to the idiosyncratic challenges of its training and clinical work. In EMS, the consequences of ineffective feedback were found to be more detrimental, potentially leading to significant negative outcomes for both trainees and patients (Cash et al. 2017; Morrison et al. 2017; Hirakawa A. et al. 2018; Wallin et al. 2020). Miscommunication between clinical supervisors and students was identified as a primary cause of ineffective feedback (Clynes and Raftery 2008; Haffling et al. 2011; Al-Mously et al. 2014).

In addition to what the literature indicates about the importance of clinical feedback and its impact on students and medical care, the importance was noted of examining the perceptions of both clinical supervisors and students with regards to

clinical feedback: understanding the supervisors' and students' perspectives is crucial in order to improve feedback's effectiveness and impacts. A large body of literature on feedback in medicine (Perera et al. 2008; Moaddab et al. 2015; Abraham and Singaram 2016; Riaz et al. 2021), in nursing (Khattab et al. 2019), and in other healthcare (Nugraheny et al. 2016; Javed et al. 2021) does not sufficiently cover the EMS environment in which paramedics learn and practise (O'Meara et al. 2014a) . Therefore, this thesis began with a scoping review to determine what research has been conducted to date about paramedical students' and clinical supervisors' perceptions of clinical feedback, and on the extent to which research on clinical feedback has informed the training needs of clinical supervisors.

Over 20 years of literature, only 12 studies focused specifically on clinical feedback in paramedicine. All these studies were empirical, and focused on various aspects of the students' clinical placement experience. Among these, two studies employed a mixed-methods approach (Wongtongkam and Brewster 2017; Filipp 2022) to examine how clinical experiences and perceptions during preceptorship influence student outcomes and satisfaction. Eight studies delved qualitatively into experiences, perspectives, and feedback related to clinical placements and preceptorship (Lane 2014; O'Meara et al. 2014a; O'Meara et al. 2015; Carver 2016a; Moodley 2016b; Williams et al. 2016; Edwards 2019; Nilsson et al. 2023b). One study (Boyle et al. 2008) quantitatively surveyed students' experiences during ambulance clinical placements. Three quarters of the twelve studies were conducted in Australia (9 studies), and one in each of Sweden (Nilsson et al. 2023), the United States (Filipp 2022), and South Africa (Moodley 2016a). Two studies were published after peer review, and two were unpublished master's theses – one from each of the United States and Australia.

Taken together, these studies highlighted the importance of feedback in EMS for enhancing clinical skills, fostering effective clinical practice, and improving patient outcomes and training. However, these studies also overlooked the views of clinical supervisors, and mainly addressed the perspectives of qualified paramedics rather than students. There was one exception, Carrollet et al. (2022), who shed light on

the feedback experiences of undergraduate paramedic students but not of clinical supervisors. Understanding the challenges faced by supervisors and their training requirements is essential to a more complete picture, as they explained. There is clearly an important literature gap with practical significance: unified research is needed on the perceptions of both paramedicine students and clinical supervisors with respect to clinical feedback. Given that both students and supervisors play pivotal roles in the feedback process, understanding their respective perceptions is crucial in comprehensively understanding in depth the clinical feedback within EMS (Ramani and Krackov 2012).

Overall, the existing knowledge in EMS clinical feedback does not cover, in a unified way, both students' and clinical supervisors' perceptions associated with EMS clinical feedback. This thesis chose Saudi Arabia as a case study, noting the potential to observe cultural, educational, and operational influences on perceptions and approaches to clinical feedback, and also the broader lack of focus on health science and clinical education research in Saudi Arabia (Alharbi 2016). This thesis sought to bridge this gap, by employing Clinical Performance Feedback Intervention Theory (CP-FIT) as a guiding theoretical framework. The CP-FIT posits that effective feedback is a three-faceted construct influenced by feedback variables, recipient variables, and contextual variables, and supplied the conceptual structure for analysing how feedback was perceived, received, and acted upon within the educational setting.

The initial phase of the thesis was propelled by the foundational question: "What are the perspectives of students and clinical supervisors on feedback in Saudi EMS education?" Addressing this question revealed the discrepancies between students' and supervisors' perspectives on feedback, which, as Ajjawi and Regehr (2019), Ramani and Krackov (2012), and others have argued, is essential for customising feedback to meet educational needs effectively.

The thesis proceeded to explore these perceptions, which not only illuminated existing discrepancies but also uncovered specific challenges and needs arising

from these perceptual differences. This exploration established a baseline understanding of the feedback process from both stakeholders' perspectives. Next, the thesis asked, "Are there differences in these perceptions?" This phase included a broader participant population and combined multiple methods to delve deeper into the clinical feedback, highlighting the resilience and adaptability of feedback mechanisms, especially in the face of the COVID-19 pandemic.

The scoping review shed light on various challenges and needs related to clinical feedback, revealing a literature gap regarding practical solutions or strategies for enhancing feedback efficacy from the perspectives of both supervisors and students. This gap led to the critical and final phase of inquiry: "How can these challenges be effectively addressed, and what are the clinical feedback needs of both students and supervisors?" This phase culminated in proposing a strategic educational framework aimed at enhancing EMS clinical feedback on a national scale in Saudi Arabia. This strategy was tailored to meet diverse educational needs, adaptable to both conventional and exceptional circumstances (such as the COVID-19 pandemic), and aimed to provide clinical supervisors with robust feedback techniques suitable for various educational settings.

The theoretical framework of this thesis, grounded in the CP-FIT, comprehensively facilitated an in-depth exploration of perceptions, identified gaps in practice and literature, and proposed strategic improvements. This process drew on the CP-FIT framework of feedback variables, recipient variables, and context variables, as shown in Figure 7.1.

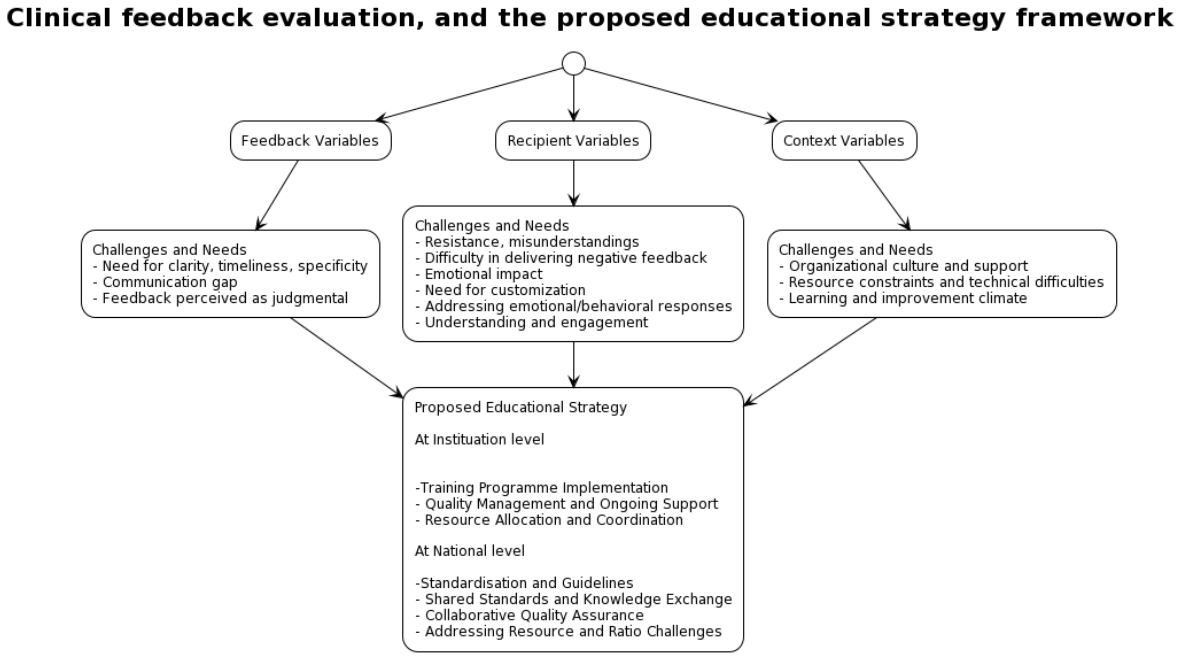

Figure 7.1Application of CP-FIT Framework

This concluding chapter synthesises the insights obtained across the project overall and reflects on the theoretical and practical implications for EMS education in Saudi Arabia. It also addresses the limitations encountered and outlines potential avenues for future investigation, thereby offering a holistic overview of the thesis's contributions to the field of EMS education and clinical feedback.

Table 7.1 Summarises the pathway traversed in this thesis, including its purpose, methods, findings, and implications.

Phase	Purpose	Methods	Findings	Implications
Phase One	To explore perceptions of clinical feedback among students and clinical supervisors within EMS education in Saudi Arabia, focusing on perceptual differences and challenges and needs of clinical feedback	The study at the College of EMS in King Saud University employed the Perception of Feedback Questionnaire (PFQ) with 72 male students and 30 clinical supervisors, and semi-structured interviews with 11 supervisors and 13 students. Validity and reliability of the PFQ were assessed through factor analysis.	Quantitative findings revealed significant perceptual disparities between students and supervisors regarding feedback comprehension and preferences. Supervisors were confident in the clarity of feedback, whereas students found it challenging to understand, particularly with written feedback. Qualitatively, challenges were identified, including delivering negative feedback and ensuring clarity, timeliness, and constructive delivery. A gap in perception regarding engagement with feedback was noted, with supervisors expressing uncertainty about student engagement, while students indicated active efforts to correct mistakes.	The study highlights the need for personalised feedback and improved communication in EMS education. It validated the questionnaires and interviews while revealing challenges faced by students and clinical supervisors. Misunderstandings and miscommunications affect perceptions. The findings prompted further research on clinical feedback in Saudi Arabia, involving multiple institutions. This research contributes to a more comprehensive understanding of clinical feedback in EMS education, highlighting the importance of tailored feedback approaches.
Phase two	To address limitations identified in the initial phase by expanding	A mixed-methods approach combined the PFQ adapted for the COVID-19 context with	Results indicated no significant differences between students' and supervisors' understanding	This phase underscored the adaptability of online clinical feedback methods during the

	the research to include a diverse participant group from four reputable EMS institutions across Saudi Arabia.	semi-structured interviews. PFQ was conducted with 376 students and 83 clinical supervisors from four EMS institutions. Data were non-normal, and analysed (using SPSS version 27) through descriptive statistics and the Mann-Whitney *U* test. Semi-structured interviews were conducted with 32 supervisors and 60 students to seek deeper insights into the experiences, challenges, and needs related to clinical feedback during the pandemic.	of or preferences for clinical feedback during the pandemic. However, challenges such as communication barriers, practical learning constraints due to social distancing, and time constraints in feedback delivery were highlighted through interviews.	pandemic while identifying areas for improvement. It emphasised the importance of addressing clinical feedback challenges and needs, suggesting that changes prompted by the pandemic be evaluated for continued use post-pandemic. The subsequent Delphi study aimed to reach consensus among EMS experts on addressing these challenges and needs.
Phase three	To identify and propose an educational strategy designed to meet the needs and address challenges of clinical supervisors and students, as identified in the previous two studies.	The participant group comprised an expert panel of deans, directors, and experienced clinical supervisors from all EMS colleges and institutions in Saudi Arabia. The process involved three rounds: interviews based on previous findings, followed by online	Results showed significant consensus on clinical feedback training needs and support, ongoing support and quality assurance, and clinical feedback guidelines and tools. These findings were pivotal in shaping the educational strategy, which emphasised formal training, specialised workshops,	This third phase presented a detailed framework for the educational strategy at a national level, highlighting the importance of formal training, ongoing support, and quality assurance mechanisms. This contribution offers practical strategies to enhance clinical feedback in EMS training programmes, thereby improving the

		surveys developed from thematic analysis of interviews using the Bristol Online Survey (BOS) platform.	mentorship, peer observation, and ongoing support for clinical supervisors.	educational experience and outcomes for both students and supervisors.

7.1 Theoretical and Practical Implications

The findings of this study offer significant theoretical implications for EMS in Saudi Arabia, as well as practical implications for individual Saudi EMS institutions and on a national level within the country. The strategy outlined in Chapter 3, rooted in the conceptual framework of the study, aims to enhance the quality and efficacy of clinical feedback. This addresses the challenges and needs identified among EMS clinical supervisors and students, focusing on improvements to clinical feedback as a means to elevate the overall standards of EMS education and training in Saudi Arabia.

7.1.1 Theoretical implications

This thesis developed a novel tool to examine perceptions of EMS clinical feedback across four different aspects: understanding, effectiveness, preferences, and interpretations. It was validated and tested for reliability. In contrast to prior studies, this tool focused specifically on the EMS clinical context. While the Perceived Feedback Questionnaire (PFQ) drew on a comprehensive review of literature about feedback within health science education more generally (Jensen et al. 2012; Murdoch-Eaton and Sargeant 2012; Jothi and Yusoff 2015; Abraham and Singaram 2016; Carver 2016a), the unpredictable and high-stress environment of emergency ambulance services (Venesoja et al. 2023)necessitated adaptation for use in EMS.

Whereas prior research typically did not undertake detailed evaluations of feedback, the PFQ directly offers a dedicated framework for understanding feedback perceptions. The PFQ is in questionnaire form, in contrast to the interviews used in previous studies.

Although the PFQ was designed with Saudi Arabia in mind, exploring its applicability to other nations could offer a significant opportunity for other EMS research communities, particularly in Australia. This is because Saudi Arabia’s EMS bachelor’s programme

was derived from that at Flinders University (AlShammari et al. 2017). However, the successful implementation of the PFQ in various countries hinges on the crucial step of re-validating the questionnaire to ensure it is compatible with the distinct EMS systems and educational frameworks of those nations. Such a process not only enriches the tool's applicability but also opens the door to comparative studies to improve understanding of paramedic functionality in various contexts.

Whereas prior research considered supervisors' and students' perspectives separately, this thesis expanded examined them together. Including multiple perspectives was in accordance with recommendations for a holistic approach to feedback evaluation (Van De Ridder et al. 2008; Burgess and Mellis 2015; Carless and Boud 2018; Carroll et al. 2023). This thesis thus provides a balanced exploration, recognising the significance of engaging both students and educators to develop a more understanding of feedback mechanisms in EMS education. When analysing the literature in nursing (Clynes and Raftery 2008; Wong and Shorey 2022), medicine (Kornegay et al. 2017; Nelson et al. 2021; Rung and George 2021), and other healthcare disciplines (Paterson et al. 2020; Nelson et al. 2021; Rung and George 2021) researchers investigated both perceptions. However, it was crucial to acknowledge that comparing these disciplines may not accurately represent the perspectives of EMS students and supervisors regarding clinical feedback in the unpredictable and high-stress setting of EMS.

Prior research in EMS has predominantly used qualitative methods to investigate the experiences, perspectives, and feedback related to clinical placements and preceptorship (Boyle et al. 2008; Lane 2014; O'Meara et al. 2014a; O'Meara et al. 2015; Carver 2016a; Moodley 2016a; Edwards 2019; Nilsson et al. 2023a). Moreover, two studies in EMS education that employed mixed-methods approaches to clinical experiences and perceptions (Wongtongkam and Brewster 2017; Filipp 2022).

By incorporating a variety of data collection and analysis techniques, this thesis has established a novel benchmark for educational research in EMS. The methods

developed in this thesis, informed by CP-FIT, could serve as a blueprint towards a deeper and more comprehensive understanding of clinical feedback in educational settings. Integrating the Clinical Performance Feedback Intervention Theory (CP-FIT) into this thesis offered a comprehensive framework to analyse feedback dynamics within EMS education in Saudi Arabia. By emphasising feedback variables, recipient variables, and contextual variables, CP-FIT facilitated an in-depth examination of clinical feedback's multifaceted nature. This research contributes to the literature utilising CP-FIT, providing insights that both align with and extend beyond findings from Wilson et al. (2023) and Wilson et al. (2022), which highlighted the positive impact of structured feedback on EMS clinical performance and professional development. This thesis extends the application of CP-FIT by examining the perceptual variances between EMS students and clinical supervisors, uncovering challenges and needs associated with feedback, and proposing an educational strategy to address these challenges and needs associated with clinical feedback, which have received less attention in previous studies that used CP-FIT in EMS.

Identifying discrepancies between students' and supervisors' perspectives on feedback was crucial for a deeper understanding of the feedback process (Ramani and Krackov 2012; Ajjawi and Regehr 2019). Considering these differences is important given their potential to enhance the learning experience, as students are more likely to engage with feedback that aligns with their expectations and learning styles.

This thesis discovered perceptual disparities between clinical supervisors and students on feedback: a significant gap exists between what supervisors believe constitutes clear, constructive feedback and students' perceptions, often finding the feedback confusing or lacking in specificity. This mismatch suggests a fundamental misunderstanding about the nature and purpose of effective feedback, supervisors might assume that their feedback is sufficiently detailed, while it may not align with students' learning needs or stages, indicating a need for enhanced training in delivering

level-appropriate feedback. Moreover, the thesis illuminated the difference in expectations, with students desiring specific, actionable advice for immediate performance improvement. In contrast, supervisors tend to emphasise broader skill development, often missing the specificity students crave.

The investigations also revealed different preferences between the two groups. While both students and supervisors showed less preference for written feedback, supervisors tended to favour extend oral feedback (after the action) more than students, who displayed a preference for more immediate and interactive feedback formats (during the action) such as quick oral comments. This distinction mirrors that in Australia, where Ross et al. (2015) noted that students highly value direct insights from paramedic educators while actively engaged in the field. Moreover, the thesis elucidated disparities in the interpretation of feedback: students displayed a relatively higher level of acceptance towards electronic modes of feedback. This pattern could signify or legitimise a shift towards more contemporary feedback technologies, necessitating adaptation to the evolving preferences and learning processes of modern students – a direction for future investigation. On the whole, there is consensus regarding the preference for immediate and timely feedback, which can likely be attributed to the fast-paced nature of EMS work.

This study incorporates a comparative analysis with international research from Sweden, Australia, the United States, and South Africa, providing a global context for its findings. For example, research by Nilsson et al. (2023) in Sweden underscores the importance of enhancing communication, transparency, and the visualisation of student progress in EMS education, advocating for the adoption of more intuitive digital tools and better training for their use.

In contrast, research from Australia, the United States, and South Africa reveals a diverse array of feedback experiences and mechanisms. Australian studies consistently

highlight the significance of immediate feedback, structured feedback sessions, and the role of feedback in building confidence and skills. Common challenges include the clarity of feedback, the creation of supportive and inclusive learning environments, and finding the right balance between constructive and positive feedback. In the United States, Filipp (2022) calls for consistent feedback and the need to tailor it to individual learning styles, suggesting standardised feedback training and diverse feedback tools. Moodley (2016) in South Africa points to the detrimental effects of negative feedback on student confidence and proposes a structured feedback approach. These international insights underline the need for feedback systems that are consistent, adaptable, and tailored to meet students' unique needs across various clinical settings.

By investigating the reasons behind different preferences and understandings related to feedback, the thesis goes beyond merely assessing its effectiveness. It delves into the underlying challenges and needs that justify these differences and proposes an educational strategy for how feedback processes can be tailored to meet the diverse needs and address the challenges of participants, focusing specifically on the EMS setting in Saudi Arabia. The findings demonstrate that the challenges and needs are not unique to the one geographical setting but are occur also elsewhere. The improvement strategy proposed may hence also improve EMS clinical feedback globally.

It is noteworthy that the research here, due to when it took place, is backgrounded by the COVID-19 pandemic. Only two studies have been conducted on pandemic-associated changes in EMS education Allred et al. (2021) in the United States and Whitfield et al. (2021) in Australia. The pandemic's rise at the midpoint of this research brought forth a multitude of challenges and unique opportunities, including exceptional opportunity to examine perceptions within an unparalleled and distinctive educational environment. The pandemic itself thus enabled an investigation into the implementation and adaptation of clinical feedback within a rapidly evolving educational landscape.

The study adjusted to these circumstances by broadening its scope to a wider range of EMS institutions and participant demographics, hence capturing the broad shift towards online educational platforms.

The thesis implemented a Delphi study into training requirements that arose during the pandemic, and also the requirements preceding it. This formed part of a broader examination of feedback under various circumstances, both preceding and during the pandemic. Consequently, the study contributed to the formulation of a comprehensive national educational strategy for Saudi Arabia aimed at enhancing EMS clinical feedback. This strategy addresses the diverse needs of EMS education and can be applied in diverse scenarios, including unconventional circumstances such as crises. Its objective is to equip EMS institutions and the Saudi national EMS with effective tools and strategies for delivering educational feedback in both online and traditional settings. The upcoming section on practical implications will elaborate on the proposed strategy.

7.1.2 Practical implications

This section outlines the practical implications, at both local and national levels, of the educational strategy proposed. Incorporating the findings from the initial phases of the thesis, which revealed significant discrepancies between clinical supervisors' and students' perceptions of feedback quality and identified critical gaps in the feedback process, the proposed educational strategy is designed to address these specific challenges. By integrating structured feedback mechanisms and enhancing supervisor training, this strategy aims to directly address the issues of feedback clarity, detail, and student comprehension. This approach ensures that the practical implications of the educational strategy are rooted in the empirical evidence gathered, promising a targeted and effective enhancement of clinical feedback practices at both local and national levels within the EMS education system in Saudi Arabia.

Proposed educational strategy at the local level

At the local level, the educational strategy focuses on creating tailored training programmes for EMS colleges or departments to address the challenges and needs specific to their environments. This approach includes mandatory training for clinical supervisors and students that integrates theoretical knowledge with practical experience. The strategy includes the adoption of simulation workshops, logbooks, and learning strategies tailored to local contexts for relevance and efficacy. Integrating clinical feedback within quality assurance frameworks promotes a culture that values constructive feedback, enhancing the students' learning experience and engagement.

Continuous professional development for clinical supervisors is a cornerstone of the strategy, fostering an environment of self-awareness and professional growth. Local institutions are responsible for ensuring access to necessary resources such as technological tools and simulation-based learning materials.

The strategy also emphasises the importance of employing coordinators at the local level to optimise feedback procedures and facilitate effective communication between educators and learners. Their role is crucial to enhancing the quality and timeliness of feedback.

Training Programme Implementation

The proposed strategy includes a compulsory training programme to enhance clinical feedback skills. This initiative not only emphasises the significant role of students in the feedback loop but also aims to remedy the identified gap in clinical feedback training not only in Saudi Arabia, but internationally. Enhancing the feedback proficiency of clinical supervisors improves the environment's conduciveness to learning and professional growth. This thesis proposed detailed suggestions for training needs

encompassing content types, frequency, and responsibility for implementing these training programmes.

The programme places considerable emphasis on integrating theoretical knowledge with practical experience, aligning with the principles of Kolb's Experiential Learning Theory (1984). This theory underscores not just the role of direct, hands-on experience in learning, but more critically, the cyclical process that transforms action into valuable experience. According to Kolb, effective learning involves a four-stage cycle: concrete experience, reflective observation, abstract conceptualisation, and active experimentation. This cycle facilitates deep learning by encouraging learners to reflect on their actions, conceptualise theories based on these reflections, and test these theories through new actions. The educational strategy adopted here acknowledges the significance of this learning cycle by incorporating a mix of lectures, resources such as logbooks, and face-to-face simulation workshops that foster not only the application but the critical reflection and adaptation of knowledge in real-life scenarios.

The strategy requires that the training programme be designed to address the distress that learners feel when feedback is provided publicly or in front of their peers. Such discomfort often leads to embarrassment and diminished engagement. To address this issue, the findings underscore the significance of private feedback sessions. This approach is recommended to enable more open and truthful communication in which learners can express their perspectives freely, and where supervisors can address emotional reactions more effectively (Ramani and Krackov 2012; Hardavella et al. 2017). For example, instead of discussing a student's performance in front of the entire group, a clinical supervisor may choose to have a private conversation after a simulation exercise. The privacy not only preserves the learner's emotional well-being but also facilitates a more focused and constructive feedback session. When time constraints or other circumstances preclude private, individual feedback, clinical feedback can be delivered in a public or group setting without singling out individuals.

This approach aims to minimise the anxiety and stress that can arise from public criticism.

The findings highlighted the significant emotional impact of feedback on learners. For instance, a student recounted feeling demotivated and humiliated after receiving feedback that labelled them as “stupid”, which led to not attending clinical training sessions.

In light of such effects, the findings propose that the training programme for clinical supervisors should include content on emotional intelligence. Clinical supervisors would then be equipped to provide feedback that is supportive and constructive, being crafted with an awareness of the emotional responses that may be evoked (Chandrapal et al. 2022). For example, supervisors trained in emotional intelligence would be more equipped to recognise the potential harm in calling a student “stupid” and would instead find more constructive ways to address areas of improvement. Supervisor appreciation of emotional intelligence will create a more supportive learning environment in which feedback fosters growth and motivation rather than demotivation and humiliation.

The influence of clinical feedback on students’ emotions and its capacity to result in adverse consequences, such as students avoiding clinical training, were clearly apparent. However, the results also indicated that it is important to prioritise additional educational resources to cultivate the appreciation and encouragement of constructive feedback. Incorporating cognitive coaching principles and evidence-based feedback structures, this approach underscores the importance of balancing positive reinforcement with constructive criticism. Drawing on the extensive literature in these areas, such as the work of Costa and Garmston (2015) on cognitive coaching and Hattie and Timperley’s (2007) framework for effective feedback, it becomes clear that the most impactful feedback practices involve acknowledging and building upon students’ existing competencies while also guiding them towards areas of

improvement with specific, actionable advice. For instance, a supervisor can foster a growth mindset by first recognising a student's advancement in mastering a skill, thus reinforcing their sense of achievement and competence, followed by targeted suggestions for further development. This method not only mitigates the potential negative emotional impacts of feedback but also aligns with research advocating for feedback that is clear, purposeful, and tailored to individual learning pathways, thereby enhancing the educational experience and outcomes.

Active participation in the proposed training programme is essential for students to learn about the importance and purpose of feedback. These findings support the research by Telio et al. (2015) and Nicol and Macfarlane (2006), which emphasises the significance of students recognising the impact of feedback on their development. This educational approach involves managing students' anticipations and training them to engage meaningfully in the feedback procedure. For instance, students can undergo training to engage in reflection regarding feedback and to develop strategic plans for enhancing their professional development, thereby augmenting their growth in their chosen field.

This EMS clinical supervisor training programme highlights the significance of starting training early, preferably when assuming their roles, to provide them with the essential skills for establishing a supportive learning environment and effectively managing the complexities of their roles from the beginning (Bing-You et al. 1997; Terry et al. 2020). In order to cater to the demanding and uncertain schedules of EMS learners, particularly those residing in remote or rural regions, the proposed programme suggests the inclusion of online modules. This approach, as suggested by Ruiz et al. (2006), Cook et al. (2010) and Frehywot et al. (2013), would provide flexibility and guarantee equal availability of training resources across all locations. These online modules will offer a consistent and excellent learning experience that is both cost-

effective and time-efficient, which is especially advantageous in settings with limited resources.

The online training modules should be user-friendly and relevant, which addresses the "perceived ease of use" facet of the Technology Acceptance Model (TAM) (Davis 1989). TAM suggests that design should enable users to interact without facing significant challenges or technical issues. Additionally, having the modules online will allow for content to be kept up to date, addressing TAM's "perceived usefulness". Such strategic use of technology responds to the needs of modern EMS clinical learners, making learning more effective and engaging for them.

The findings indicate that the training approach in EMS clinical supervision should carefully consider the duration of training sessions in order to maximise learning outcomes. The durations should be commensurate with the intricacy of the content and the participants' previous familiarity with the material not only adheres to the adult learner theory of Knowles et al. (2014) but also resonates with Vygotsky's Zone of Proximal Development. This dual alignment ensures that learners are neither overwhelmed by the content's complexity nor under-engaged due to its simplicity. By adjusting the session lengths to fit the learners' existing knowledge and the challenge level of new content, educators effectively scaffold learning in a manner that promotes maximum engagement and optimal learning outcomes. Nevertheless, it is crucial to acknowledge that initial training sessions, introducing new ideas and abilities, usually necessitate a longer duration (Ruttenberg et al. 2020) to offer comprehensive explanations and ample practice. In contrast, refresher courses can be shorter, concentrating on strengthening and modernising previously obtained skills or knowledge. Session durations should be determined by the provider at the local level, considering the specific context and requirements of the students. This customised approach guarantees that the training is not only impactful but also optimised for the benefit of both the participants and the organisation.

It is recommended that the local colleges or departments hold responsibility for the proposed EMS training programme: local operators are in the best position to assess the local circumstances for customisation (Affleck 2021). Although the localised approach guarantees customised and effective training, it is crucial to take into account the potential disadvantages such as higher expenses and logistical intricacies. Customisation may necessitate substantial financial and logistical commitments, and synchronising schedules and priorities across multiple departments could present further obstacles.

Feedback quality management and ongoing training and support

This thesis also emphasises the significance of ongoing training, self-evaluation, and quality assurance in order to maintain a high quality of clinical feedback. The strategy proposed is to continually enhance supervisors' feedback skills. Continuous training and support are the cornerstones of this strategy, in which clinical supervisors are encouraged to engage in regular self-evaluation and quality assurance practices. It is recommended that clinical supervisors participate in regular training and workshops and meet regularly with each other to review their clinical feedback provision. This allows supervisors to critically assess their feedback methods, fostering self-awareness and professional growth by recognising their strengths and weaknesses.

Effective supervisor training extends beyond feedback techniques; it requires fostering an environment where supervisors actively engage in self-reflection, in alignment with (Ward and Gracey 2006). Ongoing reflection and adaptation are vital for professional development, and to ensure that supervisors' feedback skills evolve along with the needs of EMS education. The customised approach guarantees that supervisors receive specific assistance to improve their feedback abilities.

The strategy also promotes open dialogue between clinical supervisors and students, in order to refine feedback to make it more relevant, specific, and constructive. Such

dialogue fosters trust, encourages trainee engagement, and enables open discussions about areas of weakness, thereby enhancing the overall feedback process. In accord with Armson et al. (2019), supervisor training should also concentrate on coaching and dialogue skills, such as active listening, empathy, and effective questioning.

Learning from experienced colleagues is another key component of this strategy. Observing and interacting with experienced professionals will offer the clinical supervisors practical insights into delivering feedback effectively in real-world clinical settings as shown by (Bogo 2015). This approach aims to foster communication skills and to develop a culture of continuous learning and mutual support among clinical staff, ultimately contributing to the maintenance of high-quality clinical feedback in EMS.

In addition, the strategy applies Schön's theory of reflective practice Schön (2017) to EMS education. For EMS specifically, O'Meara et al. (2015) suggested implementing systems or platforms where paramedic instructors can provide feedback even after the student's placement has ended. This can offer continuity and allow for reflection. This approach is essential for helping students overcome challenges such as embarrassment or shyness when receiving feedback, as it encourages them to engage with feedback constructively and fosters a deeper understanding and application of the insights gained.

To support the integration of reflective practice into EMS education, this thesis suggests that educational institutions should offer workshops and training sessions. These sessions should focus on effective feedback reception and application through practical exercises like asking clarifying questions and integrating feedback into clinical practice. Furthermore, to close the gap between supervisors' perceptions and students' active engagement with feedback, follow-up mechanisms, including practical assessments or reflective journals, are advised.

Central to this strategy is the integration of clinical feedback within the quality assurance management systems. Reviewing and judging clinical supervisor feedback in line with current evaluation methods makes the process more consistent and compares them against set standards, which improves the quality of clinical education (Javed et al. 2021; Nordberg et al. 2021).

The strategy advocates for the continuous enhancement of EMS education through iteratively developing measurement tools and adapting to changes. For EMS specifically, Filipp (2022) suggested periodic feedback-focused sessions to discuss feedback trends, to address concerns, and to find ways to maintain the relevance and efficiency of the feedback mechanisms. Such integration ensures that both students and supervisors are equipped with the skills and behaviours essential for professional development (Leggio et al. 2020). The process must include clear expectations to establish a common framework for feedback and to enable effective communication between students and supervisors (Foster-Collins et al. 2021).

The proposed strategy outlines a holistic approach to elevate feedback quality and culture within Saudi Arabia's EMS education. It emphasises continuous professional development, targeted support for supervisors, meaningful dialogue, and reflective practice, aiming to foster ongoing improvement and advancement in the EMS field. Essential to this strategy is the focus on regular training, self-assessment, and quality checks for clinical supervisors. By adopting these practices, supervisors can consistently refine their feedback abilities, thereby upholding EMS education standards and fostering their professional growth. This method is designed to meet the dynamic demands of EMS education in Saudi Arabia.

Resource allocation and coordination

The strategy underscores the critical need to provide clinical supervisors with comprehensive access to resources for delivering effective clinical feedback. These

include technological tools for digital feedback and simulation-based learning materials (Filipp 2022; Nilsson et al. 2023a) and funding and logistical support (Morrison et al. 2017) to streamline the feedback process. Resource availability is essential to enable supervisors to offer more hands-on and visually tailored feedback that caters to each student's unique learning needs.

The strategy also identifies the need for improved coordination within clinical feedback systems and hiring qualified coordinators to identify challenges and requirements. The coordinators would work closely with clinical supervisors to understand the specific needs of the clinical environment, identifying areas for improvement, facilitating communication between educators and learners, and implementing best practices in feedback delivery.

Proposed educational strategy at the national level

The national-level strategy emphasises standardisation of feedback practices and guidelines in EMS institutions. The intention is to ensure a consistent, high-quality approach that aligns with current educational and feedback methodologies. This strategy advocates for a collaborative approach whereby national bodies establish shared standards and facilitate the exchange of knowledge to enhance the quality of clinical feedback. Additionally, a system will be created to ensure the quality assurance of feedback, as well as incentivising supervisors and fostering a network for the sharing of best practices and the resolution of common challenges. Furthermore, the strategy acknowledges the need for improved student-to-supervisor ratios. It suggests solutions such as small-group practices and preparatory materials to enhance the effectiveness of feedback and skill development.

Standardisation and guidelines development:

To improve clinical feedback in Saudi EMS, standardised feedback systems and guidelines across institutions will be crucial. Ensuring consistency and quality in feedback necessitates clear guidelines and protocols developed in collaboration with educators and industry professionals. These standards must be flexible enough to accommodate diverse teaching styles and learning environments while maintaining a core set of principles to ensure feedback effectiveness (Boud and Molloy 2013) .

Shared standards and knowledge exchange:

Knowledge exchange among EMS institutions is crucial for crafting effective instructional strategies and improving EMS personnel learning outcomes, particularly in clinical reasoning (Torre et al. 2023). In particular, shared standards across the Saudi EMS community will be vital for ensuring consistent training quality and maintaining high clinical feedback standards. Such unity in education aligns with the latest guidelines and fosters a culture of continuous improvement (Albert et al. 2021). By collaborating on shared standards and best practices, clinical supervisors and educators ensure uniform feedback aligned with current protocols. This collaboration not only enhances the quality of clinical feedback but also strengthens the sense of purpose among EMS professionals and contributes to the ongoing evolution and improvement of EMS education in Saudi Arabia, aiming for the highest training and patient care standards.

Collaborative quality assurance

The strategy recognises the need to understand motivational factors that impact the feedback process. It addresses a lack of motivation among clinical supervisors, which correlates with students receiving limited and sporadic feedback. This gap is

addressed by incentivising supervisors through financial remuneration and professional development opportunities as per (Essoli et al. 2024).

Integral to the proposed educational strategy is collaborative responsibility for clinical feedback quality assurance among all the Saudi EMS institutions. This collaborative approach is crucial for ensuring standardised and high-quality clinical feedback across the country's institutions. By working together, these institutions can share best practices for clinical feedback, develop uniform standards, and address common challenges in EMS clinical feedback education. Such collaboration encourages a cohesive network of EMS providers and educators, ensuring that the clinical feedback processes are not only consistent but also incorporate diverse perspectives and experiences from across the EMS field. This network enhances the ability to adapt to regional needs and advances in medical practice, thereby ensuring that EMS education in Saudi Arabia remains at the forefront of global standards and practices. The collaborative effort also provides a platform for continuous dialogue and improvement, leveraging the strengths of each institution to collectively enhance the EMS educational system.

Addressing resource and ratio challenges

Increasing the number of clinical supervisors can reduce the student-to-supervisor ratio, thereby enhancing the quality of clinical feedback. While this may entail additional costs for the organisation, other solutions can be drawn from the experiences during the COVID-19 pandemic. For instance, EMS colleges and educational departments divided students into small groups in clinical practice labs, allowing clinical supervisors to focus more on individual students to deliver effective clinical feedback. However, this approach took more time, due to the increased number of student groups. To mitigate this, an educational strategy was implemented wherein students received preparatory materials before the lab sessions. This enabled students to come to the labs already prepared, reducing the clinical supervisor

lecturing needed and leaving more time for feedback. Consequently, this approach increased the amount of time available for students to practice their skills.

Checklists and logbooks are critical components of EMS clinical education, serving as key tools for students to assess their performance and skill development (Karampourian et al. 2015). However, this thesis found shortcomings in their effectiveness: Clinical supervisors often believe that merely signing off on these checklists and handing them to students is sufficient for students to understand their performance. This assumption overlooks the need for direct clinical feedback, which students often require for a deeper understanding of their performance and areas for improvement.

The thesis suggests enhancing the flexibility of checklists to allow for more varied and meaningful feedback. This could involve designing checklists that prompt more comprehensive evaluative comments than simple tick-box exercises. Additionally, increasing training for clinical supervisors on how to effectively utilise these checklists and guidelines is essential. This training should focus on how to use checklists not just as a record-keeping tool but as a foundation for providing detailed, constructive feedback.

Kogan et al. (2017) underscore the significance of using checklists in medical education, highlighting the misconception that checklists can substitute for clinical skill gaps. This observation reinforces the idea that, while checklists are valuable, they are most effectively used in conjunction with hands-on training and feedback. Training supervisors to enhance their observation and assessment skills through the effective checklist use can lead to more effective supervision and, ultimately, better clinical education outcomes.

In conclusion, the successful implementation of the proposed educational strategy requires a collaborative effort between local institutions and national bodies. Local

initiatives focus on the immediate application of training programmes, quality management, and resource allocation, tailored to the specific needs and contexts of individual institutions. In contrast, national strategies provide the necessary standardisation, support, and frameworks to ensure consistency and quality across all EMS education. This dual-level approach fosters an environment of continuous improvement, high-quality clinical feedback, and professional development in EMS education across Saudi Arabia.

7.2 Reflections on Reporting Standards and Researcher Reflexivity

7.2.1 Use of Reporting Standards

The systematic use of reporting standards, such as CREDES for Delphi studies and GRAMMS for mixed-methods research, has provided a structured approach that reinforced the transparency, replicability, and credibility of this study. These standards played a central role in addressing the inherent complexities of research into clinical feedback within EMS education in Saudi Arabia. However, while reporting standards offer several strengths, their rigid nature can also impose certain limitations on research, especially in unique contexts like that of EMS training during the COVID-19 pandemic.

Strengths of Reporting Standards

One of the primary strengths of using reporting standards was the enhancement of transparency throughout the research process. By adhering to CREDES for the Delphi methodology, this study ensured that each round of expert feedback was reported comprehensively. CREDES supported clear documentation of the consensus-building process and the criteria for item inclusion, offering a transparent account of the decision-making process. This was particularly critical in Chapter 6, where the Delphi study aimed to address the challenges of clinical feedback and propose educational

strategies. The CREDES guidelines made it easier to trace the evolution of the expert panel's opinions and to present this evolution in a way that future researchers can replicate.

Furthermore, the GRAMMS guidelines provided a robust framework for integrating both quantitative and qualitative findings across the study's three phases. The mixed-methods approach was essential in addressing the multifaceted nature of clinical feedback and capturing the differing perspectives of EMS students and clinical supervisors. Through GRAMMS, the study was able to provide a nuanced and coherent integration of survey data (quantitative) and interview insights (qualitative). This allowed for the triangulation of data sources, which strengthened the reliability of the findings. Specifically, this was evidenced in the studies' exploration of the perceptual differences between students and supervisors (Chapters 4,5), where qualitative interviews added depth to the survey results, enriching the understanding of the feedback challenges.

In addition, adherence to reporting standards ensured the studies' methodological rigor. The inclusion of validated tools, such as the Perceived Feedback Questionnaire (PFQ) in Chapter 4, and the detailed reporting of the validation process, demonstrated the robustness of the quantitative methods used. This structured approach enhanced the legitimacy of the results, supporting the subsequent Delphi study (Chapter 6) in its role of refining and addressing the training needs of clinical supervisors.

Limitations of Reporting Standards

Despite these strengths, the application of reporting standards also imposed certain limitations on the study, particularly in relation to the uniqueness of the EMS context and the cultural dimensions of Saudi Arabia. One challenge faced when following CREDES was the emphasis on reaching consensus within the Delphi methodology. While consensus-building is a key strength in generating collective expert opinions, the

reliance on a 75% agreement threshold may have excluded minority viewpoints that could provide valuable insights. Given the diversity of EMS institutions and the cultural nuances of clinical education in Saudi Arabia, the emphasis on consensus might have silenced less dominant but potentially significant perspectives.

Moreover, the structured nature of the reporting standards may have constrained the flexibility needed to address the broader contextual variables introduced by the COVID-19 pandemic. For example, while GRAMMS supported the integration of survey and interview data, the pandemic's impact on feedback practices necessitated rapid adaptation to online learning and feedback methods, which were not fully captured by the established reporting frameworks. The urgency and fluidity of the pandemic context highlighted the need for adaptable, real-time reporting mechanisms that could account for the evolving nature of clinical feedback, particularly as EMS students transitioned to hybrid learning environments.

Another limitation relates to the application of GRAMMS in addressing the non-normal distribution of quantitative data, as noted in Chapter 5. While the standards provided clear guidance on reporting non-parametric statistical methods, such as the Mann-Whitney U test, they offered limited flexibility for exploring more nuanced, non-statistical interpretations of the data. In a context like EMS education, where subjective perceptions and personal experiences might play a critical role in shaping the effectiveness of feedback, a purely statistical approach might overlook the complexities of human factors. This points to a need for more adaptable standards that allow for the integration of both quantitative rigor and qualitative depth, particularly when dealing with non-parametric data.

7.2.2 Researcher Reflexivity

The researcher's embedded position within the EMS education system in Saudi Arabia played a significant role in shaping this thesis. Familiarity with both the operational

context and educational challenges within EMS institutions provided a foundation for identifying relevant issues that framed the research objectives. However, this insider status presented challenges, necessitating a continuous reflexive approach to minimise potential bias throughout the research process.

One key area of reflexivity emerged from the researcher's personal experience during postgraduate education in the UK. While pursuing a master's degree in medical education at Cardiff University, exposure to the UK's feedback mechanisms highlighted a stark contrast with the feedback practices experienced in Saudi EMS education. In the UK, feedback was frequent, constructive, and formative, emphasising both areas for improvement and student strengths. In contrast, feedback in Saudi EMS education was predominantly summative, offering limited guidance on how students could improve. This personal experience served as a catalyst for the research focus on clinical feedback, shaping the research questions and objectives. As a result, a reflexive approach was essential to avoid overemphasising certain issues based on the researcher's prior academic experiences.

Despite the risk of potential bias, efforts were made to ensure that the research was conducted from a neutral standpoint. The study began with a systematic scoping review of the available literature, identifying gaps in EMS clinical feedback and setting the stage for an evidence-based approach. This methodological foundation provided a structured framework for the subsequent phases of the research, ensuring that it was grounded in empirical evidence rather than personal assumptions or biases.

Throughout the research process, the researcher's positionality required ongoing reflection, particularly during the Delphi study. Familiarity with the EMS context could have shaped the framing of questions and the interpretation of expert responses, potentially guiding participants toward pre-existing assumptions. To mitigate this, efforts were made to remain open to diverse perspectives, and the iterative nature of the Delphi method allowed for feedback and adjustments based on participant input.

Peer debriefing with the PhD supervisor and regular self-reflection helped to challenge any assumptions and ensured that the analysis remained balanced, reflective of the full range of participant perspectives.

Data Collection

The researcher's role within the EMS education system presented both opportunities and challenges during data collection. Familiarity with the educational and operational contexts allowed for greater access to participants and fostered a trusting relationship, particularly during interviews. Participants, especially students and clinical supervisors, were more open and candid in their responses, enriching the data gathered. However, the researcher's insider status also carried the risk of influencing participant responses or unintentionally guiding interviews toward reaffirming pre-existing views.

To address these concerns, several strategies were employed. Pilot testing of interview questions and survey instruments was conducted to ensure they were neutral and free from leading biases. Feedback from the PhD supervisor was essential in refining these instruments and ensuring that the researcher's familiarity with the EMS context did not overly shape the line of questioning. Reflexive journaling after each interview session allowed the researcher to remain aware of any unconscious biases and make necessary adjustments for subsequent interviews.

Methodology

The choice of a mixed-methods approach, combining qualitative and quantitative data, was strongly influenced by the researcher's desire to capture a comprehensive view of EMS clinical feedback. The initial scoping review helped identify gaps in the existing literature, particularly the need to explore both student and supervisor perspectives.

This dual approach addressed the multifaceted nature of feedback in EMS education, covering both operational challenges and emotional or psychological impacts.

Methodological decisions were also shaped by the researcher's personal experiences with feedback systems across different cultural contexts. For example, the decision to include both male and female participants in the second phase of the study was driven by the need to ensure that diverse perspectives, which were lacking in the researcher's own EMS education experience, were adequately represented. The scope of the study was expanded from a single EMS institution to multiple institutions, ensuring broader representation and more generalisable findings.

Minimising Bias

Several strategies were employed to mitigate potential biases throughout the study. Peer debriefing with the PhD supervisor provided an external perspective on the data, challenging initial interpretations, and ensuring objectivity in the analysis. Reflexive journaling after each round of data collection allowed the researcher to remain mindful of personal biases and make necessary adjustments in approach.

Triangulation of data from different phases of the research was another key strategy in minimising bias. By combining survey data with qualitative insights from interviews, the research aimed to balance the operational concerns of supervisors with the lived experiences of students. This approach ensured that the findings reflected a well-rounded understanding of clinical feedback, rather than being overly influenced by the researcher's professional perspective.

Interpretation of Findings

In interpreting the findings, reflexivity was essential in ensuring that both student and supervisor perspectives were given equal weight. The researcher's previous engagement with EMS supervisors naturally predisposed an inclination to prioritise

their logistical and institutional challenges. However, continuous self-reflection and feedback from the PhD supervisor helped to ensure that the emotional and psychological challenges faced by students were adequately explored and valued in the analysis.

For instance, while supervisors emphasised the operational difficulties of providing detailed feedback, students often expressed emotional distress or confusion when feedback was unclear or delayed. Initially, the researcher's interpretation leaned toward addressing these operational inefficiencies. Reflexive practice, however, prompted a re-evaluation of the findings, leading to a more holistic approach that integrated both logistical solutions and strategies to support students' emotional needs during feedback processes.

Challenges of Managing Reflexivity

Managing reflexivity throughout the research process presented several challenges. The researcher's deep familiarity with the EMS system allowed for a nuanced understanding of the issues at hand, but also required constant vigilance to prevent personal experiences from unduly influencing the findings. Reflexive journaling and peer discussions were critical in maintaining this balance, but the challenge of remaining truly objective while being deeply embedded in the research context remained an ongoing concern.

Another challenge lay in managing the evolving nature of the research as it progressed. The iterative nature of the Delphi study required constant reflection on how each round's findings were shaping the next. This reflexive process was essential in ensuring that the final educational strategy was not merely a reflection of pre-existing assumptions but was genuinely informed by the expert panel's consensus.

In conclusion, reflexivity was integral to every stage of this research. It enabled the researcher to remain mindful of personal biases, adjust the methodology as needed, and ensure that the findings were balanced and reflective of the full spectrum of participant perspectives. Through strategies such as peer debriefing, pilot testing, and reflexive journaling, the researcher was able to mitigate the influence of insider knowledge and maintain objectivity, resulting in a comprehensive and balanced exploration of clinical feedback in EMS education within Saudi Arabia.

7.3 Limitations of the Thesis

While this thesis offers important insights of global significance and a comprehensive strategy to improve EMS education, its focus on Saudi Arabia is likely to limit its broader applicability. While the Saudi EMS system incorporates elements from other countries (AlShammari et al. 2017), the unique characteristics of Saudi Arabia – factors such as organisational structures (Khattab et al. 2019), educational standards (AlShammari et al. 2020), cultural dimensions (Alanazy et al. 2021), and workforce dynamics (Al-Wathinani et al. 2023) – are naturally inherent in the conclusions and strategy produced.

Language barriers pose a significant limitation because English – the language of the questionnaires and interviews – is not the first language of many participants. Although English is used in Saudi EMS colleges and institutions, using it may have hindered participants' capacity to express themselves fully in the research (Marshall and While 1994; Van Nes et al. 2010; Wenz et al. 2021).

The under-representation of female participants, both as students and clinical supervisors, in the thesis sample also presents a limitation. This under-representation reflects the socio-cultural context of EMS work in Saudi Arabia: the field may be less

preferred by women (Alobaid et al. 2022). There is hence a possibility that the findings do not sufficiently reflect the experiences and perspectives of women in the EMS field.

Additionally, the study's reliance on self-reported data throughout all its phases poses a limitation (Paulhus and Vazire 2007). Self-report methods, susceptible to personal perceptions and experiences, can result in unrepresentative data (Paulhus and Vazire 2007).

In conclusion, while the thesis provided valuable insights into EMS clinical education in Saudi Arabia and the training and support requirements for clinical feedback, its geographical specificity, language barriers, gender representation, and reliance on self-reported data impose significant limitations. These factors should be carefully considered when interpreting the study's findings and in their application to different contexts or in future research.

7.4 Directions for Future Research

Whether the proposed educational strategy to enhance clinical feedback and address the associated challenges and needs will lead to increased satisfaction in EMS education in Saudi Arabia is a crucial area for future research. Future studies should focus on determining if this educational strategy effectively bridges the perceptual gaps and aligns expectations between clinical supervisors and students, thereby improving overall satisfaction with the feedback process.

In addition to improving satisfaction in EMS education, it is essential to consider the broader implications of enhanced clinical feedback on patient outcomes, the quality of care delivered, and overall safety in emergency medical settings. Effective feedback not only fosters improved student performance but also enhances their preparedness

for real-world clinical environments, which directly impacts patient safety and the quality of care. By refining students' clinical competence and decision-making abilities, these improvements ultimately contribute to better healthcare outcomes for patients.

Moreover, there is a need for empirical studies to evaluate the proposed strategy's effectiveness. These studies should assess how specific elements of the strategy – such as training content, duration, frequency, feedback delivery methods, quality assurance mechanisms, and guidelines – impact the performance of clinical supervisors and enhance clinical feedback. This evaluation will be crucial for providing objective data that can substantiate the effectiveness of these recommendations, ensuring their practical relevance and efficacy.

Longitudinal studies are essential for comprehensively assessing the impact of enhanced clinical feedback, training methods, and resource allocation on the development of students and clinical supervisors in the EMS field over time. These studies should not only focus on the tangible outcomes, such as improved student performance and higher-quality patient care, but also delve into the conceptual underpinnings of clinical feedback as understood and practiced by instructors. The observation that instructors may possess a limited conception of feedback—often treating it as merely a summative evaluation without recognising its formative potential or its role in teaching and learning—suggests a critical area for investigation and intervention. Through such research, there is an opportunity to explore how the proposed educational strategies, including the application of constructive alignment principles as proposed by Biggs (1999), could foster a more nuanced understanding among instructors. This re-theorising could guide them to see feedback not just as the provision of information but as a transformative act aimed at reconstructing students' understanding and practice.

Additionally, the effectiveness of proposed strategies aimed at motivating supervisors, through both resource augmentation and motivational tactics, in providing timely and

constructive feedback should be examined. Ultimately, longitudinal studies in this domain would provide valuable insights into how educational interventions can enhance students' confidence, competence, and readiness for patient care, while also improving the engagement and efficacy of clinical supervisors. Such a holistic approach to research could significantly contribute to the ongoing enhancement of EMS practice, aligning educational strategies with the ultimate goals of learning and patient care excellence.

In light of Saudi Arabia's Vision 2030, which emphasises the enhancement of women's participation across various sectors, it is imperative for future studies to ensure a more balanced representation of genders, particularly focusing on the experiences and perspectives of women in the EMS field (Al-Wathinani et al. 2023). This approach could substantially enrich the comprehension of the dynamics in EMS education and feedback mechanisms and address this thesis's limitations.

It will also be essential to conducting international comparative studies to evaluate Saudi Arabia's EMS educational strategies, particularly its clinical feedback mechanisms, against global benchmarks. Models developed in the USA and Australia already exert significant influence on Saudi Arabia's EMS systems and educational approaches (AlShammari et al. 2017). By carefully comparing Saudi Arabia to other countries, researchers can search for general principles of clinical feedback that can be used in all EMS education. They can also better characterise the adaptation of foreign models to fit the Saudi Arabian situation.

Given the revealed similarities in EMS clinical feedback challenges and needs across different contexts, the applicability of the proposed educational strategy in other countries, with necessary adjustments for local differences, also warrants investigation. This exploration will contribute to refining EMS education globally, ensuring strategies are adaptable and effective across diverse healthcare environments. By addressing

these universal challenges with tailored solutions, future research can significantly enhance the quality and efficiency of EMS training and practice worldwide.

7.5 Conclusion

In conclusion, this thesis contributes to understanding and enhancing EMS clinical feedback in Saudi Arabia, addressing critical gaps in both literature and practice. Through a comprehensive examination of perceptions, challenges, and needs regarding clinical feedback from the perspectives of both clinical supervisors and students, it has laid a foundational framework for improving EMS education in Saudi Arabia. The thesis identified key discrepancies in perceptions of feedback, underscoring the essential role of clear, effective communication in fostering an environment conducive to learning and professional growth.

The proposed educational strategy offers a comprehensive approach to enhancing the quality and efficacy of clinical feedback. This strategy encompasses tailored training programmes, the integration of clinical feedback into quality assurance frameworks, and the provision of necessary resources, aiming to bridge the perceptual gaps between supervisors and students. It also highlights the importance of ongoing professional development and support for clinical supervisors, ensuring that feedback practices evolve in line with educational and healthcare advancements.

The thesis's contributions should be seen in light of its limitations including its focus on Saudi Arabia, potential language barriers, the underrepresentation of female perspectives, and the reliance on self-reported data. These limitations suggest avenues for future research, emphasising the need for studies that assess the effectiveness of the proposed educational strategy, explore its applicability in diverse contexts, and ensure a more inclusive representation of genders within the EMS field.

Beyond adding to the knowledge on EMS clinical feedback in Saudi Arabia, this thesis also proposes strategic directions for improvement that are both practical and theoretically grounded. By doing so, it sets the stage for future advancements in EMS education and practice, aiming to elevate the standards of patient care and professional development within the EMS community in Saudi Arabia and beyond.

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Appendices

Chapter 2 Appendices:

Appendix 2.01: PRISMA-ScR Checklist

Section	Item	PRISMA-ScR Checklist Item	Reported on Page #
Title	1	Identify the report as a scoping review.	23
Abstract			23
Structured summary	2	Provide a structured summary that includes (as applicable) background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	23
Introduction			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	27

Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualise the review questions and objectives.	27
Methods			28
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and, if available, provide registration number.	
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	32
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the last search was executed.	29
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	30
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the review.	32
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their	33

		use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	30
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of individual sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	33
Summary measures	13	Not applicable for scoping reviews.	
Synthesis of results	14	Describe the methods of handling and summarising the data that were charted.	33
Risk of bias across studies	15	Not applicable for scoping reviews.	
Additional analyses	16	Not applicable for scoping reviews.	
Results			34
Selection of sources of evidence	17	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	35
Characteristics of sources of evidence	18	For each source of evidence, present characteristics for which data were charted and provide the citations.	36

Critical appraisal within sources of evidence	19	If done, present data on critical appraisal of included sources of evidence (see item 12).	
Results of individual sources of evidence	20	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	36
Synthesis of results	21	Summarise and/or present the charting results as they relate to the review questions and objectives.	37
Risk of bias across studies	22	Not applicable for scoping reviews.	
Additional analyses	23	Not applicable for scoping reviews.	
Discussion			51
Summary of evidence	24	Summarise the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	51
Limitations	25	Discuss the limitations of the scoping review process.	59
Conclusions	26	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	59
Funding	27	Describe sources of funding for the scoping review, as well as sources of funding for individual sources of evidence.	

Appendix 2.02: Characteristics of included studies of scoping review.

Author, year	Country	Type of study/ resource	Design and study purpose	Method	Findings on clinical feedback /students/supervisors	Clinical feedback on Suggestions and training needs
1.Nilsson et al, 2023	SWEDEN	Peer reviewed, published study	Explore experiences of nursing students and clinical supervisors using a digitalised feedback tool for formative assessments in EMS education.	Qualitative study involving two student groups and 13 supervisor phone interviews.	Positive reception of the digitalised assessment tool (DAT) by both groups. DAT visualises strengths, improvement areas, and progress using a Likert scale. Enhanced communication and transparency; preferred over traditional methods. Formative assessment promotes daily feedback and discussions.	**Students:** Improve DAT user-friendliness and provide better preparation/information. **Supervisors**: Need more time for assessments due to demanding work and view DAT as a potential communication hub.

2.Wongtongkam and Brewster, 2017	AUSTRALIA	Peer reviewed, published study	Investigate how clinical experiences in out-of-hospital emergency services influence student learning outcomes and satisfaction.	Mixed methods (Retrospective analysis of 160 preceptor evaluations and 21 student feedback forms.)	Students' perceptions: 72% felt welcomed and supported by qualified paramedics. 71% believed their paramedic was skilled and promoted queries. 61.9% were actively involved in clinical experiences. **52.3% received quality verbal feedback.** Satisfaction with paramedic quality: 70% positive, with 50% "satisfied", 9.5% "very satisfied", and 19% "extremely satisfied".	Students value diverse clinical experiences and approachable preceptors. Dissatisfaction stemmed from limited learning opportunities during non-emergency calls or lighter case loads.
3.Filipp, David L, 2022	United States	Unpublished thesis	Understand paramedic interns' experiences and perceptions during their	(Mixed methods) Phenomenological approach using an electronic survey and in-depth interviews of 7	**Consistency in Feedback:** Interns benefit more from feedback that is consistently delivered, both in terms of style and	After analysis the students perceptions and to maximise the benefits of feedback and facilitate the growth of paramedic interns, the following

			preceptorship phase of education.	paramedic intern students. Analysis involved coding, triangulation, rich descriptions, member checks, and peer review.	content. This consistency aids in creating a stable learning environment. **Diversity in Feedback Methods:** Different interns may respond better to different feedback techniques. **Allocated Time for Feedback:** The amount of time devoted to feedback is crucial objectives. **Holistic Approach to Success:** Merely mastering skills isn't enough. Interns need to develop a range of qualities such as a proactive approach to learning and the confidence to ask for help when needed. **Adaptable Learning:**	suggestions and training needs are recommended for Clinical supervisors: **Standardised Feedback Training:** Preceptors should undergo training to maintain a standardised feedback style, ensuring all interns receive a consistent feedback experience. **Feedback Toolkits:** Equip preceptors with diverse tools, including digital tools, to provide both hands-on and visual feedback tailored to each intern's learning style. **Time Management Workshops:** Offer training sessions on how to effectively allocate and manage time for feedback,

					Interns appreciate when teaching methods evolve based on their changing needs. **Balancing Feedback Types:** A mix of positive reinforcement and constructive feedback is crucial for comprehensive growth.	ensuring that interns receive comprehensive evaluations without taking away from other essential tasks. **Orientation Sessions:** Start each preceptorship with a clear orientation session where expectations, goals, and success metrics are laid out. **Personal Development Workshops:** Encourage interns to attend workshops focused on personal qualities like confidence building, openness to learning, and effective communication to supplement their clinical skills. **6. Feedback Retreats:** Organise

						periodic feedback-focused retreats or sessions where preceptors and interns can discuss feedback trends, address concerns, and find ways to enhance the continuous learning process. **7. Training on Feedback Balance:** Clinical supervisors should be trained on how to effectively mix positive reinforcement with constructive feedback, ensuring each intern understands both their strengths and areas for growth.
4.Edwards, Dale,2019	Australia	Unpublished thesis	Explore paramedics' ability to serve as preceptors in the Australian	Qualitative Involved: 9 paramedic preceptors (Clinical supervisors)	Paramedics expressed a need for feedback on their performance as preceptors, both from their organisation and	1. Clinical supervisors suggested the implementation of a dedicated practice education coordination role

			ambulance service and investigate the changes in paramedic education.		from the learners they worked with. Feedback mechanisms were seen as essential for encouraging change and development in the preceptor role. Lack of clarity and preparation for providing feedback to difficult or challenging learners was a common challenge among preceptors.	within ambulance services to facilitate the preceptorship process, including expectation management, paramedic preceptor selection, and guidance. 2. There was a desire for a community of practice (CoP) for paramedic clinical supervisors to develop shared understanding, language, and role identity. 3. Clinical supervisors highlighted the need for more structured professional development opportunities and mentoring for preceptors, especially in the early stages of their career. 4. Feedback on clinical supervisors'

						performance was considered vital for self-evaluation and accessing professional development opportunities to address any identified issues.
5.O'Meara, et al 2015,	AUSTRALIA	Peer reviewed, published study	Identify components of high-quality clinical and field placements for paramedicine students, focusing on paramedic instructors' views and expectations.	Qualitative research with 15 paramedic instructors, chosen for having supervised university paramedicine students on field placements. Data gathered through face-to-face semi-structured interviews.	**Clinical practice Objectives:** Vocationally trained paramedics often see placements mainly for observing paramedicine, while university-trained ones believe It is an opportunity for students to practice skills. **Diverse Views Based on Background:** The paramedic instructors' own pathways to paramedicine shape their perspectives on what students should	1. **Clarify the Purpose of Placements**: There should be a consensus or standard understanding of what the main objectives of field placements are, ensuring that both instructors and students align in their expectations. 2. **Structured Feedback Time:** Allocate specific times for paramedic instructors to provide feedback to students. This can ensure that students receive comprehensive feedback on their

					already know before field placements and what the purpose of such placements should be. **Communication Gaps:** Several of the paramedic instructors were unsure of the right channels to communicate with universities about concerns regarding a student or how to provide effective feedback, even though formal feedback and assessment processes are in place. 4. **Lack of Structured Feedback Time:** Some paramedic instructors expressed the need for dedicated time at the	performance and areas of improvement. 3. **Feedback Training for Instructors:** Develop training programmes or modules focused on giving effective feedback. This can assist paramedic instructors in providing constructive feedback that promotes student growth. 4. **Establish Clear Communication Channels:** Clear communication pathways should be established between paramedic services, paramedic instructors, and universities. This can ensure that any concerns or feedback about a student's performance can be effectively

					end of their shifts to provide feedback to students, especially after critical incidents.	communicated and addressed. 5. **Feedback Mechanisms Post-Placement:** Implement systems or platforms where paramedic instructors can provide feedback even after the student's placement has ended. This can offer continuity and allow for reflection.
6.Rose et al. 2015	Australia	Peer reviewed, published study	To examine the prominent clinical themes identified by undergraduate paramedic students following experiences on clinical placement.	Cross-sectional methodology using an online discussion forum to gather common clinical themes encountered by students during clinical placements. 116 2nd-year Bachelor of Emergency Health	**Valuable feedback from professionals:** Students greatly valued real-time feedback from paramedic educators in the field. Such feedback assisted them in refining their techniques, such as adjusting the angle of cannula insertion.	**Emphasise Real-time Feedback:** Promote the practice of on-site paramedic educators giving immediate feedback, recognised as significantly beneficial by students.

				(Paramedic) students from Monash University, Melbourne.		
7.Boyle et al. 2008	Australia	Peer reviewed, published study	Explore students' experiences during ambulance clinical placements and provide insights to ambulance services.	Quantitative Survey of 77 undergraduate paramedic students in semester one of 2007.	**Positive Experience with Feedback**: 93% of students stated their ambulance clinical placement was a positive experience, with many highlighting feelings of inclusivity, learning opportunities, and support from paramedics in the feedback they received. **Reception by Some Crew Members:** Despite the overall positive feedback, 57% of students mentioned	**Improvement in Inclusivity:** Students should feel more welcomed and included by the ambulance crew. Feedback should be constructive and supportive, fostering an environment conducive to learning. **More Practical Opportunities:** Students should be provided more hands-on patient management and skills practice opportunities, especially during downtime. This ensures they receive continuous feedback.

					encountering at least one crew member who treated them with disdain, suggesting there was negative feedback or perhaps lack of constructive feedback. **3.Value of Hands-on Experience:** 88% of the students obtained some form of "hands-on" practical experience during their clinical placement. This might suggest that they valued feedback during real patient interactions. **Presence of Clinical Instructors:** Only 44% of students had clinical instructors available during their clinical	**Presence of Clinical Instructors:** Given the significant percentage of students without clinical instructors, it is suggested that all students have access to instructors for consistent feedback during placements. **4. Utilisation of Downtime:** Ambulance crews should engage students more in patient care during downtime, offering skills sessions and feedback to ensure students are consistently learning. **5. Clearer Objectives:** Establish clearer clinical placement objectives for both students and paramedic educators.

					placement time. This could imply a lack of consistent feedback for over half of the students. **Downtime and Practice:** 69% of students felt there was a lot of unproductive downtime during the placement, and 37% of students were not given the opportunity to undertake clinical scenarios or practice skills during this time, indicating missed opportunities for feedback.	
8.Williams et al. 2016	Australia and Jordan	Peer reviewed, published study	Examine and compare satisfaction levels with simulation among paramedic	Cross-sectional research employing a paper-based English version of the Satisfaction with	**Overall Satisfaction:** Both Australian and Jordanian student groups reported a high degree of satisfaction with simulation	**Balancing Simulation and Feedback Time:** Recognise and address any imbalances between the depth of simulations and the

			students from universities in both Australia and Jordan.	Simulation Experience Scale to paramedic students across all academic years. Study encompassed 511 students - 306 (60%) from Australia (Monash University) and 205 (40%) from Jordan (Jordan University of Science and Technology).	experiences, with Australian students showing a marginally higher contentment level. **Comparative Differences:** Marked statistical variations were noticed in elements like debriefing/feedback, clinical reasoning, and clinical learning between the two groups. Jordanian students generally had lower satisfaction scores than their Australian peers. **Feedback Variance Over Time:** Australian students experienced a decline in satisfaction from the first to the fourth	time set aside for feedback, especially among the Australian students. **Strengthening Educator Training:** Continuously evaluate and enhance the training of paramedic educators, ensuring they are aptly equipped to provide valuable feedback. **Revisiting Feedback Mechanisms:** **There is a need, particularly for senior students in Australia, to assess and refine the feedback processes in place.** **Cultural Sensitivity in Feedback:** **Adjust feedback approaches to be more congruent with cultural nuances, as feedback**

					year regarding feedback. In contrast, satisfaction for Jordanian students grew as they progressed in their program. Potential reasons might be the complexity of simulations and limited time for feedback for Australian students. For Jordanians, stronger student-teacher relationships might be influential.	**interpretation might differ between cultures.** **Promoting Stronger Educator-Student Bonds:** Prioritise the establishment of strong relationships between educators and students. Such relationships can play a pivotal role in the efficacy and impact of feedback. **Emphasis on Simulation Feedback:** In both countries, focus on refining feedback during simulation-based education, with particular attention to clinical learning.
9.O'Meara et al. 2014	Australia	Peer reviewed,	The purpose of the study is to examine	This research adopted a qualitative	**Standardisation Concerns:**	**Establish Standards:** Develop standardised duration and quality

		published study	the issues affecting the quality of paramedic student clinical placements. The focus is on highlighting these issues and starting a conversation about the importance of clinical placement for paramedic students.	method known as 'Community conversations.' This action research approach engaged the 53 participants in comprehensive discussions throughout the duration of the conference. The overarching aim was to surface and engage in dialogue about challenges tied to clinical placements for paramedic students and to ideate potential solutions.	The absence of a uniformed duration or quality benchmarks for paramedic student clinical placements in Australia leads to inconsistencies in feedback provision. **Communication Breakdowns:** Communication and collaboration hindrances among universities, ambulance service entities, educational personnel, instructors, and students have repercussions on the feedback process. Consistency Issues: Students rotating amongst different ambulance crews and stations daily face disruptions in consistent learning and feedback.	benchmarks for clinical placements in order to standardise and optimise feedback. **Connect Communication Gaps:** Enhance communication and synergies among various stakeholders (such as educational institutions, ambulance services, and educators) to improve the feedback mechanism. **Accentuate Continuous Placements:** Advocate for extended and continuous clinical placements, which can enhance consistent feedback and foster the instructor-student relationship.

					Continuity's Role: The need for sustained and uninterrupted placements is underscored as it fosters beneficial relationships between educators and students, thus enhancing feedback.	**Increase the Placement Scope:** Look into the feasibility of having students distributed across varied healthcare settings, broadening their exposure and diversifying feedback experiences.
10.Lane, 2014,	Australia	Peer reviewed, published study	To examine student paramedics' perspectives of the Paramedic Educator (PEd) role, focusing on specific mentoring qualities that impact upon their learning and to	Qualitative, N=8 paramedic students participated in Semi-structured interviews	**Observational Learning:** Students emphasised the importance of observational learning and argued that PEds should possess clinical knowledge. **Communication's Crucial Role:** Students emphasised its significance, particularly in the	**Enhance Clinical Intelligence:** Training modules should prioritise bolstering the clinical foundation of PEds so they can provide pertinent and accurate feedback. **Focus on Communication Skills:**

			identify 'mentoring' issues specific to the paramedic profession.		sphere of feedback, and indicated that effective communication was crucial, especially given the close working relationships they have with PEds. **Support in Demanding Circumstances:** Students cherished the technical and emotional support they received from PEds, especially when they received feedback following challenging clinical situations. **PEd Characteristics:** Interestingly, certain students leaned towards PEds being more akin to 'friends', which occasionally made the digestion of	Tailored training sessions are required to improve the communication skills of PEds so that they can provide feedback in an effective, unambiguous, and encouraging manner. **Holistic Support Framework:** The training should include techniques for how PEds can provide both technical and emotional support during feedback, particularly after difficult clinical duties. **Constructive Feedback Training:** Special sessions should be devised to train PEds on delivering feedback that maintains a balance between being approachable

					critical feedback slightly challenging.	and being direct or critical.
11.Moodley, 2016,	South Africa	Unpublished thesis	The study delved into the experiences of paramedic students during their clinical practice placement.	(Qualitative) The study employed focus groups and individual interviews involving paramedic graduates and paramedic students. Participants: Sample 1 had 20 participants. Sample 2 had 10 participants.	**1.Negative Feedback:** Students frequently faced negative and demotivating feedback, affecting their learning trajectory and denting their confidence. Instances where they were yelled at or overlooked further aggravated the situation. **2. Lack of Systematic Feedback:** students noted the absence of a structured feedback system. Often, feedback was skewed towards critiquing a student's character rather than	**Feedback Structure:** Consider the adoption of structured feedback methodologies, such as the "sandwich" technique. **Behavior-centric Feedback:** Training should be oriented towards ensuring that feedback revolves around a student's behaviour and clinical execution rather than personal attributes. **RIME Tool:** Advocate for the Reporter, Interpreter, Manager, Educator (RIME) feedback mechanism, which emphasises long-term observation.

					pinpointing specific events or actions. Character-Centric Feedback: Rather than focusing on the clinical performance or behavior of a student, feedback frequently concentrated on the student's character. **3. Overcrowding Dilemma:** An elevated student-to-clinical-supervisor ratio obstructed effective feedback delivery. 4. Reluctance in Delivering Negative Feedback: Some supervisors exhibited hesitation in providing negative feedback, fearing it might strain their rapport with the student. 5. Inefficacy of Feedback: Despite	**Training for Healthcare Professionals:** Design modules to enhance the feedback-giving skills of healthcare professionals. **Explicit Criteria:** Establish concrete criteria that can facilitate the delivery of meaningful feedback. **Mentoring Focus:** An intricate mentorship framework can be beneficial, providing a pathway for deeper insights into the profession. **Stronger Institutional Collaboration:** Promote closer ties between academia and emergency services.

					their clinical proficiency, not all healthcare professionals might be adept at offering constructive feedback.	**Detailed Clinical Workbook Feedback:** Feedback sections within workbooks should be made more expansive, spotlighting a student's clinical accomplishments. **Clear Learning** Objectives: Ensure that learning objectives are unambiguous and tied to distinct outcomes. **Structured Clinical Teaching:** Emphasise structured curricula in clinical teaching, overseen by proficient clinicians. **Adoption of Recognised Methods:** Supervisors should be trained to use established feedback techniques.

						Strengthened Mentorship: Augment mentorship programmes, fostering deeper connections with hospitals and emergency services.
12.Hamish M. Carver 2016	Australia	Unpublished PhD thesis	To understand the experience of being a paramedic preceptor to novice paramedics who are in their first year of on-road clinical practice within an Australian ambulance service.	Eleven qualified paramedics from a single Australian ambulance service with experience as a paramedic preceptor. Qualitative-recorded conversations were utilised as the primary method of data collection.	**1. Role of Preceptors in Communication:** Preceptors significantly help novices refine their interpersonal communication skills, especially during patient handovers at hospitals, teaching them effective communication with other healthcare professionals. **2.Feedback's Role in Building Confidence:** Preceptors offer feedback that enables	1. **Strengthen Interpersonal Communication:** To ensure that newcomers are prepared, training programmes ought to place a greater emphasis on enhancing interpersonal communication skills, particularly during patient handovers. 2. **Preceptor Feedback Training:** Provide preceptors with organised training sessions with a focus

					novices to improve their confidence and clarity in communication, vital for the quality of patient care. **3.Identified Training Gap:** A noticeable gap exists in university training regarding interpersonal communication, positioning preceptors as essential in bridging this gap during on-road real-world scenarios. **4.Lack of Support for Preceptors:** Preceptors, despite their pivotal role, lack sufficient preparation and support, particularly	on providing novices with constructive, actionable, and customised feedback. **3. Preceptor Support Systems:** Provide strong preceptor support systems so they can talk about and refine their feedback techniques. **4. Encourage Peer Feedback:** Create a setting where novices and preceptors feel at ease enough to participate in dialogues, introspection, and feedback for each other's development.

					concerning delivering effective feedback.	

Chapter 4 Appendices:

Appendix 4.01: Good Reporting of a Mixed Methods Study (GRAMMS) Checklist

Section/Topic	Checklist Item	Completed (Yes/No)	Comments/Notes
Title and Abstract	Clearly identify the study as a mixed methods study. Provide a structured summary of both qualitative and quantitative components.	Yes	**Completed:** The title and abstract indicate the use of mixed methods, describing the integration of quantitative (questionnaire) and qualitative (interviews) approaches.
Introduction	Explain the rationale for using mixed methods and provide background context. Clearly state the research questions and objectives.	Yes	**Completed:** The introduction explains the rationale for using mixed methods, particularly how the quantitative data from the PFQ and qualitative data from the interviews complement each other to provide a comprehensive understanding of clinical feedback. The research questions and objectives are clearly stated.

Methods			
Justification	Explain why both qualitative and quantitative methods were necessary to address the research question.	Yes	**Completed:** The study explains that quantitative data provides statistical evidence, while qualitative data provides deeper insights into the perceptions of the participants, making it necessary to use both methods to fully address the research questions.
Design	Describe the design of the study (e.g., sequential, concurrent, or transformative) and provide a rationale for the chosen design.	Yes	**Completed:** The design of the study is described as sequential, with the survey conducted first followed by the interviews. The rationale provided explains that the survey results informed the interview questions.
Sampling Strategy	Describe how participants were selected for both qualitative and quantitative components.	Yes	**Completed:** The study describes the sampling strategy, detailing how clinical supervisors and students were selected for the surveys and interviews.
Data Collection	Explain the methods used for data collection for both qualitative (e.g., semi-structured interviews) and quantitative (e.g., surveys) parts.	Yes	**Completed:** The data collection methods are explained, with details on the PFQ survey for quantitative data and semi-structured interviews for qualitative data.

Data Integration	Detail how the qualitative and quantitative data were integrated, either during data collection, analysis, or interpretation.	Yes	**Completed:** The integration is detailed in the data analysis section, where it is explained how the qualitative interview data was used to contextualise and expand upon the quantitative survey findings during the interpretation phase.
Data Analysis	Describe the data analysis methods used for both qualitative and quantitative data and how these methods complement each other.	Yes	**Completed:** The data analysis methods are described for both the PFQ survey (quantitative) and the thematic analysis of interviews (qualitative). The complementarity of these methods is discussed, highlighting how they provide both statistical evidence and detailed contextual understanding.
Validity and Reliability	Discuss the validity and reliability of both qualitative and quantitative findings and how the integration of both enhances the study's rigor.	No	**Text to be added:** A discussion on the validity and reliability of both qualitative and quantitative findings should be added. This could include discussing the reliability of the PFQ survey results and the validity of the thematic analysis, and how integrating these findings enhances the overall rigor of the study. This can be added towards the end of the data analysis section.
Results			

Qualitative Results	Present findings from the qualitative component with appropriate quotes or themes. Discuss how these findings provide depth and context.	Yes	**Completed:** Thematic analysis results are presented with appropriate quotes, and it is discussed how these findings provide depth and context to the quantitative results.
Quantitative Results	Present findings from the quantitative component with appropriate tables, figures, or statistical summaries. Discuss how these findings provide breadth.	Yes	**Completed:** Quantitative results are presented with tables and figures, and the discussion includes how these findings provide a broad overview of the perceptions studied.
Integration of Results	Discuss how the qualitative and quantitative findings converge, diverge, or complement each other. Provide a combined interpretation of the results.	Yes	**Completed:** The combined interpretation of results is discussed in the results section, highlighting how qualitative findings from interviews complement or explain the quantitative findings from the surveys.
Discussion			

Interpretation	Interpret the findings in the context of the study's objectives and research questions. Discuss the implications for practice and future research.	Yes	**Completed:** The findings are interpreted in the context of the study's objectives, and implications for practice and future research are discussed.
Limitations	Address the limitations and strengths of the mixed methods approach.	yes	**Completed:** : Limitations related to sample size and lack of gender diversity are acknowledged, along with the strengths of using mixed methods to provide comprehensive insights.
Conclusion	Summarise the main findings and their relevance. Highlight the added value of the mixed methods approach.	Yes	**Completed:** The conclusion summarises the main findings and highlights the value of using a mixed methods approach in this study.
Funding and Conflicts of Interest	Disclose sources of funding and any potential conflicts of interest.	Yes	**Completed:** The study includes disclosures of funding sources and potential conflicts of interest.

Appendix 4.02: Refining the PFQ Survey: insights, rationale, and participant feedback.

Feedback Category	Item Number	Original Statement	Revised Statement	Reason for Adjustment/Removal	Participant Comment
Feedback Understanding	Q4	"When a clinical supervisor sends a completed rubric,"	"When a clinical supervisor sends a completed checklist,"	Modified for clarity and consistency with EMS terminology.	"We do not use rubric; we use checklist, and it is more usable. Students and educationalists in EMS in Saudi Arabia are more familiar with it." - Clinical Supervisor
Feedback Understanding	Q9	"When a clinical supervisor gives me examples of the work of another student,"	Removed	Limited relevance to survey's aim and objectives.	"Comparing students' work is not a practice in EMS clinical feedback as each student has different abilities and understanding." - Clinical Supervisors

Feedback Effectiveness	Q11	“If I seek feedback from a clinical supervisor, I agree with what he/she says about my performance.”	“The feedback I receive from my clinical supervisor aligns with my perceptions of my performance,”	Emphasis on alignment over agreement	“It’s better this way; it really captures what feedback is about.” - Student
Feedback Effectiveness	Q12	“I like it when I get feedback from my clinical supervisor about my work,”	Removed	Redundancy with other items in the section.	“This should be removed as it is repetitive. Another statement, which is ‘The feedback I get from my clinical supervisors makes me feel satisfied about my learning,’ is clearer and more comprehensive.” - Clinical Supervisors

Feedback Interpretation	Q23	After reading or listening to the clinical supervisor I don't read or hear the feedback.	Removed	Confusion and lack of clarity	"This statement is confusing and unclear. It's contradictory to claim both reading or listening to feedback and then not doing either. It complicates our understanding of how feedback is received and processed. "Student
Feedback Interpretation	Q24	"I don't know what I am doing with the Feedback my supervisors' offer"	Removed	Overlap with more positively framed items on feedback comprehension and application.	"It overlaps with a positive statement where students and clinical supervisors can agree or disagree: 'I understand the feedback that I receive from my clinical supervisors.'" - Clinical Supervisors

Feedback Interpretation	Q25	I understand my supervisors' feedback.	Moved to feedback understanding	Moved to PFU as it more suitable o Understanding conceptual concept.	"This item is more suitable for understanding domain as it examines the understanding level when feedback is given" Student
Feedback Interpretation	Q26	"I considered my supervisors' feedback is useful."	Removed	Overlapping with other items in terms of feedback effectiveness.	"Deleting this item avoids redundancy with 'When a clinical supervisor points out what I am doing well, I understand what I am doing in performing medical skills in clinical settings.'" - Participant
Feedback Interpretation	Q27	"I use my feedback to improve my medical performance in clinical settings."	Removed	Clear overlapping with more specific items in the survey.	"Removing this statement as it overlaps with 'The Feedback I get from my clinical supervisors encourages me to continue to work hard.'" – student

Feedback Interpretation	Q28	"The time I spend understanding my clinical supervisors' feedback is worth the effort."	Removed	Low correlation with survey's objectives.	"It is not clear why and what the aim of this statement is, while other statements like 'The feedback I get from my clinical supervisors makes me feel satisfied about my learning' are clearer." - Student
Feedback Interpretation	Q29	"I ask questions to clarify my clinical supervisors' feedback"	Removed	Clear overlapping with more specific items in the survey.	"Deleting this item as it overlaps with 'After reading or listening to the clinical supervisor I ask follow-up questions.'" - student
Feedback Interpretation	Q30	"I meet with my clinical supervisors outside of clinical practice hours to receive feedback."	Moved to Feedback Preferences	More appropriate for feedback preferences domain.	"This statement is more suitable for the preferences section as it could reflect a preference from students to meet outside clinical

					practice hours for feedback.” - Clinical Supervisors
Feedback Interpretation	Q31	“My clinical supervisors ask me if their feedback is helpful.”	“After reading or listening to the clinical supervisor, my clinical supervisors ask me if their feedback is helpful.”	Clarity and emphasis on the feedback process	“Makes more sense now, it’s clearer.” - Clinical Supervisor

Feedback Category	**Item Number**	**Original Statement**	**Revised Statement**	**Reason for Adjustment/Removal**	**Participant Comment**
Feedback Understanding	Q4	“When a clinical supervisor sends a completed rubric,”	“When a clinical supervisor	Modified for clarity and consistency with EMS terminology.	“We do not use rubric; we use checklist, and it is more usable. Students and

			sends a completed checklist,"		educationalists in EMS in Saudi Arabia are more familiar with it." - Clinical Supervisor
Feedback Understanding	Q9	"When a clinical supervisor gives me examples of the work of another student,"	Removed	Limited relevance to survey's aim and objectives.	"Comparing students' work is not a practice in EMS clinical feedback as each student has different abilities and understanding." - Clinical Supervisors
Feedback Effectiveness	Q11	"If I seek feedback from a clinical supervisor, I agree with what he/she says about my performance."	"The feedback I receive from my clinical supervisor aligns with my perceptions	Emphasis on alignment over agreement	"It's better this way; it really captures what feedback is about." - Student

			of my performance,"		
Feedback Effectiveness	Q12	"I like it when I get feedback from my clinical supervisor about my work,"	Removed	Redundancy with other items in the section.	"This should be removed as it is repetitive. Another statement, which is 'The feedback I get from my clinical supervisors makes me feel satisfied about my learning,' is clearer and more comprehensive." - Clinical Supervisors
Feedback Interpretation	Q23	After reading or listening to the clinical supervisor I don't read or hear the feedback.	Removed	Confusion and lack of clarity	"This statement is confusing and unclear. It's contradictory to claim both reading or listening to feedback and then not doing either. It complicates our understanding of how

					feedback is received and processed. “Student
Feedback Interpretation	Q24	“I don’t know what I am doing with the Feedback my supervisors’ offer”	Removed	Overlap with more positively framed items on feedback comprehension and application.	“It overlaps with a positive statement where students and clinical supervisors can agree or disagree: ‘I understand the feedback that I receive from my clinical supervisors.’“ - Clinical Supervisors
Feedback Interpretation	Q25	I understand my supervisors’ feedback.	Moved to feedback understanding	Moved to PFU as it more suitable o Understanding conceptual concept.	“This item is more suitable for understanding domain as it examines the understanding level when feedback is given” Student
Feedback Interpretation	Q26	“I considered my supervisors’ feedback is useful.”	Removed	Overlapping with other items in terms of feedback effectiveness.	“Deleting this item avoids redundancy with ‘When a clinical supervisor points out what I am doing well, I

					understand what I am doing in performing medical skills in clinical settings.'" - Participant
Feedback Interpretation	Q27	"I use my feedback to improve my medical performance in clinical settings."	Removed	Clear overlapping with more specific items in the survey.	"Removing this statement as it overlaps with 'The Feedback I get from my clinical supervisors encourages me to continue to work hard.'" – student
Feedback Interpretation	Q28	"The time I spend understanding my clinical supervisors' feedback is worth the effort."	Removed	Low correlation with survey's objectives.	"It is not clear why and what the aim of this statement is, while other statements like 'The feedback I get from my clinical supervisors makes me feel satisfied about my learning' are clearer." - Student

Feedback Interpretation	Q29	“I ask questions to clarify my clinical supervisors’ feedback”	Removed	Clear overlapping with more specific items in the survey.	“Deleting this item as it overlaps with ‘After reading or listening to the clinical supervisor I ask follow-up questions.’“ - student
Feedback Interpretation	Q30	“I meet with my clinical supervisors outside of clinical practice hours to receive feedback.”	Moved to Feedback Preferences	More appropriate for feedback preferences domain.	“This statement is more suitable for the preferences section as it could reflect a preference from students to meet outside clinical practice hours for feedback.” - Clinical Supervisors
Feedback Interpretation	Q31	“My clinical supervisors ask me if their feedback is helpful.”	“After reading or listening to the clinical supervisor, my clinical supervisors	Clarity and emphasis on the feedback process	“Makes more sense now, it’s clearer.” - Clinical Supervisor

			ask me if their feedback is helpful.”		

Appendix 4.03: Exploratory factor analysis

Exploratory Factor Analysis (EFA)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.719
Bartlett's Test of Sphericity	Approx. Chi-Square	851.506
	df	190
	Sig.	<.001

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.152	25.760	25.760	4.770	23.850	23.850
2	2.817	14.085	39.845	2.355	11.777	35.626
3	1.729	8.643	48.488	1.394	6.971	42.598
4	1.557	7.786	56.274	1.061	5.305	47.902
5	1.232	6.162	62.436	.761	3.803	51.706
6	1.031	5.156	67.592	.588	2.939	54.645
7	.873	4.363	71.955			
8	.845	4.223	76.178			
9	.816	4.080	80.258			
10	.674	3.369	83.627			
11	.559	2.795	86.422			
12	.524	2.618	89.040			
13	.422	2.108	91.148			
14	.382	1.910	93.058			
15	.337	1.685	94.743			
16	.312	1.561	96.304			
17	.230	1.149	97.454			
18	.191	.955	98.409			
19	.162	.811	99.221			
20	.156	.779	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor					
	1	2	3	4	5	6
PFU4	.387	.447				
PFU5	.728					
PFU6	.607					-.351
PFU7	.358	-.391				
PFU8	.687					
PFU10						
PFE11	.658					
PFE13	.741				-.485	
PFE14	.797			.325		
PFP15		.301		.347		
PFP16		.497				
PFP17		.521		.324		
PFP18		.329	-.767			
PFP19		.340		-.399		
PFP20	.340	-.523		.330		
PFI21	.593					
PFI22	.597					
PFI25	.546					
PFI30		.455	.523			
PFI31	.300	.563				

Extraction Method: Principal Axis Factoring.

a. 6 factors extracted. 16 iterations required.

Appendix 4.04: Summary of changes and final factor designation of each item in the Perception of Feedback Questionnaire (PFQ)

Item	Statement	Revised Statement	Reason for Adjustment/Removal
PFU4	When a clinical supervisor gives me a completed rubric, I understand what I am doing in performing medical skills in clinical settings.	"When a clinical supervisor sends a completed checklist, I understand what I am doing in performing medical skills in clinical settings."	Modified for clarity and consistency with EMS terminology.
PFU5	When a clinical supervisor reports my mistakes, I understand what I am doing in performing medical skills in clinical settings.	NA	NA
PFU6	When a clinical supervisor makes suggestions for improvement, I understand what I am doing in performing medical skills in clinical settings.	NA	NA

PFU7	When a clinical supervisor gives me a letter grade or percentage, I understand what I am doing in performing medical skills in clinical settings.	NA	NA
PFU8	When a clinical supervisor points out what I am doing well, I understand what I am doing in performing medical skills in clinical settings.	NA	NA
PFU9	When a clinical supervisor gives me examples of the work of another student, I understand what I am doing in performing medical skills in clinical settings.	Removed	Limited relevance to survey's aim and objectives.
PFU10	When the clinical supervisor tells me his/her expectations before I start working, I understand what I am doing in performing medical skills in clinical settings.	This statement has low correlations but not deleted after EFA	Because it meets the conceptual concept

PFE11	If I seek feedback from a clinical supervisor, I agree with what he/she says about my performance.	The feedback I receive from my clinical supervisor aligns with my perceptions of my performance," t	To emphasise alignment over agreement.
PFE12	I like it when I get feedback from my clinical supervisor about my work.	Removed	Redundancy with other items in the section.
PFE13	The feedback I get from my clinical supervisors makes me feel satisfied about my learning.	NA	NA
PFE14	The Feedback I get from my clinical supervisors encourages me to continue to work hard.	NA	NA
PFP15	I prefer to receive written feedback by hand on my performance at clinical settings.	NA	NA

PFP16	I prefer to receive typed, electronic comments on my performance at clinical settings.	NA	NA
PFP17	I prefer to receive email when electronic feedback is provided on my performance at clinical settings.	NA	NA
PFP18	I prefer to receive Quick Comments on my performance at clinical settings.	NA	NA
PFP19	I prefer to receive feedback orally (talk/conference on my performance at clinical settings).	NA	NA
PFP20	I prefer to receive comments on my performance at clinical settings through audio or video recordings.	This statement has low correlations but not deleted and weak correlations in EFA	Because it meets the conceptual concept
PFI21	After reading or listening to the clinical supervisor I try to identify and correct my errors in performing clinical medical skills.	NA	NA

PFI22	After reading or listening to the clinical supervisor I ask follow-up questions.	NA	NA
PFI23	After reading or listening to the clinical supervisor I don't read or hear the feedback.	Removed	Overlap with more positively framed items on feedback comprehension and application.
PFI24	I don't know what I am doing with the Feedback my supervisors offer.	Removed	Overlap with more positively framed items on feedback comprehension and application.
PFI25	I understand my supervisors' feedback.	Moved	moved To F1 as it more suitable o Understanding conceptual concept factor (1)
PFI26	I considered my supervisors' feedback is useful.	Removed	Overlapping with other items in terms of feedback effectiveness.
PFI27	I use my feedback to improve my medical performance in clinical settings.	Removed	"Removing this statement as it overlaps with 'The Feedback I get from my clinical supervisors encourages me to continue to work hard.'" – student

PFI28	The time I spend understanding my clinical supervisors' feedback is worth the effort.	Removed	Low correlation with survey's objectives.
PFI29	I ask questions to clarify my clinical supervisors' feedback	Removed	Clear overlapping with more specific items in the survey.
PFI30	I meet with my clinical supervisors outside of clinical practice hours to receive feedback.	Moved to Feedback Preferences	moved To F3 as it more suitable Feedback Preferences conceptual concept factor (3)
PFI31	My clinical supervisors ask me if their feedback is helpful.	After reading or listening to the clinical supervisor My clinical supervisors ask me if their feedback is helpful.	This change was also a result of multiple participants' feedback.

Appendix 4.05 : Online PFQ Survey

(Clinical supervisors' version)

Consent: By clicking on this tab, I state that I agree to participate in this study. I agree that I can stop the survey at any time without giving any reason (exact wording on the first page of the survey Appendix 4 by clinical supervisor Consent Form).

Instructions: For this study, FEEDBACK should be viewed as feedback from a clinical supervisor on student work that expresses student progress to a clinical learning target. This could include what the student is doing, what gaps in his / her learning remains, and how these gaps can be addressed.

Please tell me a little about yourself.

• Year(s) you supervise this year: 1 2 3 4

• How many years/months have you been a clinical supervisor of EMS students:
____ months (please specify)

- **5 years**
- **6 - 10 years**
- **11-15 years**
- **16 - 20 years**
- **more than 20 years**

Respond to the following questions in 1-5, 1 being "Strongly disagree" and 5 beings "Strongly agree."

Section 1: Measure the difference between clinical supervisors' and students' perceptions of the feedback understanding

4. When I give a student the completed rubric, they understand how they are doing in performing medical skills in clinical settings.
5. When I report a mistake to students, they understand how they are doing in performing medical skills in clinical settings.
6. When I make suggestions for improvement, my students understand what they are doing in performing medical skills in clinical settings.
7. When I give my students a letter grade or percentage, they understand what they are doing in performing medical skills in clinical settings.
8. When I point out to students what they are doing well, they understand what they are doing in performing medical skills in clinical settings.
9. When I give examples of the work of another student, students understand what they are doing in performing medical skills in clinical settings.
10. When I tell my students, what is expected of them before the clinical teaching, they understand what they are doing in performing medical skills in clinical settings.

Section 2: Measure clinical supervisors' perceptions of feedback effectiveness

11. My students agree with my feedback on their clinical practice performance.
12. My students like it when I give them feedback on their clinical practice performance.
13. The feedback that I give students makes them feel satisfied with their clinical practice performance.
14. The feedback I provide inspires my students to continue working hard.

Section 3: Measure clinical supervisors' preferences for different types of feedback delivery systems.

15. I prefer to provide written comments by hand on students' performance in clinical settings.
16. I prefer to provide typed, electronic comments on student work.
17. I prefer to use email when providing electronic comments on student work.

18. I prefer to use Quick Comments providing electronic comments on student work.
19. I prefer to provide comments orally (talk/conference with the student about performance in clinical settings).
20. I prefer to provide comments through audio or video recordings.

Section 4: Measure clinical supervisors' interpretation of how feedback is used by students.

21. After reading or listening to the clinical supervisor's feedback, my students try to identify and correct their errors in performing clinical medical skills.
22. After reading or listening to the clinical supervisor's feedback, my students ask follow-up questions.
23. After reading or listening to the clinical supervisor's feedback, my students don't read or hear my feedback.
24. I don't know what my students are doing with the Feedback I offer.
25. My students understand my feedback.
26. My feedback is beneficial to my students.
27. My students use my feedback to improve their medical performance in clinical settings.
28. The time I spend giving my students feedback is worth the effort.
29. My students ask questions to clarify my feedback.
30. My students meet with me outside of clinical practice hours to receive my feedback at their request.
31. I ask my students if my feedback is helpful.

The final section: Suggestions and Recommendations.

- If you could send your students a recommendation on what to do with the feedback, what would you tell them?

(Students' version)

Consent: By clicking on this tab, I state that I agree to participate in this study. I agree that I can stop the survey at any time without giving any reason (exact wording on the first page of the survey Appendix 4 by clinical supervisor Consent Form).

Instructions: For this survey, please consider FEEDBACK as any message about your work provided by a clinical supervisor that relates to your performance in clinical settings.
Please tell me about yourself: Current year in college: 1 2 3 4

Please tell us whether you believe you are (select one): • An outstanding student (top class) • A good student • Average student • Lower average student •

Section 1: Measuring the difference between clinical supervisors' and students' perceptions of feedback understanding.

Respond to the following questions in 1-5, 1 being "Strongly disagree" and 5 beings "Strongly agree."

4. When a clinical supervisor gives me a completed rubric, I understand what I am doing in performing medical skills in clinical settings.
5. When a clinical supervisor reports my mistakes, I understand what I am doing in performing medical skills in clinical settings.
6. When a clinical supervisor makes suggestions for improvement, I understand what I am doing in performing medical skills in clinical settings.
7. When a clinical supervisor gives me a letter grade or percentage, I understand what I am doing in performing medical skills in clinical settings.
8. When a clinical supervisor points out what I am doing well, I understand what I am doing in performing medical skills in clinical settings.

9. When a clinical supervisor gives me examples of the work of another student, I understand what I am doing in performing medical skills in clinical settings. (Deleted due to
10. When the clinical supervisor tells me his / her expectations before I start working, I understand what I am doing in performing medical skills in clinical settings. (deleted because very low correlation .

Section 2: Measure clinical supervisors' and students' perceptions of feedback effectiveness

11. If I seek feedback from a clinical supervisor, I agree with what he/she says about my performance.
12. I like it when I get feedback from my clinical supervisor about my work. (Deleted because repetitive)
13. The feedback I get from my clinical supervisors makes me feel satisfied with my learning.
14. The Feedback I get from my clinical supervisors encourages me to continue to work hard.

Section 3: Measure students' preferences for different types of feedback delivery systems.

15. I prefer to receive written feedback by hand on my performance in clinical settings.
16. I prefer to receive typed, electronic comments on my performance in clinical settings.
17. I prefer to receive an email when electronic feedback is providing on my performance in clinical settings.
18. I prefer to receive Quick Comments on my performance in clinical settings.
19. I prefer to receive feedback orally (talk/conference on My performance in clinical settings).
20. I prefer to receive comments on my performance in clinical settings through audio or video recordings.

Section 4: Measure students' interpretation of how feedback was to be used by the student.

21. After reading or listening to the clinical supervisor I try to identify and correct my errors in performing clinical medical skills.
22. After reading or listening to the clinical supervisor I ask follow-up questions.
23. After reading or listening to the clinical supervisor I do not read or hear the feedback.
24. I do not know what I am doing with the feedback of my supervisors' offer.
25. I understand my supervisors' feedback.
26. I considered my supervisors' feedback is useful.
27. I use my feedback to improve my medical performance in clinical settings.
28. The time I spend understanding my clinical supervisors' feedback is worth the effort.
29. I ask questions to clarify my clinical supervisors' feedback.
30. I meet with my clinical supervisors outside of clinical practice hours to receive feedback.
31. My clinical supervisors ask me if their feedback is helpful.

The final section: Suggestions and Recommendations.

- If you could send your supervisor one suggestion on how to give you clinical feedback on your performance, what would it be?

Appendix 4.06: Interview schedule

(clinical supervisor version)

Opening statement:

My name is Mohammed ALGABGAB, and I am a postgraduate research student at Cardiff University and a staff member in the Medical Education Department at King Saud University. I am researching the perceptions of clinical feedback from emergency medical services (EMS) students and clinical supervisors, to explore any possible differences and similarities. The findings from the study will inform the college of how clinical feedback can be improved.

Introductory statement:

For this interview, please consider FEEDBACK to be any message given by a clinical supervisor on student work that communicates student progress about medical performance in clinical settings. This could include what the student is doing well, what gaps still exist in his/her learnings as well as suggestions on how to close those gaps.

At this stage, I wish to turn the tape on for recording. The recording will be transcribed. I want to assure you again that the recording will be confidential.

Recorder on

Introductory statement:

- What kind of feedback do you think is useful and why?
- What is the hardest part of giving students feedback?
- Do you find certain groups or types of students where feedback is more useful and, if so, how do you determine what type of feedback to provide a particular student?
- What was your experience with students who initiated conversations about their feedback?
- What would you like students to do with the feedback you provide to them?

- What do you think are the key elements of good feedback?
- List the three words that you associate with good clinical feedback.
- List three words that you associate with bad clinical feedback.

Ending questions:

- Are there any other points you would like to add?

Thank you very much for spending time with me in this interview. The results will be available on request. The results will also be made available to your college to help inform the best ways we can support clinical supervisors and students. I would like to reassure you that if the study published or presented you will not be identified. **Recorder off.**

(Students' version)

Opening statement:

My name is Mohammed ALGABGAB, and I am a postgraduate research student at Cardiff University and a staff member in the Medical Education Department at King Saud University. I am researching the perceptions of clinical feedback from emergency medical services (EMS) students and clinical supervisors, to explore any possible differences and similarities. The findings from the study will inform the college of how clinical feedback can be improved.

Introductory statement:

For this interview, please consider FEEDBACK to be any message given by a clinical supervisor on student work that communicates student progress about medical performance in clinical settings. This could include what the student is doing well, what gaps still exist in his/her learnings as well as suggestions on how to close those gaps.

At this stage, I wish to turn the tape on for recording. The recording will be transcribed. I want to assure you again that the recording will be confidential.

Recorder on

Introductory statement:

1. What makes feedback useful to you?
2. How do you feel when you read the feedback you receive from the clinical supervisor about your work?

Perceptions of effective feedback:

- Thinking back to the clinical feedback you have received so far during your studies; can you give an example of a particular effective feedback experience.
- What made it effective? What did the clinical supervisor do or say that made it particularly effective?
- What was the impact of this feedback on you?

- Thinking back to the clinical feedback you have received so far during your studies; can you give an example of a particular feedback experience that wasn't very good.

Perceptions of ineffective feedback

- What made it ineffective? What did the clinical supervisor do or say that made it particularly ineffective?
- What was the impact of this feedback on you?
- List the three words that you connect with good clinical feedback.
- List the three words that you connect with bad clinical feedback.

Ending questions:

Are there any other points you would like to add?

Thank you very much for spending time with me in this interview. The results will be available on request in August 2020. The results will also be made available to your college to help inform the best ways we can support clinical supervisors and students. I would like to reassure you that if the study published or presented you will not be identified. **Recorder off.**

Appendix 4.07: Ethical considerations

Ethical approval documentation from Cardiff University School of Medicine Research Ethics Committee

School of Medicine
Yr Ysgol Meddygaeth

Cardiff University
Main Building
Heath Park
Cardiff CF14 4XN
Wales, UK
Prifysgol Caerdydd
Prif Adeilad
Parc y Mynydd Bychan
Caerdydd CF14 4XN
Cymru, Y Deyrnas Unedig

Thursday 27th February 2020

Mohammed Fahad Algabgab,
MSc in Medical Education,
Postgraduate Taught Studies,
School of Medicine,
Cardiff University.

Dear Mohammed

Re: Examination of the experiences and perceptions of clinical feedback: A study at an Emergency Medical Services (EMS) college in Saudi Arabia.

SMREC Reference Number: 20/30

This application was reviewed by the Committee on Tuesday 25th February 2020.

Ethical Opinion

On review, this project was classed as a service evaluation, therefore not requiring ethical review by the School's Research Ethics Committee.

Documents Considered

Document Type:	Version:	Date Considered:
Application	11/02/2020	25/02/2020
Project Proposal	No Date or Version	25/02/2020
Appendix 1 – Gatekeeper approval	No Date or Version	25/02/2020
Appendix 2 – Clinical supervisors survey	No Date or Version	25/02/2020
Appendix 3 – Student survey	No Date or Version	25/02/2020
Appendix 4 – Interview Schedule (Clinical Supervisor)	No Date or Version	25/02/2020
Appendix 5 – Interview Schedule (Student)	No Date or Version	25/02/2020
Appendix 6 – Participant Information Sheet (Clinical Supervisor)	No Date or Version	25/02/2020
Participant Information Sheet (student)	No Date or Version	25/02/2020
Appendix 7 – Consent Form	No Date or Version	25/02/2020
Appendix 8: Study timeline	No Date or Version	25/02/2020

Yours sincerely,

Participant Information Sheet (Clinical Supervisors)

Study title Examination of the experiences and perceptions of clinical feedback: A study at an Emergency Medical Services (EMS) college in Saudi Arabia.

Invitation to participate in the study.

My name is Mohammed ALGABGAB, and I am a postgraduate student in Medical Education at Cardiff University, UK, and a staff member in the Medical Education Department at King Saud University. I am writing to invite you to take part in a study that is set to investigate clinical supervisors and students' perceptions regarding Feedback at King Saud University. The study is part of my PhD. Your participation will most valuable as it will provide King Saud University with insights into clinical supervisors and students' support needs and areas that require development concerning Feedback in Clinical settings.

Before you decide whether to take part it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

You have been chosen to participate in this study because you are currently a Clinical supervisor. It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a consent form.

If you decide to take part, you are still free to withdraw at any time and without giving a reason.
If you decide to take part in this research, Participation will involve the completion of an online anonymous questionnaire and you will be asked to supply consent to take part, and after doing this you will be able to complete the questionnaire that should take no more than 10 minutes of your time to complete. There will be also a 30 to 45-minute face to face interview with questions related to your experience about feedback in clinical settings.

I want to inform you that the interview will be audiotaped, and an anonymised transcript produced as it is crucial for analysis.
Regarding the confidentiality and the results of the research study
Please be assured that the data will be confidential, your name will not be identified, and the audiotape of the interviews will be deleted, and the anonymised transcripts used in the analysis.
All results will be presented as aggregated themes and anonymised quotations.
The data collected in this study will be used for a Postgraduate Dissertation in Medical Education. It may also be published in scientific journals or presented in conferences. Any information and data gathered during this research study will only be available to the researchers identified in this information sheet. Should the research be presented or published in any form, all data will be anonymous (i.e., your personal information or data will not be identifiable).

All identifiable paper records will be stored in a locked filing cabinet, accessible only to the researchers and all electronic information will be stored on a password-protected computer. All the information you supply will be treated under the General Data Protection Regulation (GDPR) 2018.

The Governance and Compliance Framework of Cardiff University require all non-clinical research data generated by staff and or postgraduate research projects to be

stored securely by the academic unit for no less than 5 years and at least 2 years post-publication.

The research is conducted under the supervision of Dr Michal Tombs, Senior Lecturer in Medical Education, Postgraduate Medical and Dental Education, Cardiff University (email TombsM2@cardiff.ac.uk).

Contact for Further Information

Mohammed ALGABGAB

Email: mohammed.algabgab@gmail.com

Supervisor

Dr Michal Tombs Senior Lecturer in Medical Education, Postgraduate Medical and Dental Education, Cardiff University (email: TombsM2@cardiff.ac.uk).

Participant information sheet (students)

Study title Examination of the experiences and perceptions of clinical feedback: A study at an Emergency Medical Services (EMS) college in Saudi Arabia.
Invitation to participate in the stud
My name is Mohammed ALGABGAB, and I am a postgraduate student in Medical Education at Cardiff University, UK, and a staff member in the Medical Education Department at King Saud University. I am writing to invite you to take part in a study that is set to investigate clinical supervisors and students' perceptions regarding Feedback at King Saud University. The study is part of my PhD. Your participation will most valuable as it will provide King Saud University with insights into clinical supervisors and students' support needs and areas that require development about Feedback in Clinical settings.

Before you decide whether to take part it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

You have been chosen to participate in this study because you are a student. Your experience in the past year will help us gain an understanding of the perception of clinical feedback in Emergency Medical Services (EMS).

It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time and without giving a reason.
If you decide to take part in this research, Participation will involve the completion of an online anonymous questionnaire and you will be asked to supply consent to take

part, and after doing this you will be able to complete the questionnaire that should take no more than 10 minutes of your time to complete.

There will be also a 30 to 45-minute face to face interview with questions related to your experience about feedback in clinical settings.

I want to inform you that the interview will be audiotaped, and an anonymised transcript produced as it is crucial for analysis.

Regarding the confidentiality and the results of the research study

Please be assured that the data will be confidential, your name will not be identified, and the audiotape of the interviews will be deleted, and the anonymised transcripts used in the analysis.

All results will be presented as aggregated themes and anonymised quotations.
The data collected in this study will be used for a Postgraduate Dissertation in Medical Education. It may also be published in scientific journals or presented in conferences. Any information and data gathered during this research study will only be available to the researchers identified in this information sheet. Should the research be presented or published in any form, all data will be anonymous (i.e., your personal information or data will not be identifiable).

All identifiable paper records will be stored in a locked filing cabinet, accessible only to the researchers and all electronic information will be stored on a password-protected computer. All of the information you provide will be treated under the General Data Protection Regulation (GDPR) 2018.

The Governance and Compliance Framework of Cardiff University require all non-clinical research data generated by staff and or postgraduate research projects to be

stored securely by the academic unit for no less than 5 years and at least 2 years post-publication.

The research is conducted under the supervision of Dr Michal Tombs, Senior Lecturer in Medical Education, Postgraduate Medical and Dental Education, Cardiff University (email TombsM2@cardiff.ac.uk).

Contact for Further Information

Mohammed ALGABGAB
Email: mohammed.algabgab@gmail.com

Supervisor

Dr Michal Tombs
Senior Lecturer in Medical Education, Postgraduate Medical and Dental Education, Cardiff University (email TombsM2@cardiff.ac.uk).

Introductory letter

Dear Colleague,

Thank you very much for agreeing to participate in the study into an examination of the experiences and perceptions of clinical Feedback: at the College of Emergency Medical Services. The study will contain two parts:

- on-line **anonymous questionnaire** and you will be asked to provide consent to take part, and after doing this you will be able to complete the questionnaire that should take no more than 10 minutes of your time to complete.
- There will be also a 30 to 45-minute **face to face** interview with questions related to your experience about feedback in clinical settings.

These two parts will involve discussing your experiences and perceptions of clinical Feedback. please consider FEEDBACK to be any message given by a clinical supervisor on student work that communicates student progress about medical performance in clinical settings. This could include what the student is doing well, what gaps still exist in his/her learnings as well as suggestions on how to close those gaps. Although the interview will be recorded, please be assured that it will remain confidential.

Sincerely,

Mohammed Al Gabgab

Consent form

Title of Project: Examination of the experiences and perceptions of clinical feedback: A study at an Emergency Medical Services (EMS) college in Saudi Arabia.

Name of Researcher: MOHAMMED FAHAD ALGABGAB

Please initial box

1.I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions. □

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. □

3. I agree to take part in the above study. □

Name of Participant _____

Date _____

Signature _____

Researcher Date: Signature:

MOHAMMED ALGABGAB

Chapter 5 Appendices:

Appendix 5.01: Good Reporting of a Mixed Methods Study (GRAMMS) Checklist

Section/Topic	Checklist Item	Completed (Yes/No)	Comments/Notes
Title and Abstract	Clearly identify the study as a mixed methods study. Provide a structured summary of both qualitative and quantitative components.	Yes	The study title and abstract mention the mixed methods approach and Summarise both qualitative and quantitative findings.
Introduction	Explain the rationale for using mixed methods and provide background context. Clearly state the research questions and objectives.	Yes	The rationale for using mixed methods is explained, with clear research questions and objectives outlined.
Methods			
Justification	Explain why both qualitative and quantitative methods were necessary to address the research question.	Yes	The necessity of mixed methods is discussed in the context of capturing both broad trends and in-depth insights.
Design	Describe the design of the study (e.g., sequential, concurrent, or transformative) and provide a rationale for the chosen design.	Yes	The study uses a sequential explanatory design, with a clear rationale provided for this choice.

Sampling Strategy	Describe how participants were selected for both qualitative and quantitative components.	Yes	The sampling strategy is clearly described for both components, ensuring a representative and purposeful sample.
Data Collection	Explain the methods used for data collection for both qualitative (e.g., semi-structured interviews) and quantitative (e.g., surveys) parts.	Yes	Detailed descriptions of data collection methods for both qualitative and quantitative components are provided.
Data Integration	Detail how the qualitative and quantitative data were integrated, either during data collection, analysis, or interpretation.	Yes	Data integration is discussed in terms of how qualitative findings complement and explain quantitative results.
Data Analysis	Describe the data analysis methods used for both qualitative and quantitative data and how these methods complement each other.	Yes	The data analysis methods are clearly described, showing how the qualitative and quantitative data complement each other.
Validity and Reliability	Discuss the validity and reliability of both qualitative and quantitative findings and how the integration of both enhances the study's rigor.	Yes	Validity and reliability are addressed, highlighting how the integration of methods enhances the study's rigor.
Results			
Qualitative Results	Present findings from the qualitative component with appropriate quotes or themes. Discuss how these	Yes	The qualitative results are presented with themes and quotes, providing depth and

	findings provide depth and context.		context to the study's findings.
Quantitative Results	Present findings from the quantitative component with appropriate tables, figures, or statistical summaries. Discuss how these findings provide breadth.	Yes	Quantitative findings are presented with statistical summaries, providing breadth to the study's results.
Integration of Results	Discuss how the qualitative and quantitative findings converge, diverge, or complement each other. Provide a combined interpretation of the results.	Yes	The study discusses how the findings converge and complement each other, with a combined interpretation provided.
Discussion			
Interpretation	Interpret the findings in the context of the study's objectives and research questions. Discuss the implications for practice and future research.	Yes	The findings are interpreted in the context of the study's objectives, with implications for practice and future research discussed.
Limitations	Address the limitations and strengths of the mixed methods approach.	Yes	The limitations and strengths of the mixed methods approach are addressed, acknowledging challenges and benefits.
Conclusion	Summarise the main findings and their relevance. Highlight the added value of the mixed methods approach.	Yes	The conclusion summarises the main findings and emphasises the added value of the mixed methods approach.

Funding and Conflicts of Interest	Disclose sources of funding and any potential conflicts of interest.	Yes	No potential conflicts of interest are disclosed.

Appendix 5.02: Online PFQ survey

(Clinical supervisors' Version)

Consent: By clicking on this tab, I hereby agree to participate in this study.

Instructions: This questionnaire requires you to think about the clinical feedback you have given to students during the COVID -19 Pandemic. Clinical feedback is feedback given by you, within your capacity as a clinical supervisor, to a student, commenting on the student's progress with regards to a clinical learning target. This could include what the student is doing, what gaps in his / her learning still remains, and how these gaps can be addressed.

Please tell me a little about yourself

What is your gender?

Male ( )

Female ( )

What is your age bracket? (Please tick appropriately)

18-25 years ( )

26-35 years ( )

36-45 years ( )

46-55 years ( )

Above 56 years ( )

What is your current institution and role?

• How many years/months have you been a clinical supervisor of Emergency medical service students:

____ months (please specify)

1- 5 years

6 - 10 years

11-15 years

16 - 20 years

more than 20 years

Section 1: Reflecting back to the clinical feedback you have been providing students during the COVID-19 pandemic, please indicate to what extent you agree or disagree with each statement

(1 being “Strongly disagree” and 5 being “Strongly agree”):

	Strongly Disagree **1**	**Disagree** **2**	**Neutral** **3**	**Agree** **4**	**Strongly Agree** **5**
When I submit the completed rubric to the student, they understand how they are doing in					

performing medical skills in clinical settings.					
When I report a mistake to students, they understand how they are doing in performing medical skills in clinical settings.					
When I make suggestions for improvement, my students understand what they are doing in performing medical skills in clinical settings.					
When I give my students a letter grade or percentage, they understand their performance in clinical settings.					
When I point out to students what they are doing well, they understand what they are doing in performing medical skills in clinical settings.					
9- When I give examples of the work of another student, students understand what they are doing in performing medical skills in clinical settings.					
When I tell my students what is expected of them before the clinical teaching, they understand what they are doing in performing medical skills in clinical settings.					

Section 2: Reflecting back to the clinical feedback you have been providing to students during the COVID-19 pandemic, please indicate to what extent you agree or disagree with each of the statements (1 being “Strongly disagree” and 5 being “Strongly agree”)

	Strongly Disagree **1**	**Disagree** **2**	**Neutral** **3**	**Agree** **4**	**Strongly Agree** **5**
My students agree with my feedback on their clinical practice performance.					
My students are content when I give them feedback on their clinical practice performance.					
The feedback that I give students makes them feel satisfied about their clinical practice performance.					
The feedback I offer to my students inspires them to continue working hard.					

Section 3:

Reflecting back on your experience of using the electronic system to give clinical feedback on-line during the COVID-19 pandemic, please indicate to what extent you agree or disagree with each of the statements (1 being “Strongly disagree” and 5 being “Strongly agree”).

	Strongly Disagree **1**	**Disagree** **2**	**Neutral** **3**	**Agree** **4**	**Strongly Agree** **5**
I prefer to provide comments using online platforms such as Turnitin on students’ performance at clinical settings.					
I prefer to provide typed, electronic comments on students’ work.					
I prefer to use email when providing electronic comments on students’ work.					
I prefer to use the comment section in Microsoft Office word to provide electronic comments on students’ work.					
I prefer to provide comments concerning the student’s performance in clinical settings via online video calls.					

I prefer to provide comments to students online through audio recordings.					

Section 4: Reflecting back on your experience of providing clinical feedback to students during the COVID 19 pandemic, please indicate the extent to which you believe your feedback was interpreted (1 being “Strongly disagree” and 5 being “Strongly agree”).

	Strongly Disagree **1**	**Disagree** **2**	**Neutral** **3**	**Agree** **4**	**Strongly Agree** **5**
After reading or listening to my clinical feedback, students try to identify and correct their errors in performing clinical medical skills.					
After receiving, reading or listening to my feedback, students ask follow-up questions.					
After receiving, reading or listening to my feedback, students don’t understand what to do with the online feedback given.					

I don’t know what my students are doing with the Feedback I offer.					
My students understand my feedback that is given via electronic means.					
My clinical feedback is beneficial to my students.					
My students use my clinical feedback to improve their medical performance in clinical settings					
The time I spend giving my students feedback using online platforms is worth the effort.					
My students ask questions to clarify the online feedback I provide					
3I survey whether my online feedback is helpful to my students					

The final section: Suggestions and recommendations.

What suggestions would you have for clinical feedback to be improved at these challenging times?

Do you have anything you would like to tell us about the way in which clinical feedback has been provided during the Covid-19 pandemic? If so, please tell us more in this space.

Invitation to participate in the interview: 'Clinical feedback during the Covid-19 pandemic: A study of clinical supervisor' and students' perceptions at Emergency Medical Services (EMS) colleges in Saudi Arabia'.

Dear clinical supervisor(s)

I am conducting interviews as part of my PhD research to expand our understanding of the perceptions of Clinical feedback provided during the COVID-19 pandemic. As an experienced clinical supervisor, you are in an ideal position to provide valuable firsthand data from your own perspective.

The interview is very informal and consumes around 30-45 min. It is designed to capture your thoughts and perspectives concerning the feedback you provided to students during the pandemic. Your responses will remain confidential. Code numbers will be attached to each interview to ensure that no personal identifiers are collected or disclosed during analysis and findings' write-up.

No compensation was provided for this study. However, you participation will offer valuable data thus informing the college of the way in which online clinical feedback can be improved and aim to inform the development of a set of national guidelines.

If you are willing to take part, please click on this link for an online booking form (a link will be provided). Please write down the date and timeline that suits you and I will do my best to make it available. Because of COVID19 pandemic, the interview will be conducted online for your safety. Please choose the popular online voice application such as ZOOM, SKYPE AND GOOGLE DUE or other preferences. Please do not hesitate to ask any questions. Thank you.

(Students' survey Version)

Consent: By clicking on this tab, I state that I agree to participate in this study here.

Instructions:

This questionnaire requires you to think about the clinical feedback you received during the COVID -19 Pandemic. Clinical feedback is feedback given to you by a clinical supervisor commenting on your work that expresses your progress with regards to a clinical learning target or a practical skill. This could include what you were doing, what gaps in your learning still remain, and how these gaps can be addressed.

Please tell us whether you believe you are (please tick appropriately):

• An outstanding student (top class) ( )

• A good student ( )

• Average student ( )

• Lower average student ( )

Which is your study institution?

Please specify your current year of study?

Have you had any experience of receiving clinical feedback in person by a clinical supervisor before the COVID-19 pandemic?

Yes ( )

No ( )

Section 1: Reflecting back to the clinical feedback you were provided during the COVID-19 pandemic, please indicate to what extent you agree or disagree with each statement (1 being “Strongly disagree” and 5 being “Strongly agree”)

	Strongly Disagree **1**	**Disagree** **2**	**Neutral** **3**	**Agree** **4**	**Strongly Agree** **5**
When a clinical supervisor sends me a completed rubric, I understand what I am doing in performing medical skills in clinical settings.					
When a clinical supervisor reports my mistakes, I understand what I am doing in performing medical skills in clinical settings.					
When a clinical supervisor makes suggestions for improvement, I understand what I am doing in performing medical skills in clinical settings.					
When a clinical supervisor gives me a letter grade or percentage, I understand what I am doing in performing medical skills in clinical settings.					

When a supervisor points out that I am doing well, I understand what I am doing in performing medical skills in clinical settings.					
When a clinical supervisor sends me examples of the work of another student, I understand what I am doing in performing medical skills in clinical settings.					
When the clinical supervisor tells me his / her expectations, I start working, I understand what I am doing in performing medical skills in clinical settings.					

Section 2: Reflecting back to the clinical feedback you were provided during the COVID-19 pandemic, please indicate to what extent you agree or disagree with each of the statements. (1 being “Strongly disagree” and 5 being “Strongly agree”)

	Strongly Disagree **1**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree** **5**

		2	**3**	**4**	
When I receive feedback from a clinical supervisor, I agree with what he / she says about my performance.					
I like it when I get feedback from my clinical supervisor about my work.					
The feedback I get from my clinical supervisors makes me feel satisfied about my learning.					
The Feedback I get from my clinical supervisors encourages me to continue to work hard.					

Section 3: Reflecting back on your experience of using the electronic system to give clinical feedback on-line during the COVID-19 pandemic, please indicate to what extent you agree or disagree with each of the statements (1 being “Strongly disagree” and 5 being “Strongly agree”)

	Strongly Disagree **1**	**Disagree** **2**	**Neutral** **3**	**Agree** **4**	**Strongly Agree** **5**
I prefer receiving online feedback comments through online platforms such as Turnitin regarding my performance at clinical settings.					
I prefer to receive online feedback via typed, electronic comments on my work and performance at clinical settings.					
I prefer to receive online feedback through email when electronic feedback is providing on my performance at clinical settings.					
I prefer to receive online feedback via the comment section in Microsoft Office word to evaluate my performance at clinical settings.					
I prefer to receive online feedback comments concerning my performance in clinical settings via online video calls).					

I prefer to receive online feedback comments regarding my performance or work through audio recordings.					
When the supervisor sends me online feedback, I understand what is expected of me in clinical settings.					

Section 4: Reflecting back on the clinical feedback given to you by your supervisors during the COVID 19 pandemic, please indicate the extent to what extent you agree or disagree with each of the following statements (1 being “Strongly disagree” and 5 being “Strongly agree”).

	Strongly Disagree **1**	**Disagree** **2**	**Neutral** **3**	**Agree** **4**	**Strongly Agree** **5**
After receiving, reading or listening to the clinical supervisor I try to identify and correct my					

errors in performing clinical medical skills.					
After receiving, reading or listening to the clinical supervisor's feedback, I ask follow-up questions.					
After receiving, reading or listening to the supervisor's feedback, I don't understand what to do with the online feedback given.					
I don't know what I am doing with the Feedback my supervisors' offer.					
I understand my supervisors' feedback.					
I consider my supervisors' feedback is useful.					
I use my feedback to improve my medical performance in clinical settings					
The time I spend understanding my clinical supervisors' feedback is worth the effort.					
I ask questions to clarify my clinical supervisors' feedback					

My clinical supervisors ask me if their feedback is helpful.					
I engage with my clinical supervisors outside of clinical practice hours to receive feedback.					

The final section: Suggestions and Recommendations.

What suggestions would you have for clinical feedback to be improved at these challenging times?

Do you have anything you would like to tell us about the way in which clinical feedback has been provided during the Covid-19 pandemic? If so, please tell us more in this space.

Invitation to participate in the interview: 'Clinical feedback during the Covid-19 pandemic: A study of clinical supervisor' and students' perceptions at Emergency Medical Services (EMS) colleges in Saudi Arabia'.

Dear student(s)

I am conducting interviews as part of my PhD research to expand understanding of the perceptions of Clinical feedback provided during the COVID-19 pandemic. As a student, you are in an ideal position to provide valuable first hand data from your own perspective.

The interview is very informal and consumes around 30-45 min. It is designed to capture your thoughts and perspectives concerning the feedback provided during the pandemic. Your responses including questions will remain confidential. Code

numbers will be attached to each interview to ensure that no personal identifiers are collected or disclosed during analysis and findings' write-up.

No compensation was provided for this study. However, you participation will offer valuable data thus informing the college of the way in which online clinical feedback can be improved and aim to inform the development of a set of national guidelines.

When you're willing to take part. Click on this link for an online booking form (a link will be provided) Please write down the date and timeline that suits you and I'm going to do my best to make it available. Because of COVID19 pandemic, the interview will be conducted online for your safety. Please choose the popular online voice application such as ZOOM, SKYPE AND GOOGLE DUE or other preferences. Please do not hesitate to ask any questions Thanks

Appendix 5.03: Interview schedule

(Clinical supervisors' version)

Opening statement:

My name is Mohammed ALGABGAB, and I am a postgraduate research student at Cardiff University and a staff member in the Medical Education Department at King Saud University. I am conducting research on EMS students' and clinical supervisors' perspectives concerning clinical feedback given during the pandemic to explore possible challenges and best practices that can be taken forward. The findings from the study will inform the college of the way in which online clinical feedback can be improved and aim to inform the development of a set of national guidelines.

Introductory statement:

For the purpose of this interview, please consider CLINICAL FEEDBACK as you have provided it to students during the COVID 19 pandemic, which may be on-line or may be adjusted with social distancing rules applied. Clinical feedback refers to any feedback you have given within your role as a clinical supervisor on student work with regards to student progress and medical performance in clinical settings. This could include what the student is doing well, what gaps still exist in his/her performance as well as suggestions on how to close those gaps.

At this stage, I wish to turn the tape on for recording. The recording will be transcribed. I want to assure you again that the recording will be confidential.

Recorder on

Introductory statement:

Reflecting back to the past few months of your role as a clinical supervisor or as a faculty member, in what way did the pandemic impact your work?

What did you have to do differently?

How did you cope with the changes that took place?

Do you think that students' expectations of clinical feedback were met? Please provide examples and details.

What were you able to do as a clinical supervisor to ensure that the students' needs were met and how did you provide them with clinical feedback?

With these changes in place, have you come across any challenges or barriers to providing clinical feedback to your students? Please provide some examples and detail.

Reflecting back on your experiences as a clinical supervisor during the pandemic, what suggestions you may have on how clinical feedback can be improved in the current situation?

Reflecting back on your experiences as a clinical supervisor during the pandemic have you observed any good practices and examples of clinical feedback that can be carried forward once face to face teaching can be resumed.

If you had to describe in three words your experience of providing clinical feedback during the pandemic, what would they be?

Ending questions:

Are there any other points you would like to add?

Thank you very much for spending your time with me in this interview. The results will be available on request starting August 2021. The results will also be made available to the College in a report format in order to help inform the best ways we

can support clinical supervisors and students through these challenging time in clinical education. Once again, I would like to reassure you that confidentiality will be maintained throughout. **Recorder off.**

(Students' version)

Opening statement:

My name is Mohammed ALGABGAB, and I am a postgraduate research student at Cardiff University and a staff member in the Medical Education Department at King Saud University. I am conducting research on EMS students' and clinical supervisors' perspective concerning clinical feedback given during the pandemic to explore possible challenges and best practices that can be taken forward. The findings from the study will inform the college of the way in which online clinical feedback can be improved and aim to inform the development of a set of national guidelines.

Introductory statement:

For the purpose of this interview, please consider CLINICAL FEEDBACK to be any message given by a clinical supervisor during the COVID 19 pandemic, which may be on-line or may be adjusted with social distancing rules applied. Clinical feedback refers to any feedback you have given within your role as a clinical supervisor on student work with regards to student progress and medical performance in clinical settings. This could include what the student is doing well, what gaps still exist in his/her performance as well as suggestions on how to close those gaps.

At this stage, I wish to turn the tape on for recording. The recording will be transcribed. I want to assure you again that the recording will be confidential.

Recorder on

Reflecting back to the past few months of your, in what way did the pandemic impacted your studies?

Reflecting back to the past few months, in what way did the pandemic impacted you in the way which you received clinical feedback?

What was done differently?

How did you cope with the changes that took place?

Do you think that your expectations of clinical feedback were met? Please provide examples and detail.

What were you able to do as a student to ensure that your needs were met and in how was clinical feedback provided?

With these changes in place, have you come across any challenges or barriers to receiving clinical feedback from your clinical supervisor? Please provide some examples and detail.

Reflecting back on your experiences as a student during the pandemic, what suggestions you may have on how clinical feedback can be improved in the current situation?

Reflecting back on your experiences as a student during the pandemic have you observed any good practices and examples of clinical feedback that can be carried forward once face to face teaching can be resumed.

If you had to describe in three words your experience of receiving clinical feedback during the pandemic, what would they be?

Ending questions:

Are there any other points you would like to add?

Thank you very much for spending your time with me in this interview. The results will be available on request starting August 2021. The results will also be made available to the College in a report format in order to help inform the best ways we can support clinical supervisors and students through these challenging times in

clinical education. Once again, I would like to reassure you that confidentiality was maintained throughout.

Recorder off

Appendix 5.04 Ethical considerations

Ethical approval documentation from Cardiff University School of Medicine Research Ethics Committee

School of Medicine
Yr Ysgol Meddygaeth

Cardiff University
Main Building
Heath Park
Cardiff CF14 4XN
Wales, UK
Prifysgol Caerdydd
Prif Adeilad
Parc y Mynydd Bychan
Caerdydd CF14 4XN
Cymru, Y Deyrnas Unedig

Thursday 26th November 2020

Mohammed Algabgab
Centre for Medical Education
School of Medicine
Cardiff University

Dear Mohammed

Research project title: Clinical feedback during the COVID-19 pandemic: A study of clinical supervisors' and students' perceptions at Emergency Medical Services (EMS) colleges in Saudi Arabia
SREC reference: SMREC 20/109

The School of Medicine Research Ethics Committee ('Committee') reviewed the above application electronically on Wednesday 18th November 2020.

Ethical Opinion
The Committee gave a favourable ethical opinion of the above application on the basis described in the application form, protocol and supporting documentation, **subject to the conditions** specified below.

Conditions of the favourable opinion
The favourable opinion is subject to the following conditions being met prior to the start of the research project.

1. Ensure that data retention for this study complies with the University's data retention schedule. For non-clinical studies, study data must be stored for a minimum of 5 years or 2 years post-publication.
2. Ensure that dates and version numbers are included as footers on all participant facing documents.
3. Proofread the Participant Information sheet for formatting inconsistencies and typos.
4. Review and amend Professor Steve Riley's titles on the Participant Information Sheet as he is now Head of the School of Medicine and Dean of Medical Education.
5. Remove the answer "Yes" from question 5 on the Participant Information Sheet. As there's a prize draw, there is a higher likelihood of not being paid.
6. Confirm the data storage arrangements in point 8.1 of the application form.

Whilst the Committee does not propose to conduct a further review of your application/revised research project documents following implementation of the conditions above, you should notify the Committee once all conditions have been met and provide copies of any revised documentation with updated version numbers before the research commences.

Additional approvals
This letter provides an ethical opinion only. You must not start your research project until all appropriate approvals are in place.

Amendments
Any substantial amendments to documents previously reviewed by the Committee must be submitted to the Committee via email to Claire Evans (EvansCR9@cardiff.ac.uk) for consideration and cannot be implemented until the Committee has confirmed it is satisfied with the proposed amendments.

You are permitted to implement non-substantial amendments to the documents previously reviewed by the Committee but you must provide a copy of any updated documents to the Committee via email to Claire Evans (EvansCR9@cardiff.ac.uk) for its records.

Monitoring requirements
The Committee must be informed of any unexpected ethical issues or unexpected adverse events that arise during the research project. In addition to this, the Committee request an end of project report sent to the Committee via email to Claire Evans (EvansCR9@cardiff.ac.uk). This must be sent along with confirmation that your research project has ended and sent within the three months of the research project completion.

Participant Information Sheet (Clinical Supervisors)

Clinical feedback during the COVID-19 pandemic: A study of clinical supervisor' and students' perceptions at Emergency Medical Services (EMS) colleges in Saudi Arabia.

You are being invited to take part in a research project. Before you decide whether or not to take part, it is important for you to understand why the research is being undertaken and what it will involve. Please take time to read the following information carefully and discuss it with others, if you wish.

Thank you for reading this.

1. What is the purpose of this research project?

My name is Mohammed ALGABGAB and I am a postgraduate medical education research student at Cardiff University, UK, and a member of the Medical Education Department at King Saud University. I am writing to invite you to take part in a study to investigate the perceptions of EMS students and clinical supervisors about clinical feedback given during the COVID-19 pandemic. The study is part of my PhD research. The findings of the study will inform colleges of how online clinical feedback can be improved and will inform the development of a set of national guidelines.

2. Why have I been invited to take part?

You have been invited because you are currently a Clinical supervisor and have experienced both feedback methods, pre and during the Covid-19 pandemic. Your experience concerning the shift from the traditional clinical to online feedback methods will help us gain an understanding of the effectiveness of clinical feedback methods in Emergency Medical services (EMS) during the pandemic.

3. Do I have to take part?

Your participation in this research project is entirely voluntary and it is up to you to decide whether or not to participate. If you decide to participate, we will discuss the research project with you and ask you to sign the consent form. If you decide not to take part, you do not have to explain your reasons. Your participation in this research project will have no impact on your education or career.

You are free to withdraw your consent to participate in the research project at any time, without giving any reason, even after signing the consent form. However, due to the anonymous nature of the questionnaire, this will not be possible once it has been completed.

4. What will participation involve?

Participation will involve the completion of an anonymous online questionnaire and you will be asked to give your consent to participate, and after doing so you will be able to complete a questionnaire that should take no more than 10 minutes of your time to complete.

You will be invited to take part in an interview at the end of the questionnaire. This can be done face to face or online and can be done at a time convenient for you. The interview will take approximately 30 to 45 minutes to complete and will ask you about your experience of feedback in clinical settings during the pandemic. The interview will be audiotaped, and an anonymous transcript will be produced as crucial to the analysis.

5. Will I be paid for taking part?

No

6. What are the possible benefits of taking part?

Your participation is most valuable because it will provide insight into how clinical feedback has changed and been provided during these challenging times. It will provide the basis for the development of a set of recommendations and guidelines at the institutional and national level as a result of the participation of several Emergency Medicine Services institutions in the study.

7. What are the possible risks of taking part?

There are no possible risks of participating in this study. Data collection will be carried out in accordance with the national guidelines on the pandemic, and your safety will be assured throughout. Please be assured that the data will be confidential, that your name will not be identified and that the audio tape of the interviews will be converted into anonymised transcripts to be used in the analysis.

8. Will my taking part in this research project be kept confidential?

All information collected from or about) you during the research project will be kept confidential and all personal information you provide will be managed in accordance with data protection legislation.

9. What will happen to my Personal Data?

The data collected in this study will be used for a PhD in Medical Education. It may also be published in scientific journals or presented in conferences. Any information and data gathered during this research study will only be available to the researchers identified in this information sheet. Should the research be presented or published in any form, **all data will be anonymous** (i.e., your personal information or data will not be identifiable).

The Governance and Compliance Framework of Cardiff University requires all non-clinical research data generated by staff and or postgraduate research projects to be stored securely by the academic unit for a period of a minimum of 5 years or 2 years post-publication

10. What happens to the data at the end of the research project?

All identifiable paper records will be stored in a locked filling cabinet, accessible to researchers only and all electronic information will be stored on a password-protected computer. All information you provide will be treated in accordance with the General Data Protection Regulation (GDPR) 2018.

11. **What will happen to the results of the research project?**

The results will be available on request from August 2021 onwards. The results will also be made available to the Colleges to help inform the best ways in which clinical supervisors and students can be supported by improving online feedback. I would like to assure you that you will not be identified if the study was published or presented.

12. What if there is a problem?

If you have any problems, please contact me as a primary researcher. You may also wish to contact my supervisors, Dr Michal Tombs or Professor Steve Riley, if you wish to make a complaint or if you feel that your problem has not been addressed.

13. Who is organising and funding this research project?

The research is organised by myself and my supervisors who are based at the centre for Medical Education, Cardiff University.

14. Who has reviewed this research project?

This research project has been reviewed and given a favorable opinion by the Research Ethics Committee of the School of Medicine, University of Cardiff. The

research will be conducted under the supervision of Dr. Michal Tombs and Professor Steve Riley.

Further information and contact details Contact for Further Information

Mohammed ALGABGAB

Email: ALGABGABMF@Cardiff.acuk

Supervisors:

Dr Michal Tombs

Reader in Medical Education, Centre for Medical Education, Cardiff University (email TombsM2@cardiff.ac.uk).

Professor Steve Riley

Head of the School of Medicine and Dean of Medical Education., Cardiff University (email rileysg@cardiff.ac.uk).

Thank you for considering taking part in this research project.

Participant information sheet (students)

Clinical feedback during the COVID-19 pandemic: A study of clinical supervisor' and students' perceptions at Emergency Medical Services (EMS) colleges in Saudi Arabia.

You are invited to take part in a research project. Before you decide whether or not to participate, it is important for you to understand why the research is being carried out and what it will involve. Please take the time to read the following information carefully and if you wish, discuss it with others. Thank you so much for reading this.

1. **What is the purpose of this research project?**

My name is Mohammed ALGABGAB and I am a postgraduate research student in Medical Education at Cardiff University, UK and a staff member in the Medical Education Department at King Saud University. I am writing to invite you to take part in a study that is set to investigate EMS students' and clinical supervisors' perspective concerning perceptions of clinical feedback given during COVID-19 pandemic. The study forms part of my PhD research. The findings from the study will inform colleges of the way in which clinical feedback can be improved and aim to inform the development of a set of national guidelines.

2. **Why have I been invited to take part?**

You have been invited because you are currently a student and you've experienced both the pre and post-pandemic feedback methods. Your experience in moving from traditional clinical to online feedback methods will help us understand the effectiveness of clinical feedback methods in emergency medical services (EMS) during the pandemic.

3. **Do I have to take part?**

Your participation in this project is entirely voluntary and it is up to you to decide whether or not to participate. If you decide to participate, we will discuss the research project with you and ask for your consent. If you decide not to take part, you do not have to explain your reasons and your rights will not be affected. Your participation in this research project will have no impact on your education or career.

You are free to withdraw your consent to participate in the research project at any time, without giving any reason, even after signing the consent form. However, due to the anonymous nature of the questionnaire, this will not be possible once it has been completed.

4. **What will taking part involve?**

Participation will involve the completion of an anonymous online questionnaire and you will be asked to give your consent to participate. The questionnaire should take no more than 10 minutes to complete. The questionnaire should take no more than 10 minutes to complete.

You will be invited to take part in an interview at the end of the questionnaire. This can be done face to face or online and can be done at a time convenient for you. This interview will take 30 to 45 minutes to answer questions related to your experience of feedback in clinical settings. The interview will be audiotaped, and an anonymous transcript will be produced as crucial to the analysis.

5. **Will I be paid for taking part?**

No

6. **What are the possible benefits of taking part?**

Your participation is most valuable because it will provide insight into how clinical feedback has changed and been provided during these challenging times. It will provide the basis for the development of a set of recommendations and guidelines at the institutional and national level as a result of the participation of several Emergency Medicine Services institutions in the study.

7. **What are the possible risks of taking part?**

There are no possible risks of participating in this study. Data collection will be conducted in accordance with the national guidelines for the pandemic, and your safety will be assured throughout. Please be assured that the data will be confidential, that your name will not be identified and that the audio tape of the interviews will be converted into anonymised transcripts to be used in the analysis.

8. **Will my taking part in this research project be kept confidential?**

All information collected from or about) you during the research project will be kept confidential and all personal information you provide will be managed in accordance with data protection legislation.

9. **What will happen to my Personal Data?**

The data collected in this study will be used for research purposes (PhD) in Medical Education. It may also be published in scientific journals or presented in conferences. Any information and data gathered during this research study will only be available to the researchers identified in this information sheet. Should the research be presented or published in any form, **all data will be anonymous** (i.e., your personal information or data will not be identifiable)

The Governance and Compliance Framework of Cardiff University requires all non-clinical research data generated by staff and or postgraduate research projects to

be stored securely by the academic unit for a period of a minimum of 5 years or 2 years post-publication

10. What happens to the data at the end of the research project?

All identifiable paper records will be stored in a locked filling cabinet, accessible to researchers only and all electronic information will be stored on a password-protected computer. All information you provide will be treated in accordance with the General Data Protection Regulation (GDPR) 2018.

11. What will happen to the results of the research project?

The results will be available on request from August 2021 onwards. The results will also be made available to the Colleges to help inform the best ways in which clinical supervisors and students can be supported by improving online feedback. I would like to assure you that you will not be identified if the study were published or presented.

12. What if there is a problem?

If you have any problems, please contact me as a primary researcher. You may also wish to contact my supervisors, Dr Michal Tombs or Professor Steve Riley, if you wish to make a complaint or if you feel that your problem has not been addressed.

13. Who is organising and funding this research project?

The research is organised by myself and my supervisors, who are based at the Centre for Medical Education, Cardiff University.

14. Who has reviewed this research project?

This research project has been reviewed and given a favourable opinion by the School of Medicine's Research Ethics Committee, Cardiff University. The research is conducted under the supervision of Dr Michal Tombs, and Professor Steve Riley.

Further information and contact details Contact for Further Information

Mohammed ALGABGAB

Email: ALGABGABMF@cardiff.ac.uk

Supervisors

Dr Michal Tombs,

Reader in Medical Education, Centre for Medical Education, Cardiff University (email TombsM2@cardiff.ac.uk).

Professor Steve Riley

Head of the School of Medicine and Dean of Medical Education., Cardiff University (email rileysg@cardiff.ac.uk).

Thank you for considering taking part in this research project.

Introductory letter

Dear Colleague,

Thank you very much for agreeing to participate in the study to explore possible challenges and best practices of clinical feedback during the Covid-19 Pandemic.. The study will contain two parts:

online anonymous questionnaire and you will be asked to provide consent to take part, and after doing this you will be able to complete the questionnaire that should take no more than 10 minutes of your time to complete.

There will be also a 30 to 45-minute face to face interview with questions related to your experience about feedback in clinical settings.

These two parts will involve discussing your experiences and perceptions of clinical Feedback. please consider CLINICAL FEEDBACK to be any message given by a clinical supervisor during the COVID 19 pandemic, which may be on-line or may be adjusted with social distancing rules applied. Clinical feedback refers to any feedback you have given within your role as a clinical supervisor on student work with regards to student progress and medical performance in clinical settings. This could include what the student is doing well, what gaps still exist in his/her performance as well as suggestions on how to close those gaps.

Sincerely,

Mohammed Al Gabgab

Consent form

Title of research project **Clinical feedback during the COVID-19 pandemic: A study of clinical supervisor' and students' perspective at Emergency Medical Services (EMS) colleges in Saudi Arabia.**

Name of Chief/Principal Investigator MOHAMMED FAHAD ALGABGAB

	Please initial box
I confirm that I have read the information sheet dated version for the above research project.	
I confirm that I have understood the information sheet dated [10-11-2020] version [2] for the above research project and that I have had the opportunity to ask questions and that these have been answered satisfactorily.	
I understand that my participation is voluntary, and I am free to withdraw at any time without giving a reason and without any adverse consequences (e.g. to medical care or legal rights, if relevant).	
I understand that such information will be held in accordance with all applicable data protection legislation and in strict confidence, unless disclosure is required by law or professional obligation.	

I understand who access to personal information will have provided, how the data will be stored and what will happen to the data at the end of the research project.	
I understand that it will not be possible to identify me from this data that is seen and used by other researchers, for ethically approved research projects, on the understanding that confidentiality will be maintained.	
I consent to being audio recorded and I understand how it will be used in the research.	
I understand that anonymised excerpts and/or verbatim quotes from my [INTERVIEW/QUESTIONNAIRE ETC] may be used as part of the research publication.	
I understand how the findings and results of the research project will be written up and published.	
I agree to take part in this research project.	

Name of participant (print)	Date	Signature

Appendix 5.05: Exploratory Factor Analysis (EFA).

Exploratory Factor analysis (EFA)

Factor Loadings

	Factor				
	1	2	3	4	Uniqueness
PFU1	0.782				0.340
PFU2	0.823				0.358
PFU3	0.938				0.256
PFU4	0.674				0.545
PFU5	0.759				0.216
PFU7	0.730				0.363
PFE1	0.440			0.390	0.347
PFE2	0.468		0.418		0.426
PFE3	0.626			0.307	0.292
PFE6	0.770				0.301
PFI1	0.373			0.408	0.457
PFI2			0.908		0.145
PFI3		0.331		0.398	0.702
PFI8	0.564			0.333	0.382
PFP1		0.818			0.312
PFP2		0.834			0.269
PFP3		0.640	0.315		0.352

Note. ‘Principal axis factoring’ extraction method was used in combination with a ‘oblimin’ rotation

Factor	SS Loadings	% of Variance	Cumulative %
1	6.02	35.40	35.4
2	2.08	12.25	47.7
3	1.71	10.08	57.7
4	1.12	6.60	64.3

Kaiser-Meyer-Olkin (KMO) Measure and Bartlett's Test

KMO Measure of Sampling Adequacy

	MSA
Overall	0.896
PFU1	0.921
PFU2	0.911
PFU3	0.893
PFU4	0.882
PFU5	0.949
PFU7	0.933
PFE1	0.945
PFE2	0.899
PFE3	0.914
PFE6	0.928
PFI1	0.914
PFI2	0.689

KMO Measure of Sampling Adequacy

	MSA
PFI3	0.870
PFI8	0.934
PFP1	0.794
PFP2	0.770
PFP3	0.685

Kaiser-Meyer-Olkin (KMO) Measure and Bartlett's Test

Bartlett's Test of Sphericity

χ^2	df	p
4284	136	<.001

Appendix 5.06: Confirmatory Factor analysis (CFA).

Model fit

Chi-square test

Model	X^2	df	p
Baseline model	2540.159	78	
Factor model	275.094	59	< .001

Note. The estimator is ML.

Additional fit measures

Fit indices

Index	Value
Comparative Fit Index (CFI)	0.912
Tucker-Lewis Index (TLI)	0.884
Bentler-Bonett Non-normed Fit Index (NNFI)	0.884
Bentler-Bonett Normed Fit Index (NFI)	0.892
Parsimony Normed Fit Index (PNFI)	0.674
Bollen's Relative Fit Index (RFI)	0.857
Bollen's Incremental Fit Index (IFI)	0.913
Relative Noncentrality Index (RNI)	0.912

Information criteria

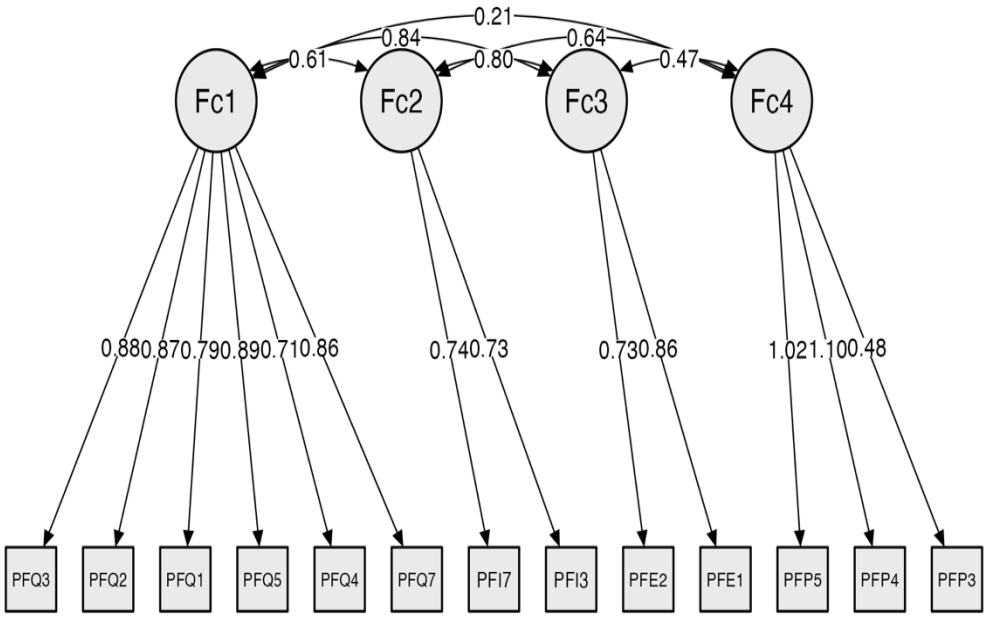
	Value
Log-likelihood	-6371.005
Number of free parameters	45.000

Information criteria

	Value
Akaike (AIC)	12832.011
Bayesian (BIC)	13008.842
Sample-size adjusted Bayesian (SSABIC)	12866.068

Other fit measures

Metric	Value
Root mean square error of approximation (RMSEA)	0.099
RMSEA 90% CI lower bound	0.087
RMSEA 90% CI upper bound	0.111
RMSEA p-value	1.808×10^{-11}
Standardised root mean square residual (SRMR)	0.045
Hoelter's critical N (α = .05)	107.516
Hoelter's critical N (α = .01)	120.138
Goodness of fit index (GFI)	0.982
McDonald fit index (MFI)	0.750
Expected cross validation index (ECVI)	0.971


0.21
0.84
0.64
0.61
0.80
0.47
Fc1
Fc2
Fc3
Fc4
0.88
0.87
0.79
0.89
0.71
0.86
0.74
0.73
0.73
0.86
1.02
1.10
0.48
PFQ3
PFQ2
PFQ1
PFQ5
PFQ4
PFQ7
PFI7
PFI3
PFE2
PFE1
PFP5
PFP4
PFP3

Chapter 6 Appendices:

Appendix 6.01: Reporting Standards: CREDES (Criteria for Reporting Delphi Studies)

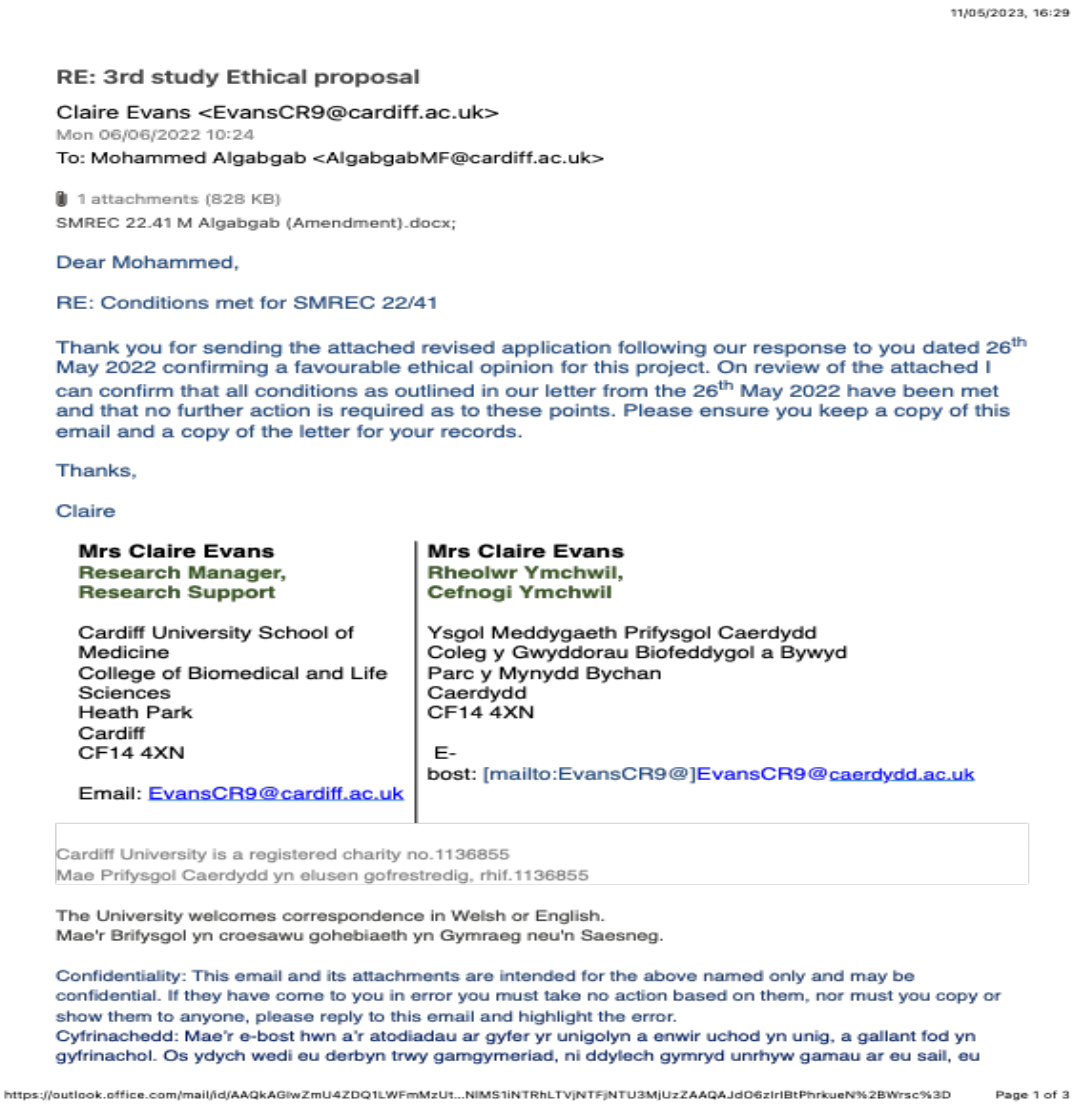
Section/Topic	Checklist Item	Completed (Yes/No)	Comments/Notes
1. Title and Abstract	The title clearly indicates the use of a Delphi study. Abstract summarises the background, methods, results, and conclusions.	Yes	The title clearly reflects the Delphi study design, and the abstract provides a concise summary of the study's background, methods, results, and conclusions.
2. Introduction	Provides background information on clinical feedback in EMS education. States the objectives and rationale for using the Delphi method.	Yes	The introduction gives comprehensive background information and clearly states the objectives and the rationale for choosing the Delphi method, especially due to COVID-19 constraints.
3. Methods	**Design:** Describes the modified Delphi methodology and the three-round process.	Yes	The design section clearly describes the modified Delphi process, including the rationale for choosing this method and the structure of the three rounds.

	Participants: Details the selection criteria, number, and characteristics of the expert panel.	Yes	The selection criteria, number, and characteristics of the expert panel are detailed, enhancing transparency and understanding of the panel's expertise.
	Procedure: Explains the development and distribution of questionnaires, including thematic analysis and consensus measurement.	Yes	The procedure section explains the iterative development and distribution of the questionnaires, including how thematic analysis was conducted and consensus measured.
	Data Collection and Analysis: Outlines how responses were collected and analysed, with a focus on achieving consensus.	Yes	Details on data collection and analysis are provided, with a clear explanation of how consensus was achieved through the Delphi rounds.
4. Results	Presents findings from each round. Includes response rates and consensus levels for each item. Uses tables and	Yes	The results section presents the findings from each Delphi round, including response rates and consensus levels,

	figures to illustrate results.		supported by tables and figures for clarity.
5. Discussion	Interprets the results in the context of study objectives. Discusses implications, limitations, and suggestions for future research.	Yes	The discussion interprets the results within the context of the study's objectives, addressing implications for EMS education, limitations of the Delphi method, and future research directions.
6. Conclusions	Summarises main findings and their relevance to EMS education in Saudi Arabia.	Yes	The conclusions effectively Summarise the main findings and their relevance, emphasising the importance of the Delphi method in shaping EMS education strategies.
7. References	Includes relevant literature and sources cited throughout the study.	Yes	References are comprehensive and relevant, ensuring that all sources are appropriately cited.
8. Ethical Considerations	Describes ethical approvals, informed consent, and data protection measures.	Yes	Ethical considerations are thoroughly addressed, with details on approvals, informed consent, and data protection measures.
9. Appendices	Provides additional materials such as interview schedules,	Yes	Appendices include all relevant supplementary materials, such as

	survey questions, and detailed qualitative analysis.		interview schedules and survey questions, enhancing the transparency and replicability of the study.

Appendix 6.02: Ethical approval documentation from Cardiff University School of Medicine Research Ethics Committee.



11/05/2023, 16:29

RE: 3rd study Ethical proposal

Claire Evans <EvansCR9@cardiff.ac.uk>
Mon 06/06/2022 10:24
To: Mohammed Algabgab <AlgabgabMF@cardiff.ac.uk>

1 attachments (828 KB)
SMREC 22.41 M Algabgab (Amendment).docx;

Dear Mohammed,

RE: Conditions met for SMREC 22/41

Thank you for sending the attached revised application following our response to you dated 26th May 2022 confirming a favourable ethical opinion for this project. On review of the attached I can confirm that all conditions as outlined in our letter from the 26th May 2022 have been met and that no further action is required as to these points. Please ensure you keep a copy of this email and a copy of the letter for your records.

Thanks,

Claire

Mrs Claire Evans
Research Manager,
Research Support

Cardiff University School of Medicine
College of Biomedical and Life Sciences
Heath Park
Cardiff
CF14 4XN

Email: EvansCR9@cardiff.ac.uk

Mrs Claire Evans
Rheolwr Ymchwil,
Cefnogi Ymchwil

Ysgol Meddygaeth Prifysgol Caerdydd
Coleg y Gwyddorau Biofeddygol a Bywyd
Parc y Mynydd Bychan
Caerdydd
CF14 4XN

E-bost: [mailto:EvansCR9@]EvansCR9@caerdydd.ac.uk

Appendix 6.03: Interview schedule (Round 1)

Opening statement:

My name is Mohammed ALGABGAB, and I am a postgraduate research student at Cardiff University and a member of the Medical Education Department at King Saud University. I am currently conducting research on the perspectives of EMS experts regarding their perceptions of training and development needs in the area of clinical feedback. I am also obtaining expert opinions on the development of a standardised handbook and a set of clinical feedback instructions, and on how to manage continuous support and quality assurance for clinical feedback. The study's findings should thus aid in the construction of a manual and a set of clinical feedback instructions, as well as in the development of better consensus in this field.

Introductory statement:

For the purposes of this interview, please consider FEEDBACK to be any message given by a clinical supervisor to a student on their work that communicates something about student progress in medical performance in clinical settings. This could include things the student is doing well or what gaps still exist in their learning and suggestions on how to close those gaps.

At this stage, I would like to turn the tape on and begin recording. The recording will be transcribed for analysis, but I would like to assure you again that the recording itself will be kept confidential at all times.

Recorder on

Please tell me a little about yourself

1- What is your gender?

Male ( )

Female ()

2- What is your age bracket? (Select as appropriate)

18-25 years ( )

26-35 years ( )

36-45 years ( )

46-55 years ( )

56 years and above ( )

3- What is your current institution and role?

• How many years have you been a clinical supervisor of Emergency Medical Service students:

- **6 - 10 years**
- **11-15 years**
- **16 - 20 years**
- **more than 20 years**

Questions regarding training and development:

Introductory questions:

- Do you think clinical feedback is an important aspect of the learning journey of EMS students? If so, why?
- Can you please tell me a bit about how you learnt how to give clinical feedback? What helped you prepare for that part of your work and how did you develop the required skills?
- Do you have a responsibility for the ongoing support and quality assurance of clinical feedback provided by clinical supervisors? If so, please provide details.

Training and support

- In your institution, do clinical supervisors receive training and support on how to provide clinical feedback?

If yes,

- What sort of training do clinical supervisors receive to help them develop the skills necessary to give clinical feedback to students?
- Are clinical supervisors provided with ongoing support and development on the provision of clinical feedback?
    - If yes, what does this entail?
    - If no, do you think clinical supervisors should be provided with additional training and support? If so, what should this entail?
- Do you believe that the training and support provided regarding clinical feedback meet the needs of clinical supervisors and students?
    - If yes, what gives you that impression?
    - If no, what gives you that impression?
- Who is responsible for clinical feedback quality assurance, training and development at your institution? Is it a professional body or the individual school or department?

If no,

- Do you think Clinical supervisors should be provided with formal training to help them develop the skills necessary for giving clinical feedback to students? If so, what type of training should they be provided with? If not, how would you suggest that they develop this skill?
- Do you think clinical supervisors should be provided with ongoing support and development on the provision of clinical feedback? if yes, what should this entail? If not, why? How would you suggest that they develop instead?
- Who should be responsible of quality assurance, development and training regarding clinical feedback? For example, should this be managed by an external governing body or by individual schools?

Questions about standardised guidelines and a handbook on clinical feedback:

Do you think that standardised guidelines in the form of a handbook or a manual could support clinical supervisors in addressing their difficulties in providing students with clinical feedback?

If yes, what do you think this should entail?

- Which format for clinical feedback guidelines would you prefer to see? a set of instructions or a handbook?
- Which type of format do you personally prefer: online, paper format, or something else?
- If you prefer an online format, which format should this take (a mobile app, etc.)?
- Who should be responsible for this? For example, should the Saudi Medical Education Association or another organisation provide these guidelines? Or should this be managed at individual institution or department level?

If you do not think that such handbook or guidelines are needed, can you please explain why?

Supporting faculty and addressing challenges associated with clinical feedback:

We have recently asked students and faculty at various EMS colleges in Saudi Arabia about their experiences and perceptions of clinical feedback, which highlighted those various challenges exist. These include issues related to feedback content, the various processes and methods of giving feedback and the need to better support clinical supervisors through training and teaching aids such as a handbook and guidelines on giving clinical feedback.

In this part of the interview, we are seeking your suggestions on how these challenges may best be addressed. We would particularly like your opinions regarding what should be included in the handbook or manual and how it should be managed and presented to ensure it achieves its full potential.

1. **Content** - Various challenges have been raised by students regarding the **content** of clinical feedback provided by clinical supervisor. Supervisors' comments also suggest that they are aware of these issues, but some barriers exist when it comes to giving clinical feedback. In your opinion, how can the following issues best be addressed? Training, a handbook, both? Do you have any other suggestions?

	Training	Handbook	Suggestions on what should be included in these
Lack of clarity			

Lack of detail			
Lack of specificity			
Not being able to understand the feedback.			
Difficulties accepting the feedback			

2. **Use of feedback** - Various challenges have also been raised by students regarding the use of feedback provided by supervisors. In your opinion, how can the following issues best be addressed? Training, a handbook, both? Do you have any other suggestions?

	Training	Handbook	Suggestions on what should be included in these

Lack of suggestions on how clinical performance can be improved			
Feedback underuse			
Feedback does not always facilitate learning development			
Absence of personalised feedback - all students often receive the same feedback			

3. **Methods of giving feedback** - Challenges were discussed by students and supervisors regarding the methods of giving clinical feedback. In your opinion, how can the following issues best be addressed? Training, a handbook, both? Do you have any other suggestions?

	Training	Handbook	Suggestions on what should be included in these

Feedback is unstructured and unplanned			
Lack of agreed standards regarding clinical feedback			
Delayed feedback – waiting for a long time for feedback.			
Dealing with large numbers of students			
Electronic feedback - Lack of knowledge around electronic feedback delivery technical difficulties such as slow internet and connectivity.			
Lack of voice and video feedback			

Improper settings-Inappropriate places and times for feedback.			

4. **The impact of feedback**- Challenges were discussed by students and supervisors regarding the impact of receiving and providing clinical feedback. In your opinion, how can the following issues best be addressed? Training, a handbook, both? Do you have any other suggestions?

	Training	Handbook	Suggestions on what should be included in these
Lack of satisfaction with the clinical supervisor's feedback.			
Bad thoughts toward the clinical supervisor when the feedback was unfavourable and embarrassing.			
Despair and lack of confidence - Students experience grief and diminished confidence after receiving clinical feedback from a clinical supervisor			

Concluding questions:

Are there any other points you would like to add?

Thank you very much for giving up your time and for taking part in this interview. The results of this research will be available on request after completion, beginning in December 2022. The results will also be made available to the relevant EMS institutions in order to help inform the best ways to support clinical supervisors and students by improving online feedback. I would like to reassure you that if the study is published or presented in any way, you will not be personally identified, however.

Recorder off.

Appendix 6.04: Thematic analysis

Overview of the analysis and reporting of results

The data analysis section presents the themes and subthemes developed from the interviews with EMS stakeholders in Saudi Arabia.

Thematic analysis

Thematic analyses were used to examine the following:

1. Clinical supervisors' training and development needs with respect to clinical feedback

2. The development of a standardised handbook and a set of standardised instructions on clinical feedback

3. Ongoing support and quality assurance for clinical feedback and how and by whom this should be managed

After reading participants' quotations and listening to the perspectives of EMS stakeholders, it became evident that this study included six comprehensive themes. The inclusion of these themes was prompted by a discussion of expectations relating to the following six topics:

Theme 1: Initial training

Theme 2: Ongoing training and support

Theme 3: Management and quality assurance of clinical feedback

Theme 4: Resources

Theme 5: Values and attitudes of clinical supervisors towards feedback

Theme 6: **Management and aligning students' and supervisors' expectations of clinical feedback.**

Table 1: Concepts, categories and subthemes of theme 1: Initial training

Quotes	Concepts	Categories	Category Definitions	Relevant Subtheme	Suggested Questions for 2nd Round. To what extent do you agree or disagree with the following statements?
'I always give support to the clinical supervisors. But in terms of training, we they have not received anything'. EMS Stakeholder No. 9 *'I haven't had any official or formal training to give a student feedback and I don't think it ever existed here. I haven't had any training*	Lack of preparedness in how to provide feedback	No training	Some of the participants emphasised that at the beginning of their career as a clinical supervisor, there was no formal training	Formal training at the start of role	The best way for me to prepare for this role as a clinical feedback provider is to receive formal training in clinical feedback.

programmes in Saudi Arabia or elsewhere in the world, to be honest'. EMS Stakeholder No. 3					
'At the beginning of my job as a clinical supervisor I start to read or self-learning about how important the feedback and how we conduct it'. EMS Stakeholder No. 6	Personal dependence on learning	Self-learning	Some of the participants lacked formal education, hence personal reliance on learning to deliver feedback	On the job and self-learning	The best way for me to prepare for this role as a clinical feedback provider is to use external resources (the Internet) and self-education.
'At the beginning of my career, if somebody asked me to go and teach normal delivery to students, I would have requested my other faculty who had experience in conducting those courses, because I did not have the required skills'. EMS Stakeholder No. 1	No experience providing feedback; relying on colleagues and peers	Seek help from senior colleague	Some participants had no experience providing feedback; they relied solely on their colleagues and peers for guidance	Learning from peers and senior colleagues	The best way for me to prepare for this role as a clinical feedback provider is to learn from peers and senior colleagues.

'You let them go and supervise and then you give them a course or training course or whatever'. EMS Stakeholder No. 3	Training programme	Flipped training	Some participants emphasised the importance of formal training, even for clinical supervisors who are already work in that role	Attending formal training after a period of working as a clinical supervisor	Even if I am already knowledgeable about clinical feedback, I would prefer formal training.
'We should have training when you talk about details. Yes, you have to give more details to your students, so he or she understands why, and what are the problems? What should be done? What shouldn't be done? One by one? I mean, you don't miss out' EMS Stakeholder No.3	Needs training on detailed and specific feedback	Required training type	Some participants emphasised that they need training on how to provide precise and effective feedback to provide successful feedback	Parts of a needed training programme include specificity and detail	The training programme for clinical supervisors should include instruction on how to provide specific and detailed feedback.
'There is lack of training and education regarding this issue so they can solve it internally, like with their department level. For example, I and my colleagues	Need training on dealing with students'	Required training type	Some participants emphasised that they need training on managing emotions and	Parts of the needed training program is the management of emotions and	The training programme for clinical supervisors should include instructions on how to manage of

together gave this student this, and he answered that he felt embarrassed, not, you know, open to discussion to improve himself. I think this will solve most of the issues that you found in your research'. EMS Stakeholder No. 4	emotions when giving feedback		reactions to feedback	reaction to feedback	emotions and reaction to feedback.
'When clinical supervisors used to deliver feedback to students, they used to follow that generic approach, whereas I feel that feedback needs to be customised according to each individual's needs'. EMS Stakeholder No. 7 *'When we are trying to give feedback there should be two types of feedback which we need to train the students to receive. The clinical*	Needs training on customised feedback to each individual's needs	Required training type	Some participants emphasised that they need training on management of emotions and reactions to feedback	Customised and individualised feedback	The training programme for clinical supervisors should include instruction on how to customise and individualise feedback.

supervisors need to understand that it should be an objective type of feedback and it should be a subjective type of feedback.' EMS Stakeholder No. 8					
'They you need to give them time management workshops. Also, once they are given a time management workshop, then you can strictly tell them "Okay". Now you have those skills, you have to utilise your time *'. EMS Stakeholder No. 7*	Time management training is required to provide feedback to a large number of students	Required training type	Some participants emphasised that they need training on management of emotions and reactions to feedback	Time management	The training programme for clinical supervisors should include instruction on how to manage time to deliver feedback to numerous students.
'First of all, we should give general feedback for all of the students, then we have to submit each one because each one we should have	Needs training on how to give feedback when teaching in groups	Required training type	Some participants emphasised the need for training on how to provide	Giving feedback when teaching in groups	The training programme for clinical supervisors should include instruction on how to give feedback

a counselling session from the students'. EMS Stakeholder No. 10			feedback to large student groups		when teaching in groups.

Table 2: Concepts, categories and subthemes of Theme 2: ongoing training and support

Quotes	Concepts	Categories	Category Definitions	Relevant Subtheme	Suggested questions for 2nd round To what extent do you agree or disagree with the following statements?
'With the help of a senior colleague, we can set up a friendly workshop and hold regular meetings to improve clinical supervisors and feedback'. EMS Stakeholder No. 7	Ongoing support, including workshops, regular meetings and personal evaluations	Ongoing support, workshops, training and evaluations	Some of the participants emphasised the importance of ongoing support regular meeting and evaluations	Ongoing workshops and meetings on clinical feedback	The most effective method of providing continuous support and training is to organise workshops and regular meetings with clinical supervisors to discuss clinical feedback.

'I think the best way I have to compare myself with the others, by the end of the course, is that I need to have an evaluation. I also need to compare it to other courses, because every instructor is going to have like a different score in the evaluation'. EMS Stakeholder No. 10 *'Evaluation to see what is also needed to work on the weakness'. EMS Stakeholder No. 3*	Own assessment of what is good Compare your own performance	How to analyse and enhance clinical feedback	Some participants discussed how to offer clinical feedback more effectively and evaluated their performance in doing so	Individual reflection and personal evaluation of clinical feedback	The most effective method of providing continuous support and training is for each person to think about and evaluate clinical feedback on their own.

'You can have them all after do their clinical skills and have a group discussion, a friendly group discussion. Having feedback like, "Hey, Mr. X, you did this, you did this. You did this. You know the best way? Yes, you did. Excellent. Be positive. But if I were you, I would do this and this and this." "Mr. B, you did this. You did that. You did this."' EMS Stakeholder No. 3	Group discussion with colleagues regarding their performance	Discussions amongst colleagues about individual performance	Some participants offered their techniques for using peer observations and moderator comments to improve clinical results	Moderation and peer observations	Moderation and peer observations are the most efficient means of giving continuous assistance and training about clinical feedback.

Table 3: Concepts, categories, and subthemes of Theme 3: Management and quality assurance of clinical feedback

Quotes	Concepts	Categories	Category Definitions	Relevant Subtheme	Suggested questions for 2nd round To what extent do you agree or disagree with the following statements?
'Quality assurance unit responsibility for one of my colleagues under my supervision, and this unit is responsible to ensure all education and all of the early education are met, as well as clinical	Quality assurance responsibilities	Need for feedback quality assurance management	There was some talk about embedding quality assurance into the management system, and some people offered suggestions	Embed within a quality assurance management system	The best way to ensure the quality of feedback is to incorporate quality assurance into the clinical feedback quality assurance management system.

supervision and feedback'. EMS Stakeholder No. 9 *'We, as an EMS department, don't have a quality assurance person who's responsible for clinical feedback. We do have a quality officer who is responsible for the quality of the programme. Part of it is for sure about the education and the training'. EMS Stakeholder No. 4*	Need for quality assurance				

'We do receive feedback from the students about the instructors and they are going to critique the instructors. Part of it is how to deliver the content by itself, including the clinical feedback. The aim, as the chairperson is the one who's responsible, is to read and review the feedback from the students about the instructors. So, the chairperson is going to know how the	Students' feedback regarding clinical feedback to evaluate clinical supervisors' feedback	Feedback from students in relation to clinical feedback, to assure the quality of clinical supervisors' feedback	There was some discussion regarding the possibility of ensuring the high quality of clinical supervisors' feedback by evaluating such feedback through the collection of student opinions	Ongoing and centralised evaluation of clinical feedback	The best strategy to ensure the quality of feedback is to centralise the examination of clinical supervisor input by incorporating student feedback.

instructors deliver a quality level of instructors in giving clinical feedback and the content general'. EMS Stakeholder No. 4					
'To work to supervise, it's also that we need to compare ourselves to another institution using key performance indicators (KPIs). You see how are we like on the right track or not'. EMS Stakeholder No. 10	To evaluate feedback systems by comparing them to current feedback systems	Comparing clinical feedback to standards that have been set	There was some discussion regarding the possibility of ensuring the high quality of clinical supervisors' feedback through benchmarking against established standards of clinical supervisors' feedback	Benchmarking against set standards for clinical feedback	The best strategy to ensure the quality of feedback is to benchmark against set standards of clinical feedback.

'Also, we base these programmes on other references like King Saud University, National Guard or institutes outside the Kingdom. So, having references regarding decisions was a problem with us'. EMS Stakeholder No. 11	Using other EMS programmes as a reference to find the issues and reach the best possible solutions	Solutions for quality assurance	There was some discussion regarding the possibility of ensuring the high quality of clinical supervisors' feedback through sharing and exchanging knowledge with other EMS colleges regarding clinical feedback	Share and exchange knowledge with other EMS colleges on clinical feedback	The best strategy to ensure the quality of feedback is to share and exchange knowledge with other EMS colleges on clinical feedback
'At the country level, quality assurance should be in charge. For example, in Saudi Arabia as a whole, we need people from the Emergency Medical Association to	Management of quality assurance by external affairs at the country level	Quality assurance management by external bodies	The possibility of ensuring the high quality of clinical supervisors' feedback through external quality assurance management was discussed	Quality and standards of clinical feedback should be set and managed by an external body	The best strategy to ensure the quality of feedback is to have it managed by external bodies, such as Saudi health specialists or the Saudi EMS Association.

act as barriers. They should have hired Cassatt Surya and worked with the Saudi Health Specialists Commission to standardise the guidelines or support and provide training, such as courses for the clinical coordinators. This would have helped them, and they could have counted this as CMEs and continuing education credits or hours. I think the Saudi Commission for Health Specialists should be the first to do this. The other level at the					

university should be the Clinical Affairs Department, and the person in charge of this should be the programme director'. EMS Stakeholder No. 9					
'We design three committees for this like the issues committee inside that department. It's called the Clinical Committee in the college and we have a separate quality assurance unit. Okay, so we have three like committees to follow up on these issues. But the most important one is the assurance and the	Management of quality assurance by internal affairs at the department level or institutional level	Quality assurance management by internal body	The possibility of ensuring the high quality of clinical supervisors' feedback through internal quality assurance management was discussed	Quality and standards of clinical feedback should be set and managed at an institutional level	The best strategy to ensure the quality of feedback is to have it managed by internal bodies such as department level or institutional level

fundamental training committee inside the department'. EMS Stakeholder No. 11					

Table 4: Concepts, categories and subthemes of Theme 4: Resources

Quotes	Concepts	Categories	Category Definitions	Relevant Subtheme	Suggested questions for 2nd round. To what extent do you agree or disagree with the

					following statements?
'So having standardised feedback system, we'll put everything in the right place'. EMS Stakeholder No. 3 *'So, there should be a feedback system and we should also follow it and give the feedback based on their feedback and if it is needed'. EMS Stakeholder No. 8* *'Once students receive structured,*	With a consistent feedback system, we will arrange everything in the right positions	EMS clinical feedback guidelines	Some of participants asserted that a standardised system would alleviate all concerns related to clinical feedback	Need of a standardised feedback system	Having a standardised feedback system will resolve the concerns with feedback.

planned and organised feedback from their clinical supervisors, Students will be satisfied. So, when can you say that they are satisfied'. EMS Stakeholder No. 3					
'Always give the support to the clinical supervisors. But in terms of training, they have not received anything regarding the costs. EMS Stakeholder No. 9	Needs for funds.	Training costs	Some participants emphasised that there is a deficiency of training with regard to clinical feedback due to insufficient funding	Funds for training	Having more training and funding will resolve issues linked to clinical feedback.

'It's regarding to the budget for training and improvement. We can train every six months or three months, but in the private sector, it's difficult'. EMS Stakeholder No. 11	Budget for training				
'Considering the shortage of manpower in academics or academic staff, it is a situation and depends on each university and each department and	Lack of manpower	Shortage of manpower	Some of participants highlighted the importance of management/resource coordination.	Need more manpower and coordinators.	By having additional manpower and coordinators, concerns will be resolved through feedback.

the number of sets available…This is a very important issue regarding the lack of manpower and all institutes, especially in my institution'. EMS. Stakeholder No. 11					
'I think there is no handbook that can address this and the options for training on, for example, the management or dividing students to grow jobs or adding new coordinators or	Adding more coordinators	Shortage of coordinators			

more coordinators. Stakeholders No. 9					
'The handbook should be in different forms. What I prefer, personally, is a paper format'. EMS Stakeholder No. 9 *'There should be like a handbook. Okay, nowadays it is technology based. So, we need to have create an electronic book also'. EMS Stakeholder No. 8*	Preference for the handbook's paper format	Participants prefer paper. Participants prefer online.	Some of participants preferences for paper format versus online format vary.	Clinical feedback guidelines in different forms (physical, digital, etc.)	I prefer clinical feedback guidelines to be available in digital format. I prefer clinical feedback guidelines to be available in paper format.

'In Saudi Arabia, the good thing is that they have standard tools known as checklists already established. But at the same time, it limits our capacity of generating or improvising feedback, or customising feedback or making some innovative approval providing some innovative feedback'. EMS Stakeholder No. 7 *'Clinical supervisors unable to give more*	The existing checklist and rating system impeded clinical supervisors' capacity to provide feedback and think beyond the checklist and clinical supervisors require training and guidelines on how to use the checklist to provide meaningful feedback	Training and support on the checklist for clinical supervisors	Some of participants demonstrated how existing checklists and scoring systems impede their ability to provide effective feedback, and they desire additional training on how to use checklists and guidelines to make scoring systems more useful for providing effective feedback	Checklists/rating systems	I prefer more training on how to use checklists and guidelines to make scoring systems more useful for providing effective feedback.

feedback because they are not going beyond the checklist'. EMS Stakeholder No. 1 *'Train clinical supervisors on how to give feedback based on the checklist'. EMS Stakeholder No. 1*					
'I believe guidelines are more important, supported by a handbook. They can also be handbooks or textbooks, but the guidelines should be	Preference for clinical feedback guidelines handbook	Participants prefer clinical feedback guidelines as handbook.	Some of participants' preferences differ for guideline type	Guideline types, handbook, set of instructions or set of recommendations	I prefer clinical feedback guidelines as a handbook.

there.' EMS Stakeholder No. 9 *'Actually, a set of instruction. Because it's gonna be easier. It's gonna give me what I should follow, like a handbook, not like a book because the book, I need to read everything. I need to sit for the information I'm required'. EMS Stakeholder No. 10*	Preference for a set of instructions on paper	Participants prefer clinical feedback guidelines as a set of instructions.			I prefer clinical feedback guidelines to be a set of instructions.

'I think it should be called recommendations. Instructions are something you have to follow strictly. Recommendations are better. You need to provide people with the ability to judge for themselves'. EMS Stakeholder No. 5	Guideline for clinical feedback to be included as a set of recommendations.	Participants prefer clinical feedback guidelines as a set of recommendations.			I prefer clinical feedback guidelines as a set of instructions and recommendations.
'We try to solve this issue by focusing on using the focus group, like I told you, who's in this subject. We will use three people from Class A, Class B,	Focused group conversations with clinical supervisors to address issues related to clinical feedback	Dialogue and debate to address issues around clinical feedback	Some of participants emphasised that giving students and clinical supervisors the opportunity to converse will resolve problems with clinical feedback	Provide opportunities and time for dialogue and discussion.	The best strategy to ensure the quality of feedback is to provide opportunities and time for dialogue and discussion for

Class C, Class D, like this and from the other group that was like this. So, the analysis is dealing with the focus group or direct meeting because, as you know, feedback is in a large number or not efficient or could give you good results. EMS Stakeholder No. 11 *'You can have them all after they do their clinical skills and have a group discussion. A*					students and clinical supervisors.

friendly group discussion. Having feedback such as, "Hey, Mr. X, you did this, you did this. You did this. You know the best way? Yes, you did. Excellent. Be positive. But if I were you, I would do this and this and this." "Mr. B, you did this. You did that. You did this"'. EMS Stakeholder No. 3					

Table 5: Concepts, categories and subthemes of Theme 5: Values and attitudes of clinical supervisors towards feedback

Quotes	Concepts	Categories	Category Definitions	Relevant Subtheme	Suggested questions for 2nd round. To what extent do you agree or disagree with the following statements?
'Students can learn more skills they can use. The more time and effort related to the skills that they are lacking, will help them to develop and work on them. So that's why it is very, very important to have feedback'. EMS Stakeholder No. 8 *'Feedback is an important tool for the students for*	Improvement and development of EMS outcomes	Importance of feedback for EMS outcomes	Some of participants demonstrated the significance of clinical feedback, and they refer to it as an essential instructional resource for clinical practise	Importance as a vital tool for EMS education	

learning. No doubt about that.' EMS Stakeholder No. 8 *'What I believe, I think feedback is a cornerstone in education. I think of the feedback portion as a tool of education'. EMS Stakeholder No. 6*					
'Motivation is a very important tool that will make our clinical supervisors support things. So, there we are. One way of doing this is to try to give them incentives. So, incentives are very helpful, maybe monetary wise or in the form of other training	Motivation is crucial and influences clinical feedback	Motivate clinical supervisors by rewards through. A) Incentives B) Free training courses	Some participants highlighted the significance of encouraging clinical supervisors to provide feedback	Motivation	The most effective method for ensuring the quality of feedback is to incentivise clinical supervisors to provide feedback through payment or free training and conferences.

programmes. EMS Stakeholder No. 8					
'So, we need them to commit. Commitment is a very important key. So, there should be some agreements related to payment or something like incentives in the form of training so that we help them out'. EMS Stakeholder No. 8	Commitment is crucial and influences clinical feedback.	Commit clinical supervisors to provide feedback by rewarding them	Some of the participants stressed the importance of motivating clinical supervisors to commit to offering feedback	Commitment	The most effective method for ensuring the quality of feedback is for clinical supervisors to commit to inspiring clinical supervisors to provide feedback via remuneration or free training and conferences.

Table 6: Concepts, categories and subthemes of Theme 6: Management and aligning students' and supervisors' expectations of clinical feedback.

Quotes	Concepts	Categories	Category Definitions	Relevant Subtheme	Suggested questions for 2nd round. To what extent do you agree or disagree with the following statements?
'This can be solved by providing training sessions to the students to understand what feedback is and that it is okay to receive negative feedback. We all receive negative feedback at least once in our lives or in our lives of the school yoni. So, they should understand that it's not	Training session for students to understand feedback	Training of Students	Some of the participants emphasised providing students with training to comprehend the feedback's purpose	Train students on the purpose of clinical feedback	Training students on the purpose of feedback eliminates the problem associated with feedback.

personal, it is just for our own benefit.' EMS Stakeholder No. 4					
'We advise students how to be open minded and accept the feedback. So, I believe in training and education'. EMS Stakeholder No. 9	Advising students to understand how to receive feedback	Accepting the feedback	Some of participants stressed the significance of training students on accepting clinical feedback	How to receive feedback	Training and instructing students on how to receive feedback will result in their acceptance of feedback.
'Where they support students with their any issues such as a mental issue or like this issue'. EMS Stakeholder No. 9 *'Students need psychological support. This is just to improve performance, not for evaluation or for anything like this. So, this*	Issues such as student embarrassment or shyness when receiving feedback require mental assistance	Psychological support	Some of participants proposed solutions for problems such as embarrassment or shyness while receiving feedback that they require psychological support		X (same statement as below)

point is very important for training and also by sharing them and the feedback process'. EMS Stakeholder No.					
'How can I assume that students did understand the feedback? So, communication between the technical instructor and the students receiving the feedback should be improved'. EMS Stakeholder No. 4 *'You should always talk to the students first before you start. Talk to them, at least for a few minutes and develop rapport. Explain to them what they're supposed to be doing today.*	Communicate with students and listen to what they have to say to engage to feedback	Communication skills and space to talk	Some of participants placed an emphasis on communication skills and having a safe space to express themselves	Management of reaction and emotions	It is essential for students to acquire mental support to regulate their reactions and emotions when receiving feedback.

And then how you're going to provide the feedback to them or how they're going to ask further questions or the process that's going to happen.' EMS Stakeholder No. 5					
'We need to train students and clinical supervisors on what each expects from the other, and we also need to grasp what everyone else expects to get the satisfactory level of clinical feedback.' EMS Stakeholders No. 12	Train students to comprehend the feedback expectations of clinical supervisors and vice versa	Understand expectations of clinical feedback	Some of participants emphasised training students to understand the expectations of clinical supervisors regarding feedback and vice versa	How to engage with feedback	It is crucial that clinical supervisors and students utilise feedback to enhance their communication skills and make time to sit and discuss.
'The problem of not understanding the feedback can be fixed by teaching the students what to do with the feedback. It's very crucial for the instructor to explain to the	If students do not understand feedback, they need to be taught what to do	Teaching what to do with feedback	Some participants will emphasise teaching students what to do with the offered feedback	What to expect	It is vital for students to grasp the feedback expectations of their

student exactly what the feedback is for and how to understand and use the information'. EMS Stakeholder No. 12				What to do with feedback provided	clinical supervisors and vice versa. Not understanding the feedback can be addressed by providing training on what to do with the feedback that has been provided to them.

Appendix 6.05: Round 2 Survey

Second Round of the Delphi Study of Clinical Feedback Delphi Study Survey With the agreement of the King Saudi University and Cardiff University Ethical Committee for Scientific Research, Reference No. KSU-HE-22-384

Introduction:

My name is Mohammed Algabgab, a PhD student at Cardiff University. This questionnaire is a part of My PhD studies, which focuses on identifying and addressing the support needs of all those who provide clinical feedback to students in Emergency medical service education.

Your thoughts on the topic are important to us, as we want to ensure the measures that are put in place address those needs identified in the previous studies we conducted.

We will not ask you to provide any information of sensitive nature as we are only interested in your thoughts on what should be done to ensure that the educational needs of clinical supervisors are being met. The questionnaire will take about (10 minutes) to complete, and participation is completely voluntary. It is divided into four parts, and although you are asked for some background information, no questions are sensitive in nature. The focus is on your preferences regarding clinical feedback training, how training and guidelines on teaching clinical feedback should be managed and quality assured, and what tools and guidelines should be included to improve clinical feedback.

Your responses will be treated with confidentiality and will only be used for the purpose of this study.

The research is conducted under the supervision of Dr. Michal Tombs, Reader in Medical Education, Postgraduate Medical and Dental Education, Cardiff University (email TombsM2@cardiff.ac.uk)

Contact for Further Information

Mohammed ALGABGAB

Email: AlgabgabMF@cardiff.ac.uk

1. Your responses will be analysed, and the questionnaire will be further revised to establish key priorities and a way forward regarding the training of clinical feedback. This revised questionnaire will be sent to your email to establish the extent of your agreement with the measures that may be developed. Please provide us with your Email Address: Required

2. Consent: Required

By clicking on this tab, I confirm that I agree to participate in this study.

3. To be able to take part in this survey, you must have taught at least one clinical

group of students in a clinical setting (e.g., hospital, ambulance department, or in a simulation lab)? Required

Yes, I have ()

No, I have not ()

Part One: About You

Q1 Please indicate your age:

- 20–29
- 30–39
- 40–49
- 50–59
- 60+

Q2 Please indicate your sex.

- Male
- Female

Q3 What is your highest level of education?

- Diploma
- Bachelor's Degree
- Master's Degree
- PhD or equivalent
- Other

Q4 How many years have you been instructing students in a clinical setting?

- Less than one year
- 1–5 years
- 6–10 years
- 11–15 years
- More than 16 years

Q5 How many years have you been providing students with clinical feedback?

- Less than one year
- 1–5 years
- 6–10 years
- 11–15 years
- More than 16 years

Q6 Which educational institution do you work at?

- Prince Sultan College for EMS
- Umm Al Qura University – Makkah
- King Saud bin Abdulaziz University for Health Sciences (KSAU-HS)
- Al Ghad International Colleges
- Imam Abdulrahman Bin Faisal University
- Prince Sultan Military College of Health Sciences

- Other: _____

Q7 What is your current role/job? (Select as many as are applicable.)

- Dean
- Programme director
- Head of department
- Clinical supervisor
- Coordinator
- Lecturer
- Instructor who is involved in teaching and supervising students either in clinical laboratories or other clinical settings.
- Other: _____

Part Two: Training for Clinical Feedback

Instructions:

Using the 5-point Likert scale below, please indicate your level of agreement with each statement.

1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree.

1) To what extent do you agree that the best type of training that will help clinical supervisors prepare for giving students clinical feedback is:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)

1. Completing a formal educational training on teaching including clinical feedback					
2. Attending workshops specific on clinical feedback					
3. Attending regular meetings to discuss clinical feedback.					
4. Receiving compulsory training					
5. Receiving optional training					

6. Receiving remotely delivered training					
7. Receiving face-to-clinical feedback face training?					

Do you have any other suggestions on the best type of training that will help clinical supervisors be better prepared for giving students clinical feedback?

_____

_____

_____

_____

2) To what extent do you agree that the best way to learn how to give students' clinical feedback is by:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)

1. learning by observing a senior and more experienced colleague					
2. learning through discussions and instructions with a senior and experienced colleague					
3. observing and learning from peers					
4. learning from external resources (e.g., the internet, books and					

other health care)					
5. being self-directed and learning independently					

Do you have any other suggestions about the best way for clinical supervisors to learn how to give students' clinical feedback?

_____

_____

_____

_____

3) To what extent do you agree that the training programme on clinical feedback should include information on:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. how to provide					

specific feedback					
2. how to provide detailed feedback					
3. how to customise and individualise feedback					
4. how to give feedback when teaching in groups					
5. how to provide constructive clinical feedback					
6. how to speak openly and enable dialogue					

with students					
7. how to engage in dialogue with students					
8. how to train students about the purpose of feedback					
9. how to manage students' expectations of clinical feedback					
10. how to train students on the importance of receiving and accepting feedback					
11. how to ensure students understand					

supervisors' expectations when receiving clinical feedback					
12. How to provide detailed feedback					
13. how to ensure that students understand what to do with the feedback that been provided					
14. how to manage students' emotions and reaction to clinical feedback					

15. how to manage time to deliver feedback to large numbers of students					

Do you have any other suggestions on what should be included in the clinical feedback training to clinical supervisors?

_____

_____

_____

_____

4**)** To what extent do you agree that the frequency and timing of training on clinical feedback should be:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)

1. once only (at the beginning of the role)					
2. Once at the start of the role and then once a year, in a formal refresher course					
3. once only at the start of role and thereafter only if and when the need arises.					
4. always available as online module done independently.					

Do you have any other suggestions on when and how frequently training on clinical feedback should be provided to clinical supervisors?

_____

_____

_____

_____

5)To what extent do you agree that the best length of time for clinical feedback training is:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. A one-day training events					
2. A half day training event					
3. No more than a couple of hours training					

Do you have any other suggestions on how long the training of clinical feedback should be?

_____

_____

_____

_____

6) To what extent do you agree that the following should be responsible for the training and support regarding clinical feedback?

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. the EMS college or department					
2. all the Saudi EMS institutions in collaboration					
3. the Saudi EMS association					

4. the Saudi Commission for Health Specialties					

Would you like to make any suggestions or comments on who should be responsible for training clinical supervisors on clinical feedback?

_____

_____

_____

_____

7) To what extent do you agree that the most effective method of providing continuous support and training on clinical feedback is:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. to offer regular training and workshops					

2. to meet with clinical supervisors on regular basis to review their provision of clinical feedback.					
3. to allow clinical supervisors to self-evaluate on their performance					
4. to conduct one formal evaluation of the provision of clinical feedback to identify areas that may need improvement.					
5. to enable clinical supervisors to self-reflect and identify areas					

of improvement and training needs					
6. to enable discussion and dialogue between clinical supervisors to reflect on their provision of clinical feedback.					
7. to provide opportunities to observe and learn from a senior or more experienced colleague on providing clinical feedback.					
8. to offer students ongoing					

support on how to overcome embarrassment or shyness when receiving feedback.					
9. to offer students ongoing support on how to make the most of clinical feedback.					

Do you have any other suggestions on what might be the most effective method of providing continuous support and training on clinical feedback?

_____

_____

Part Three: Management and Quality Assurance of Clinical Feedback

8) To what extent do you agree that the best way to ensure high standards of quality feedback is by:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. incorporating clinical feedback into the existing quality assurance management system					
2. positioning the review and evaluation of clinical supervisor feedback in the current evaluation strategy					

3. benchmarking the provision of set standards of clinical feedback					
4. sharing and exchanging knowledge amongst all EMS colleagues and creating shared standards					
5. offering incentives to clinical supervisors, such as payment or free training and invitations to conferences in order to motivate clinical supervisors to					

give quality feedback					
6. providing incentives and opportunities that will make supervisors more committed to provide quality feedback.					
7. giving students an opportunity to provide ongoing evaluations of their satisfaction with clinical feedback.					
8. using evaluation data to identify support needs regarding					

clinical feedback.					

Do you have any other suggestions on what might be the best way to ensure high standards and quality feedback?

_____
_____
_____
_____

9)To what extent do you agree that quality assurance should be managed by:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. the EMS college or department					
2. the Saudi Commission					

for Health Specialties					
3. the Saudi EMS Association?					

Do you have any suggestions on who might be best to manage the quality assurance of clinical feedback?

_____

_____

_____

_____

Part Four: Guidelines and Tools to Improve Clinical Feedback

10) To what extent do you agree that the clinical feedback can be improved by:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. having a standardised feedback					

system and guidance					
2. having more training with a specific focus on clinical feedback					
3. having more funding to attend training.					
4. Increase the number of clinical supervisors who can provide clinical feedback					
5. Have better coordinators of clinical feedback.					

6. Having checklists that are more flexible to enable more varied ways of giving feedback					
7. having more training on how to use checklists and guidelines.					

Do you have any suggestions on how the provision of clinical feedback can be improved?

_____

_____

_____

_____

11) To what extent do you agree that clinical feedback guidelines should be provided in the following format?

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. digital					
2. paper					
3. handbook					
4. a set of instructions					
5. a set of recommendations					

Do you have any suggestions on the format of clinical feedback guidelines?

_____

_____

_____

_____

12) To what extent do you agree that the clinical feedback guidelines and tools should be provided and developed by:

Round 1 (Statements)	Strongly Disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
1. the EMS college or department					
2. all the Saudi EMS institutions in collaboration					
3. the Saudi EMS association					

4. the Saudi Commission for Health Specialties					

Do you have any suggestions on who should develop and provide clinical feedback guidelines and tools of clinical feedback?

_____

_____

Do you have any additional suggestions in general regarding clinical feedback?

_____

_____

Thank you for taking the time to complete the survey.

Appendix 6.06: Round 3 Survey

Approved by the King Saudi University and Cardiff University Ethical Committee for Scientific Research, Reference No. KSU-HE-22-384

Introduction:

Thank you for participating in the Second Round of the Delphi Study on Clinical Feedback. We are now in the final stage of the study, and your participation in this Third Round is greatly appreciated. The questionnaire items in this round will be similar to those in the second round, but with items that did not meet the consensus threshold to determine the final results of the study.

Survey details:

In this round of the study, you will be presented with the items of the previous round, as well as some additional suggestions made in the previous round. You will have the opportunity to respond and revised your previous answer to these items by indicating or revise your level of agreement or disagreement using a Likert scale ranging from 1 to 5. This will enable us to gather your views and opinions on these items, and to determine if there are any different thoughts or if consensus can be reached on these items.

The survey will take approximately 10 minutes to complete and is divided into four parts. Similarly, to the previous round of questions, we are interested in your thoughts and opinions on clinical feedback training, the management and quality assurance of training and guidelines, and the tools and guidelines that should be included to improve clinical feedback.

Confidentiality:

Your responses will be kept confidential and will be used solely for the purpose of this study.

We appreciate your continued participation and contribution to this study. For further information, please contact Mohammed ALGABGAB at **AlgabgabMF@cardiff.ac.uk.**

If you have any questions or concerns about the study, please contact Dr. Tombs at **TombsM2@cardiff.ac.uk, who is the study's supervisor at Cardiff University.**

Continued overleaf

Part One: Training for Clinical Feedback

Instructions:

Using the 5-point Likert scale below, please indicate your level of agreement with each statement. 1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree, 5 = Strongly agree.

1. **To what extent do you agree that the best type of training that will help clinical supervisors prepare for giving students clinical feedback is:**

Items	Statement	% scoring "Agree" or "Strongly Agree"	
		Round 2	Round 3
1	Completing a formal educational training on teaching including clinical feedback	87.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	Attending workshops specific on clinical feedback	87.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3	Attending regular meetings to discuss clinical feedback	82%	Strongly Disagree Disagree

			Neither Agree nor Disagree Agree Strongly Agree
4	Receiving face-to-face clinical feedback training	74.4%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
5	Receiving compulsory training	66.6%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
6	Receiving optional training	61.6%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
7	Receiving remotely delivered training	60.5%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
8	Attending simulation workshops on clinical feedback*	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

*A new item was suggested in the previous round of the study

2)To what extent do you agree that the best way to learn how to give students' clinical feedback is by:

Items	Statement	% scoring "Agree" or "Strongly Agree"	
		Round 2	Round 3
1	Learning through discussions and instructions with a senior and experienced colleague.*	87.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	Learning from external resources (e.g., the internet, books, and other healthcare.	71.8%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3	Learning by observing a senior and more experienced colleague.	69.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4	Observing and learning from peers.	69.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

5	Being self-directed and learning independently.*	56.4%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
6	Gaining knowledge and experience through hands-on practice in delivering feedback through simulated scenarios.*	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

*A new item was suggested in the previous round of the study

3) To what extent do you agree that the training programme on clinical feedback should include information on:

ITEMS	Statement	% scoring “Agree” or “Strongly Agree”	
		Round 2	Round 3
1)	How to provide specific feedback	79.5%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2.	How to customise and individualise feedback	84.6%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3.	How to give feedback when teaching in groups	79.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4.	How to provide constructive clinical feedback	89.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
5.	How to speak openly and enable dialogue with students	87.1%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

6.	How to engage in dialogue with students	89.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
7.	How to train students about the purpose of feedback	79.5%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
8.	How to manage students' expectations of clinical feedback	89.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
9.	How to train students on the importance of receiving and accepting feedback	87.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
10.	How to ensure students understand supervisors' expectations when receiving clinical feedback	82%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
11.	How to provide detailed feedback	82.1%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

12.	How to ensure that students understand what to do with the feedback that has been provided	87.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
13.	How to manage students' emotions and reaction to clinical feedback.	82.1%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
14.	Student opinions on feedback given to them.*	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
15.	Student opinions on feedback process. *	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
16.	Providing practical experience and promoting a positive attitude towards implementing feedback effectively.*	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
17.	Training should include theoretical aspects of clinical feedback as well as practice.*	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
18.	Experience Enthusiasm.*	New Item from R2	Strongly Disagree

			Disagree Neither Agree nor Disagree Agree Strongly Agree

* A new item was suggested in the previous round of the stud

4) To what extent do you agree that the frequency and timing of training on clinical feedback should be

Item	Statement	% scoring “Agree” or “Strongly Agree”	
		Round 2	Round 3
1	always available as online module done independently.	73.4%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	Once at the start of the role and then once a year, in a formal refresher course	59.4%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3	Once only at the start of role and thereafter only if and when the need arises.	43.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4	Once only (at the beginning of the role).	36.9%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
5	Training should always be given at the start of instructing role.*	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree

			Agree Strongly Agree
6	When students' evaluation highlight that an instructor is not performing well training should be offered.*	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

* A new item was suggested in the previous round of the study

5) To what extent do you agree that the best length of time for clinical feedback training is:

Item	Statement	% scoring “Agree” or “Strongly Agree”	
		Round 2	Round 3
1	A one day training event.	56.4%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	A half day training event.	43.6%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3	No more than a couple of hours training.	48.8%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4	Depend on the materials presented and whether it is a first or refresher course. *	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
5	Length of time should be determined locally by training provided.*	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

* A new item was suggested in the previous round of the study

6) To what extent do you agree that the following should be responsible for the training and support regarding clinical feedback?

item	Statement	% scoring “Agree” or “Strongly Agree”	
		Round 2	Round 3
1	EMS college or department	84.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	all the Saudi EMS institutions in collaboration.	66.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3	the Saudi Commission for Health Specialties.	50%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4	the Saudi EMS association.	42.1%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
5	A specific academic department *	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

* A new item was suggested in the previous round of the stud

Part two: Quality Assurance of Clinical Feedback

7) To what extent do you agree that the most effective method of providing continuous support and training on clinical feedback is:

Item	Statement	% scoring "Agree" or "Strongly Agree"	
		Round 2	Round 3
1	to offer regular training and workshops	84.6%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	to meet with clinical supervisors on regular basis to review their provision of clinical feedback	73.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3	to meet with clinical supervisors on regular basis to review their provision of clinical feedback.	73.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4	to allow clinical supervisors to self-evaluate on their performance.	68.4%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

5	Consider the students' ability to evaluate feedback and instructors who require additional training.*	New Item from R2	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

*A new item was suggested in the previous round of the stud

8) To what extent do you agree that the best way to ensure high standards of quality feedback is by:

item	Statement	% scoring “Agree” or “Strongly Agree”	
		Round 2	Round 3
1.	Incorporating clinical feedback into the existing quality assurance management system	84.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2.	Positioning the review and evaluation of clinical supervisor feedback in the current evaluation strategy	79.5%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3.	Benchmarking the provision of set standards of clinical feedback	82%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4.	Sharing and exchanging knowledge amongst all EMS colleagues and creating shared standards	84.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
5.	Offering incentives to clinical supervisors, such as payment or free training and invitations to conferences in order to motivate clinical supervisors to give quality feedback	82.1%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

6.	Providing incentives and opportunities that will make supervisors more committed to provide quality feedback	76.9%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
7.	To provide opportunities to observe and learn from a senior or more experienced colleague on providing clinical feedback	84.6%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
8.	Giving students an opportunity to provide ongoing evaluations of their satisfaction with clinical feedback	87.2%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
9.	Using evaluation data to identify support needs regarding clinical feedback	89.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

9) To what extent do you agree that quality assurance should be managed by:

Items	Statement	% scoring “Agree” or “Strongly Agree”	
		Round 2	Round 3
1	the EMS college or department	80.4%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	the Saudi Commission for Health Specialties.	66.7%	
3	the Saudi EMS association.	46.1%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4	all the Saudi EMS institutions in collaboration.*	New Item from R2 #	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

* A new item was suggested in the previous round of the stud

Part Three: Guidelines and Tools to Improve Clinical Feedback

10) To what extent do you agree that the clinical feedback can be improved by:

Items	Statement	% scoring "Agree" or "Strongly Agree"	
		Round 2	Round 3
1	Having a standardised feedback system and guidance	89.8%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	Having more training with a specific focus on clinical feedback	84.6%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3	Having more funding to attend training	81.6%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4	Increase the number of clinical supervisors who can provide clinical feedback	79.5%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
5	Have better coordinators of clinical feedback	89.5%	Strongly Disagree

			Disagree Neither Agree nor Disagree Agree Strongly Agree
6	Having checklists that are more flexible to enable more varied ways of giving feedback	84.6%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
7	Having more training on how to use checklists and guidelines	89.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

11) To what extent do you agree that clinical feedback guidelines should be provided in the following format?

Rank R2	Statement	% scoring “Agree” or “Strongly Agree”	
		Round 2	Round 3
1	Digital	88.7%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	Paper	61.5%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3	Handbook	52.9%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4	A set of instructions	64.1%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

12) To what extent do you agree that the clinical feedback guidelines and tools should be provided and developed by:

Item	Statement	% scoring “Agree” or “Strongly Agree”	
		Round 2	Round 3
1	the EMS college or department	78.9%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
2	all the Saudi EMS institutions in collaboration	82%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
3	the Saudi EMS association	59%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree
4	the Saudi Commission for Health Specialties	71.8%	Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree