NURSES' EXPERIENCES OF CARING FOR PATIENTS WITH COVID-19

A thesis submitted for the degree of Doctor of Philosophy

By

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December 2024

Abstract

Background: Work-related stress remains a significant organisational issue facing all healthcare groups including the nursing profession. Widely acknowledged as one of the most stressful professions, nursing is marked by challenges such as understaffing, excessive workloads, increased complexity of healthcare, emotional labour, unfavourable working conditions, shift work, quality of leadership and management and constantly changing patient care demands. While some of these stressors are inherent to nursing, they can further be exacerbated during health threats such as the recent SARS-CoV-2 pandemic. As such, prolonged exposure to these stressors can immensely affect staff well-being, patient care, and organisational outcomes and potentially compromise the quality and efficiency of healthcare services. While there is a growing body of literature on work-related stress and coping among registered nurses during the SARS-CoV-2 pandemic around the globe, there is a dearth of research specifically addressing registered nurses' (adult/mental health fields) experiences of working in hospital inpatient settings during the pandemic in Wales and England.

Aim: To explore the work-related stress experienced by registered nurses (adult/mental health fields) who cared for severely ill patients with COVID-19 in hospital settings during the SARS-CoV-2 pandemic in Wales and England.

Methods: An explanatory sequential mixed-methods approach was used. In the quantitative phase, 516 registered nurses who worked in hospitals during the pandemic completed an online bespoke survey questionnaire. The online survey questionnaire comprised the Expanded Nursing Stress Scale (ENSS), Positive Affect and Negative Affect Schedule (PANAS), Coping Orientation to Problems

Experienced Inventory (Brief COPE), and questions on personal characteristics. The subsequent qualitative phase involved one-to-one semi-structured interviews with 12 registered nurses who worked in hospitals during the pandemic.

Findings: Using the Transactional Model of Stress and Coping (Lazarus and Folkman, 1984) as a theoretical framework for data analysis, it was found that the majority of the participants experienced high levels of work-related stress. This stress was associated with an excessive workload, shortage of staff, the burden of using personal protective equipment (PPE), inadequate educational preparation and frequent changes in clinical guidelines. Divergent perspectives were identified among participants regarding whether the perceived work-related stress experienced during the pandemic constituted a hindrance or a challenge stressor. Predominantly, the participants adopted problem-focused coping strategies, indicating their practical approach to managing work-related stress.

Conclusion and Implications: This study found that the SARS-CoV-2 pandemic brought about a multitude of challenges and a variety of experiences for participants. Amidst these challenges, participants demonstrated a profound sense of responsibility toward patients, acknowledged personal and professional development opportunities and relied on professional solidarity and family support as coping mechanisms. It is crucial that healthcare organisations and policymakers use the findings of this study to implement targeted interventions aimed at supporting nurses' mental well-being. Addressing the underlying causes of work-related stress, including staffing shortages and inadequate educational preparation, and fostering organisational environments that promote resilience and professional growth, will ensure the continued provision of high-quality care while safeguarding the well-being of the nursing workforce.

Acknowledgements

I would like to begin by expressing my sincere gratitude to Almighty God for providing me with the strength, resilience, and guidance throughout this research journey.

I am profoundly grateful to my academic supervisors, Professor Chris Bundy, Dr. Tessa Watts and Dr. Dean Whybrow, for their unwavering support, insightful guidance, and mentorship. Their expertise was indispensable, and I could not have reached this milestone without their valuable assistance.

My heartfelt appreciation extends to my family, especially my parents, Mr. and Mrs. Temeng, my siblings, my son Josh, AJ, and my godfather, Dr. Andrews Larbi. Their constant love, encouragement, and belief in me have been a source of unwavering strength throughout this process.

I would also like to extend my appreciation to Elizabeth Gillen, Specialist Librarian, Cardiff University, who assisted with the database search; to the amazing review team for this project, Dr. Hewitt, R., Dr. Pattinson, R., and Dr Sydor, A.; and to all the staff at the School of Healthcare Sciences for their dedication and support, which have significantly contributed to the success of this work.

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List of Abbreviations

Abbreviation	Full form
A&E	Accident and Emergency department
Brief COPE	Coping Orientation to Problems Experienced inventory
CANOPI	Caring for All Nursing and Healthcare Practitioners' Initiative
CBT	Cognitive Behavioural Therapy
CIHAHL	Cumulative Index to Nursing and Allied Health Literature

CSM	Self-regulatory Common-Sense Model
ED	Emergency Department
ENSS	Expanded Nursing Stress Scale
EPRR	Emergency Preparedness Resilience and Response
EU/EEA	European Union and European Economic Area
GCP	Good Clinical Practice
HCARE SREC	School of Healthcare Science Research Ethics Committee
HRA	Health Research Authority
HSE	Health and Safety Executive
ICN	International Council of Nurses
ICU	Intensive Care Unit
ILO	International Labour Organisation
JBI	Joanna Briggs Institute
LFS	Labour Force Survey
MAU	Medical Assessment Unit
MERS-CoV	Middle East Respiratory Coronavirus
MMRS	Mixed-methods Systematic Review
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NMC	Nursing and Midwifery Council
PANAS	Positive Affect and Negative Affect Schedule
PPE	Personal Protective Equipment
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PTSD	Post-traumatic Stress Disorder
RCN	Royal College of Nursing

SARS	Severe Acute Respiratory Syndrome
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
UK	United Kingdom
WHO	World Health Organisation

Chapter 1: Introduction

1.0. Background of the study

Work-related stress continues to be a chronic issue in the healthcare sector, posing a threat to both the well-being of healthcare professionals and overall effectiveness of healthcare organisations. Compared to the broader workforce in the United Kingdom (UK), nurses are disproportionately at a higher risk of work-related stress (Conolly et al. 2022). This is mainly due to the demanding nature of their roles, which often include long and irregular hours, shift work, excessive workloads, emotional demands, inadequate organisational support, and exposure to traumatic situations (González-Pascual et al. 2024; Vu et al. 2024). Aserri et al. (2021) further highlighted that inadequate staffing levels, handling large patient loads, and insufficient breaks during shifts are significant contributors to stress among nurses in Saudi Arabia. Together, these stressors can undermine nurses' physical and mental health, thereby compromising patients' quality of care (Couper et al. 2022; Khamisa et al. 2015a; Nowrouzi et al. 2015).

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) pandemic has demonstrated that this new virus can exert unprecedented pressure on the already overstretched global healthcare system (Sun et al. 2022). The pandemic has intensified the existing stressors faced by nurses (Conolly et al. 2024), leading to a decline in job performance, diminished quality of care, and worsening mental and physical health among nurses (Wilbiks et al. 2021). A review of previous pandemics and epidemics found that high levels of psychological distress among healthcare professionals were associated with being a nurse, being female, and having direct contact with infected patients (Sirois and Owens 2021).

In the UK, an annual National Health Service (NHS) survey revealed that 41.7 per cent of staff reported feeling unwell as a result of work-related stress (NHS Survey 2023). This finding echoes the widespread and systemic nature of the issue. Research has consistently identified work-related stress as a significant contributor to burnout, anxiety, and depression among nurses, particularly during the SARS-CoV-2 pandemic (Sun et al. 2022). Moreover, nurses often encounter unprecedented challenges, such as balancing professional responsibilities with caring for family and friends, dealing with existential fears for themselves and others, and overcoming prolonged uncertainty (Chegini et al. 2021; Iddrisu et al. 2023). Protracted exposure to work-related stress can lead to a chain of adverse consequences including absenteeism, high staff turnover, diminished job performance, and psychological distress (Mohammed 2019; Ibrahim et al. 2023). Furthermore, the cumulative effects of work-related stress can lead to chronic burnout, depression, and a decreased quality of patient care (Wilbiks et al. 2021).

Work environment plays a crucial role in influencing nurses' well-being. Havaei et al. (2021) found that nurses' perceptions of unsafe working environments were correlated with increased reports of post-traumatic stress disorder (PTSD), anxiety, and depression. Jordan et al. (2016) highlighted that stress-induced absenteeism and mental health problems among nurses can lead to increased operational costs for healthcare systems, stating healthier nurses are more likely to provide quality care. This highlights the importance of addressing work-related stress not only for the well-being of nurses, but also for the overall effectiveness of healthcare delivery (Iddrisu et al. 2023).

Coping strategies play an important role in the management of work-related stress among nurses. However, the effective management of this stress is a complex

challenge due to the demanding nature of their roles. This requires a comprehensive understanding of the nurses' experiences and coping strategies. Studies have identified that nurses use both adaptive (problem-focused and emotion-focused) and maladaptive (avoidance) coping strategies. For instance, problem-focused coping strategies, such as time management, advocating for resources, seeking relevant information and training are frequently referred to as effective methods for managing stress, as they focus on changing stressors (Jannati et al. 2011). In addition, emotion-focused strategies, such as positive reappraisal and seeking emotional support in the short term, have been shown to relieve feelings of isolation and stress among nurses, thereby improving their overall well-being (Ali et al. 2021). Conversely, maladaptive coping strategies, such as avoidance or denial, can exacerbate stress and lead to increased psychological distress (Hasan and Tumah 2019). Conolly et al. (2024) found that during the early phase of the pandemic, nurses' coping strategies were characterised by "getting by" (where work-related stress was normalised), "getting out" or "job-hopping" (changed their working environment), "getting their needs met" (prioritised their own well-being through either sickness or unpaid leave) and 'getting organised' (questioned organisational changes). Although these emotion-focused strategies were short-term, nurses used them to cope with the challenges posed by the pandemic with the aim of enhancing their well-being and reinforcing their professional identity and resilience (Conolly et al. 2024). This underscores the importance of fostering supportive work environments that encourage positive coping strategies, while addressing the underlying causes of stressors (Iddrisu et al. 2023).

Addressing work-related stress among nurses requires a complete systemic approach to identify stress trigger points and develop tailored interventions. A

comprehensive examination of workplace stressors will enable employers, stakeholders, and policymakers to initiate evidence-based and proactive interventions that promote a safe working environment, nurses' well-being, job satisfaction, resilience, and quality of care.

1.1. Problem Statement

Epidemics and pandemics are known to have profound effects on society, economic stability, and disruptions to several aspects of life, particularly in healthcare systems and workforce (Madhave et al. 2017; Seale et al. 2009). At a time when the UK healthcare system faced a substantial shortage of staff, with a vacancy rate exceeding one in ten across the country (Buchan et al. 2019), the World Health Organisation (WHO) in January 2020 declared the outbreak of a new coronavirus disease, Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), latterly called COVID-19, as a global public health emergency. This emergency has immeasurably tested the healthcare systems in the UK and beyond.

As the largest group of healthcare professionals (WHO 2020), nurses have been at the forefront of pandemics and epidemics, providing direct care to patients (WHO 2020). Substantial evidence indicates that, during any public health crisis, nurses demonstrate a strong sense of ethical and moral obligation towards patients and the community (Arcadi et al. 2021; Al Muharraq 2021; Chiang et al. 2007; Kalateh et al. 2021; Lapum et al. 2021; Logiudice and Bartos 2021). As integral members of multidisciplinary teams, nurses have been instrumental in addressing global health threats from various pandemics and epidemics. These include the 2003 Severe Acute Respiratory Syndrome (SARS) outbreak, the 2015 Middle East Respiratory Coronavirus (MERS-CoV) epidemic, the 2016 Zika virus disease, the 2014 Ebola

virus disease, and the current SARS-CoV-2 pandemic that emerged in 2019 (WHO 2020).

Previous studies have shown that healthcare workers directly involved in patient care during global health threats are at high risk of experiencing emotional trauma (McAlonan et al. 2007). This trauma not only affects healthcare workers' health and well-being but also the quality of care provided to patients (Kang et al. 2020a; Patel et al. 2018). Healthcare professionals on the frontline providing care are confronted with personal and professional challenges, including dealing with the death of patients, dealing with the death of colleagues, fear of infection, and increased workload and complexity, as well as other ethical and professional dilemmas (WHO 2020). Issues such as inadequate material and human resources, poor management, lack of clearly defined crisis protocols, and until recently, the absence of vaccination can intensify the psychological impact of the pandemic on nurses (Lam et al. 2020; Xie et al. 2020; Inchausti et al. 2020; Lai et al. 2020) who are key members of frontline healthcare teams (Fernandez et al. 2020).

Despite these challenges, nurses and other healthcare professionals have demonstrated resilience and commitment and have continued to provide essential services (WHO 2020; Cui et al. 2020). Some have viewed these challenges as opportunities for professional growth (Galehdar et al. 2021; Chiang et al. 2007), gained new competencies (Cui et al. 2020; Danielis et al. 2021; González-Gil et al. 2021), increased job satisfaction to societal recognition (Deliktas et al. 2021; Galehdar et al. 2021; Kim 2018), new experiences (Sheng et al. 2020), and increased confidence (Liu et al. 2020; Sun et al. 2020; Shih et al. 2009). Nurses' commitment has been recognised globally during this pandemic (Freer 2020). In the

UK, healthcare workers were applauded for their commitment through the nationwide "Clap for our Carers" initiative during the initial phase of the pandemic, which lasted for a period of ten weeks. However, nurses' commitment came with significant risks, some of which were fatal (Lapum et al. 2020).

Emerging evidence has shown that the SARS-CoV-2 pandemic has increased concerns about the health and well-being of nurses (Lee and Lee 2020). The SARS-CoV-2 pandemic has presented nurses with unprecedented challenges, resulting in their disproportionate exposure to the virus (International Council of Nurses (ICN) 2021). Globally, millions of healthcare workers have contracted COVID-19, and tragically, during the early stages of the pandemic, there have been nearly 3,000 COVID-19-related deaths among nurses in 60 countries (ICN 2021). The available international literature has demonstrated that nurses are concerned about the heightened health risks associated with COVID-19 infection, the consistently high workload due to the increased number of severely ill patients, inadequate staff to effectively respond to the pandemic, and the presence of fear and uncertainty (Moradi et al. 2021; Santos et al. 2021; ICN 2021). These challenges have resulted in elevated levels of anxiety, stress, depression, panic attacks, frustration, self-blame, and poor mental health among nurses (Bahadir-Yilmaz and Yüksel 2020; Crowe et al. 2021; Fawaz and Itani 2021). Recent literature reviews have indicated that nurses are at a higher risk of psychological and emotional distress compared to other healthcare workers (De Kock et al. 2021; Vizheh et al. 2020; Cabarkapa et al. 2020; Shaukat et al. 2020; Batra et al. 2020).

The conflict between nurses' personal safety and their professional role has led some to reassess their purpose as nurses (Lee and Lee 2020). Some have

questioned their professional intent (Yildrim et al. 2021), expressing intentions to retire or leave their jobs, experiencing a low desire to work, and even regretting their decision to become nurses (Labrague and Santos 2021; Moradi et al. 2021). The long-term effects of COVID-19, such as Long-COVID and PTSD, could potentially have consequences, particularly for the nursing workforce (ICN 2021).

Although a growing body of literature explores work-related stress and coping among registered nurses during the SARS-CoV-2 pandemic globally, a significant research gap remains in examining the experiences of registered nurses (adult/mental health fields) working in hospital inpatient settings in Wales and England. A deeper understanding of the work-related stress encountered by nurses caring for severely ill patients with COVID-19 in these settings is crucial for developing targeted interventions, informing policies, and strengthening support systems within the healthcare workforce. Such insights can shape healthcare policies, guide evidence-based interventions to support nurses in future pandemics, and improve patient outcomes by addressing nurses' emotional challenges and coping strategies.

1.2. Research aims and objectives

The overarching aim of this study was to explore and better understand the work-related stress experienced by registered nurses (adult/mental health fields) who cared for severely ill patients with COVID-19 in hospital inpatient settings during the SARS-CoV-2 pandemic in Wales and England.

The research objectives were as follows:

- Explore work-related stress experienced by nurses caring for severely ill patients with COVID-19,

- Consider nurses' perception of the work-related stress experienced in caring for severely ill patients with COVID-19 (Challenge/Positive or Hindrance/Negative) and to
- Examine how nurses cope with work-related stress experienced in caring for severely ill patients with COVID-19.

1.3. Research questions

The following four key research questions were developed based on the study's objectives, which were informed by the mixed-methods systematic review in Chapter 3:

- What is the overall level of work-related stress experienced by nurses caring for severely ill patients with COVID-19?
- What work-related stressors did nurses experience while caring for severely ill patients with COVID-19?
- How do nurses perceive the work-related stress encountered in caring for severely ill patients with COVID-19? And
- What coping strategies did nurses use to manage the work-related stress they experienced while caring for severely ill patients with COVID-19?

Figure 1.0 illustrates how the mixed-methods systematic review (MMSR) in Chapter 3 informed the development of the research questions and shaped the overall research design. Through a systematic synthesis of empirical evidence on nurses' experiences during severe viral influenza outbreaks, the MMSR identified critical knowledge gaps, thereby ensuring that the research questions were both evidence-based and contextually relevant.

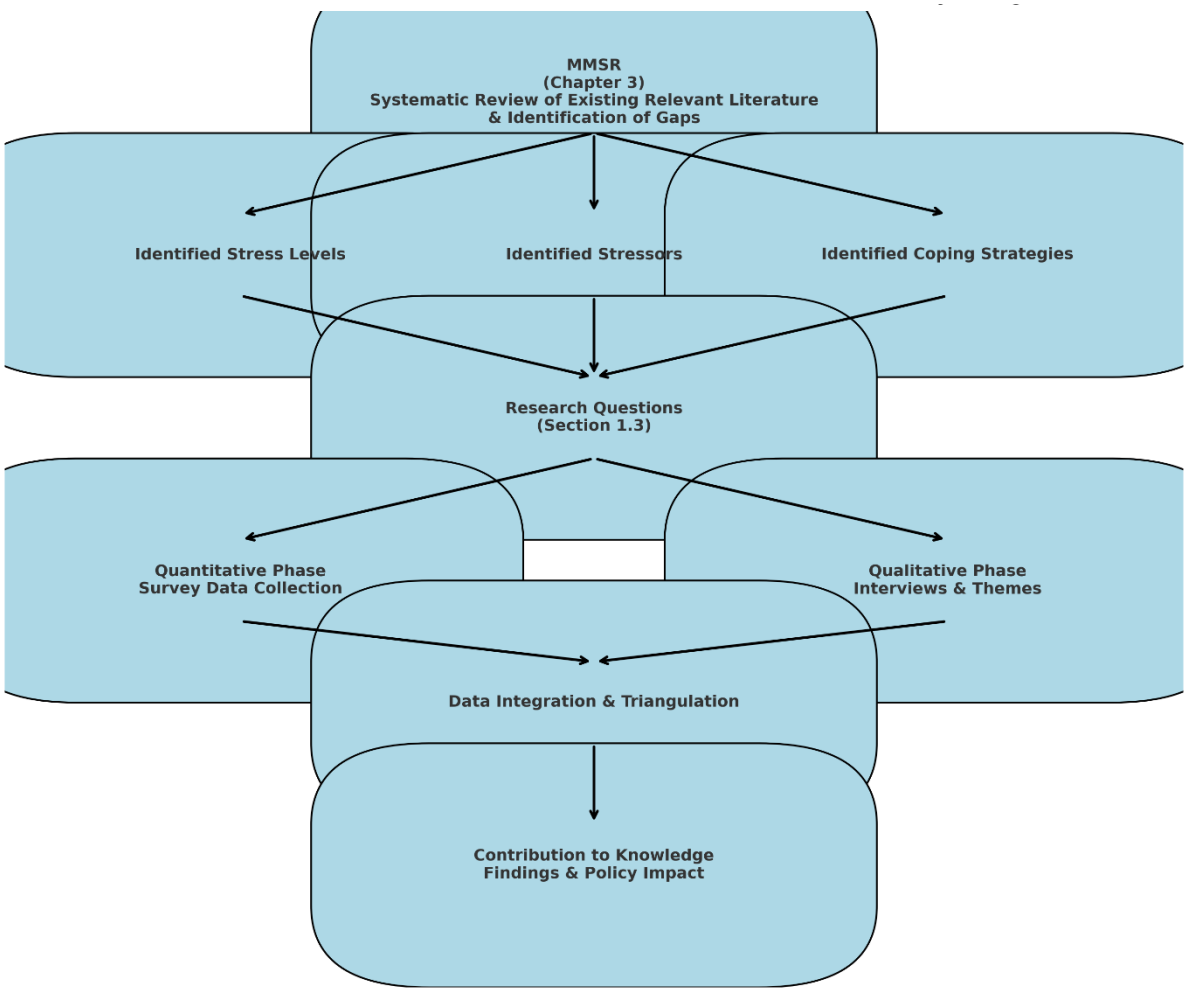


Figure 1.0: A flowchart illustrating how the MMSR informed the research questions and study design

1.4. The importance of this research study

Nurses play an important role in providing healthcare services. While all healthcare workers are essential to sustaining a functional healthcare system, nurses are often considered the cornerstone of any healthcare organisation (Bandeali and Maita 2023). They make a central contribution to national and global targets related to a range of health priorities, including universal health coverage, mental health and noncommunicable diseases, emergency preparedness and response, patient safety, and the delivery of integrated people-centred care (WHO 2020). The UK nursing workforce works across a wide variety of care settings within NHS hospitals, private clinical settings, and community services, with the majority working in acute, elderly, or general care (Audit Office 2020).

Through close contact and interaction with patients, nurses deliver personalised care holistically according to patient needs and concerns, resulting in improved patient experiences and outcomes (Tamshan et al. 2022). The presence of nurses at the bedside around the clock enables the development of therapeutic relationships and in-depth knowledge of patients, further facilitating patient advocacy (Jackson et al. 2021). As patient advocates, nurses guide individuals through the healthcare system, providing essential support, facilitating dialogue, and ensuring informed decision making (Tamshan et al. 2022; Ritta 2023). Given the substantial amount of time spent with patients, nurses' interactions significantly affect patient satisfaction and care experiences (Bandeali and Maita 2023).

These demanding roles make nursing practice straining in nature, resulting in work-related stress (Chukwu et al. 2024), which remains a global issue that impacts healthcare delivery and nurses’ well-being (Mohammed et al. 2024). Stress arises

from multiple factors such as staff shortages, increased workload, widespread criticism, high patient-to-nurse ratios, emotional strain, and ethical dilemmas, all of which increasingly challenge nurses' ability to adhere to their professional values (Allen 2015). Additionally, these challenges negatively affect patient outcomes, hinder efforts to improve public health, jeopardise patient safety, increase mortality rates and reduce the quality of care (Tamata and Mohammadnezhad 2022; Mahmood et al. 2023). Systemic failures within the UK healthcare system, reflected in reports such as Francis Inquiry (2013), Health Service Ombudsman (2011), and Care Quality Commission (2011), highlight these issues. Nurses often bear the brunt of public criticism of these failures, which can intensify work-related stress (Hewison and Sawbridge 2014).

The SARS-CoV-2 pandemic intensified these stressors, revealing deep-rooted challenges and exposing longstanding gaps and weaknesses in the UK healthcare system (Oliver 2020; Maniatopoulos and Hunter 2024; Shah et al. 2024; Khan 2023). Nurses working during the pandemic faced unprecedented pressure, and their well-being suffered as a result (Deakin 2022). While previous studies have examined the overall well-being of the nursing workforce during the early stages of the pandemic (Couper et al. 2022; Gray et al. 2022), these studies grouped registered nurses with other healthcare staff such as student nurses, midwives, and healthcare assistants. Evidence has shown that sources and factors of work-related stress vary substantially with nurses' working environments, job roles, and levels of responsibility (Alenezi et al. 2018; Al-Makhait et al. 2014). Given the dynamic role that registered nurses play during global health crises, understanding their experiences is necessary. For instance, an eyewitness statement from experts such as Doctor Fong, a National Clinical Adviser in Emergency Preparedness Resilience and

Response (EPRR) for the Covid-19 incident, recounted the working conditions faced by nurses. He described the working conditions in the NHS as “a scene from hell”, narrating the shortage of staff and resources and how some nurses even resorted to wearing adult diapers due to lack of basic function breaks (Lacobucci 2024).

As the experiences of registered nurses who bore the brunt of caring for severely ill patients with COVID-19 in inpatient hospital settings have not yet been thoroughly investigated, I felt that there was a need to address the gap in research. This study could help shed light on the experiences of registered nurses as lived during an outbreak, provide insights for improving working conditions, enhance policies, and help develop robust interventions that could support nurses in future pandemics. The findings of this study could inform policy decisions aimed at safeguarding the well-being of nurses, enhancing patient care, and strengthening resilience of the healthcare workforce. By providing empirical evidence on the key challenges and coping strategies employed by nurses during public health crises, this study supports the development of targeted interventions designed to reduce work-related stress, improve mental well-being, and optimise workplace conditions, ultimately contributing to the delivery of higher-quality patient care.

1.5. Personal interest in this study

The SARS-CoV-2 pandemic has redefined healthcare systems, posing unprecedented challenges for frontline healthcare professionals. As a registered nurse (Adult field) working in an NHS Wales Emergency Department during the pandemic, I experienced these challenges firsthand, which shaped my research.

Before embarking on my PhD journey, I worked full-time as a registered nurse (Adult field) in an NHS Wales Emergency Department, both before and during the SARS-

CoV-2 pandemic. Initially, the emergency department (ED) operated efficiently with strong managerial and colleague support as well as adherence to clinical regulations and protocols. However, the emergence of the SARS-CoV-2 pandemic brought significant changes to the working environment. We (nursing staff) first learned about the COVID-19 virus through media reports and informal discussions without anticipating its profound impact. Some weeks later, we were formally informed to expect cases of “the virus” in our department and to report any signs to the nurse-in-charge. At that time, symptoms were vaguely described as similar to the common cold or flu, treating flu-like symptoms as community acquired pneumonia, leading to confusion and misinformation. With limited knowledge of the virus and no established infection control protocols, the ED was largely unprepared for this crisis. This heightened stress, fear, and anxiety among healthcare workers.

In the initial days, we only had standard-issued personal protective equipment (PPE) such as aprons and gloves. In subsequent weeks, we received disposable surgical masks and visors, to be used cautiously to avoid alarming patients. Therefore, we often attend to patients with minimal PPE. As the pandemic peaked, the department experienced staff shortages due to infections which further increased workload, strained the working environment, and reduced managerial support.

Tragically, a colleague took his own life during this period. While the exact reasons for the suicide remain unclear, I believe the pandemic played a significant role. This heartbreaking event reinforced my interest in research on the experiences of frontline nurses during the pandemic. Working during the pandemic was clouded by the fear of infection, uncertainty, overwhelming, and helplessness. As a single parent, I felt isolated and relied mainly on regular phone calls from my family

overseas for emotional support. The constant information overload from the media exacerbated the stress. Anticipating that other nurses, particularly those separated from their families, might have felt the same, I was motivated to explore the emotional impact of the pandemic on nurses' personal and professional well-being. This study is a reflection of my personal experience, academic curiosity, and commitment to improving the well-being of nurses.

1.6. Definition of terms used in this research

For the purpose of this research, the following definitions of terms were adopted.

Viral influenza outbreaks: An acute viral infection that spreads easily from person to person in any age group and can cause serious complications (WHO 2016a).

Pandemic and epidemic: An outbreak becomes a pandemic when it spreads globally or an epidemic when it is limited to a small geographical area with little or no pre-existing immunity in the human population (WHO 2016a).

Nursing: A safety-critical profession with four pillars: clinical practice, education, research, and leadership, while a registered nurse is someone who applies these principles to assess, plan, implement, and evaluate nursing care (Royal College of Nursing (RCN) 2023). This definition is adopted because it emphasises the need for nurses to effectively integrate emotional, physical, organisational, and cognitive labour to meet the diverse needs of individuals, organisations, systems, and populations (RCN 2023).

Registered nurses: Use evidence-based knowledge, professional and clinical judgement to assess, plan, implement, and evaluate high-quality person-centred

nursing care (RCN 2023). Registered nurses in the UK are registered with and meet the standards set by the Nursing and Midwifery Council (NMC) (Audit Office 2020).

Inpatient hospital setting: Patients are admitted over a period of time to receive medical care, treatment, and monitoring. These settings include all hospital wards and specialised units such as the Accident and Emergency department (A&E), Intensive Care Unit (ICU), and Medical Assessment Unit (MAU).

Work-related stress: A harmful reaction that people experience due to pressures and demands placed on them at work (Health and Safety Executive (HSE) 2021).

Sources of work-related stress (stressors): Circumstances of threat, difficulty, demands, or structural limitations that raise concerns about an organism's ability to function (Wheaton et al. 2012)

Coping: The cognitive and behavioural efforts individuals use to manage stress, challenges, or difficult situations they encounter (Folkman and Moskowitz 2003).

1.7. Chapter summary

In this introductory chapter, a brief overview of work-related stress among nurses and the study's problem statement, aims, objectives, and research questions which collectively framed the study are presented. The chapter emphasised the importance of understanding nurses' experiences during the pandemic to inform future policies, improve crisis response strategies, and better support nurses in future health emergencies. Additionally, working definitions of key terms used in the study were provided to ensure clarity and consistency throughout the research.

1.8. Structure of the Thesis

Chapter 1: Introduction: A brief background on work-related stress among nurses and the study's problem statement, aims, objectives, and research questions which collectively framed the study are presented. Finally, working definitions of key terms used in the study were provided to ensure clarity and consistency throughout the study.

Chapter 2: Literature Review: A critical review of the existing literature concerning work-related stress in the nursing profession during viral influenza outbreaks. This chapter introduces the concept of work-related stress, discusses the key theoretical frameworks essential to work-related stress and coping mechanisms, and examines the impact of past viral influenza outbreaks on the nursing profession and healthcare systems.

Chapter 3: Nurses' coping strategies for caring for patients during severe viral respiratory pandemics: a mixed-methods systematic review. This chapter presents a published mixed-methods systematic review (MMSR) and narrative synthesis of nurses' experiences during viral influenza outbreaks. The MMSR identified significant gaps in the literature, which further supports the need for this study.

Chapter 4: Methodology: This chapter focuses on the methodology that underpins this study. To begin, an overview of the study's theoretical framework was provided, followed by a discussion of the philosophical assumptions and rationale for the chosen research design that underpin this study. The chapter then details the data analysis procedures, integration strategies, and approaches used to ensure ethical rigour.

Chapter 5: Quantitative Findings: This chapter presents the analysis and findings of the data collected through a cross-sectional online survey.

Chapter 6: Qualitative Findings: This chapter presents a thematic analysis and interpretation of the qualitative data collected through one-to-one semi-structured interviews.

Chapter 7: Discussion and Conclusion: This chapter presents the integration of key findings from the quantitative (Chapter 4) and qualitative (Chapter 5) phases of the study. The key findings are discussed and interpreted in relation to the study objectives, theoretical framework, and the relevant literature. Finally, conclusions are drawn, highlighting the study's original contributions to existing knowledge. This chapter also provides evidence-based recommendations for practice and future research. Finally, the study’s strengths, limitations, and dissemination strategies are discussed.

Chapter 2: Background and Context

2.0 Introduction

This chapter provides an overview of the literature on stress, coping, and the effects of viral influenza outbreaks, with a particular focus on their impact on the nursing workforce. This chapter is organised into two main sections. The first section explored foundational concepts of stress, work-related stress, and coping, highlighting the key psychosocial factors that contribute to stress in nursing and their effects on the workforce. Key theoretical frameworks relevant to work-related stress and coping mechanisms were examined, shedding light on effective approaches for measuring stress and coping. The second section examined the impact of past viral influenza outbreaks on the nursing profession and the broader healthcare system.

2.1. The concept of stress

The concept of stress has evolved considerably with extensive discussions and refinements in the literature over the past decades. Initially introduced in biological research by Selye (1987, p. 17), who defined it as "a non-specific response of the body to any demand for change." Selye argued that stress is a state of threatened homeostasis (the stability of physiological systems that maintain life) caused by internal or external stressors (Scheitz et al. 2018). Following criticisms of being too vague, confusing, and ambiguous, Selye later refined stress and offered the following operational definition:

> *"A state manifested by a specific syndrome which consists of all the non-specifically induced changes within the biological system" (Selye 1976b, p. 64).*

According to Selye, stress is an ever-present state that individuals experience throughout their exposure to nonspecific demands. He differentiated between acute stress and the overall response to chronic stressors, referring to the latter as the general adaptation syndrome or Selye's syndrome (Ça et al. 2024). This syndrome comprises three phases: alarm reaction, resistance, and exhaustion. When individuals encounter a stressor, they initially react with surprise, attempt to maintain homeostasis by resisting change, and ultimately succumb to exhaustion when trying to counter the stressor (Ça et al. 2024).

Although Selye's stress theory has played a pivotal role in shaping our understanding of how individuals respond to challenges, the concept of stress has advanced and broadened significantly (Lu et al. 2021). Some researchers have criticised Selye's definition of stress and pointed out its contradictions and limitations. For instance, Nageishi and Nageishi (2015), challenged the universality of Selye's definition and suggested that stress responses may vary based on individual factors and circumstances. Acknowledging the intricate nature of stress, diverse definitions (Table 2.0) have been established across various fields, emphasising its multifaceted nature and the necessity of a comprehensive understanding that encompasses physiological and psychological aspects (Fink 2017).

Table 2.0: Differences in stress definitions

Author (s)	Stress definition
Health and Safety Executive (HSE 2000)	*'Stress is the adverse reaction people have to excessive pressures or other types of demand placed on them'*.
European Commission (1999)	*'The emotional, cognitive, behavioural and physiological reactions to aversive and noxious aspects of work, work environments, and work organisations. It is a state characterised by high levels of arousal and distress and often by feelings of not coping'.*
Falsetti et al. (2005)	'Stress is any unpleasant emotional experience which is accompanied with predictable biochemical, physiological, and behavioural changes'
Confederation of British Industry (2000)	*'That which arises when the pressures placed upon an individual exceed the perceived capacity of that individual to cope'.*
Trades Union Congress (2000)	'*Stress occurs where demands made on individuals do not match the resources available or meet the individual's needs and motivation'.*
Cooper and Palmer (2000)	*'Stress occurs when perceived pressure exceeds your ability to cope'.*
International Labour Organisation (ILO 2016)	*'Stress is the harmful physical and emotional response caused by an imbalance between the perceived demands and the perceived resources*

	and abilities of individuals to cope with those demands'.
Michie (2002)	*'Stress is the psychological and physical state that results when the resources of the individual are not sufficient to cope with the demands and pressures of the situation'.*
Sarafino (2002)	*'Stress is considered as a situation which is the result of interactions of individuals and their surrounding environments and causes disharmony between situational demands and biopsychosocial resources'.*

Owing to its numerous definitions, the concept of stress has been a subject of debate in many disciplines. In the psychological sciences, Lazarus and Folkman (1984, p. 19) defined stress as 'any situation in which internal demands, external demands, or both, are appraised as taxing or exceeding the adaptive or coping resources of an individual or group'. In other words, stress occurs when individuals' perceptions of external expectations are greater than their perceived ability to meet those demands (Folkman 2013). Despite the differences in stress definitions (Table 2.0), it is acknowledged that stress is a personal experience caused by pressure or demands on an individual and impacts the individual's ability to cope, or rather, his/her perception of that ability (Blaug et al. 2007).

Thus, stress is widely regarded as a pervasive phenomenon that can affect an individual's health in various ways. This may be triggered by external factors in an individual's environment or by their own internal perceptions. In their definition,

Lazarus and Folkman (1984) suggested that people perceive stress from three main perspectives: what in the environment causes the stress; how they appraise stress; and their responses and reactions in managing stress. In effect, how individuals appraise stress determines their responses and reactions (Lazarus and Folkman 2006).

The implications of stress have expanded greatly to include both negative and positive aspects, such as adapting to the existing environment and anticipating future challenges (Lu et al. 2021). Therefore, Lazarus and Folkman (2006) argued that the stress experienced by individuals can be either positive or negative depending on the individual's reaction to it. This viewpoint is comparable to that of Selye (1974), who distinguished between good stress as eustress and bad stress as distress. Eustress can be beneficial for an individual's well-being as it may trigger a mild stress response, enhance their ability to cope with adversity, and promote growth (Lu et al. 2021). Good stress can also lead to growth and increase in an individual's functional capacity (Donovan et al. 2013). However, when an individual is unable to cope with stress due to negative response to the environment, it can lead to distress, which may result in a severe stress response, impair the body's ability to maintain balance and homeostasis, and potentially harm an individual's health (Lu et al. 2021). It must be acknowledged that stress is a normal part of humanity and life; it is a state, not an illness. However, prolonged exposure can also cause physical and psychological health problems (Donovan et al. 2013; Fink 2017).

In the ongoing exploration of stress, researchers have acknowledged that stress varies in duration and frequency. According to Crosswell et al. (2020) and Folkman (2011), stressors commonly manifest in different time frames. These include chronic

stressors, life events, daily events/hassles, and acute stress, as illustrated in Table 2.1. Nevertheless, it is posited that stress experiences frequently defy categorisation (Crosswell et al. 2020).

Table 2.1: Categories of stress by timeframes

Categories of stress	Definition	Implications on health
Life events	These events involve significant adjustment to individual's current life patterns which can be positive or negative	Exposure to a higher number of stressful life events has been found to be associated with a decline in mental health, as well as the development and progression of cardiovascular disease
Traumatic life events	Traumatic life events are a subclass of life events in which individual's physical and/or psychological safety is threatened	Experiencing a larger number of traumatic events throughout one's life is consistently linked to poorer health and a higher risk of mortality
Daily events/hassles	Interruptions or difficulties that happen frequently in daily life such as work overload, and that can build up overtime to create persistent frustration or overwhelm	An intense emotional reaction to daily hassles has been found to be associated with a decline in both mental and physical health
Acute stress	Short-term, event-based exposures to threatening or challenging stimuli that evoke a psychological and/or physiological stress response	Acute stressors have been found to be associated with increased risk of cardiovascular disease

Note: Adapted from Crosswell et al. (2020)

2.1.1. Psychosocial factors contributing to work-related stress

Work is a central part of life, valued not only as a primary source of income, but also as a means for personal and professional development. It provides a sense of purpose and fosters a sense of belonging within a community (Pfejfer-Buczek et al. 2023). However, when the work environment becomes a significant source of stress, it can negatively impact employee well-being (Pfejfer-Buczek et al. 2023). The workplace can be a major source of stress, significantly impacting individuals, organisations, and stakeholders (Jalagat 2017). When discussing stress in the workplace, it is mostly linked to notions such as performance, motivation, and employee well-being, which have become pivotal points in literature (Harshana 2018).

Notably, workplace stress has been investigated under different terminologies, including “job stress”, “occupational stress”, “organisational role stress” and “workplace stress”. However, some researchers have argued that despite differences in terminology, these terms are grounded in the same meaning (Johari 2020). For the clarity and purpose of this study, the term “work-related stress” was adopted. Work-related stress arises when job demands do not match or exceed workers’ capabilities, resources, or needs or when workers’ knowledge or skills do not match organisational expectations (ILO 2016). The Health and Safety Executive (HSE 2021) further defined work-related stress as a harmful reaction that people experience because of the pressures and demands placed on them at work.

Several factors in the work environment classified as psychosocial factors often contribute to work-related stress. According to the ILO (1984), psychosocial factors are defined as “interactions between and among work environment, job content, organisational conditions and workers’ capacities, needs, culture, and personal

extra-job considerations that may, through perceptions and experience, influence health, work performance, and job satisfaction". Indeed, job dissatisfaction which manifests in symptoms such as irritation, tension, depression, or reduced ability to concentrate, often emerges when an organisation fails to balance individual elements and the working environment (Hernández-Rodríguez et al. 2022). When workplace conditions and personal resources are imbalanced, it may lead to emotional instability, behavioural problems, and hormonal imbalances presenting added risks of mental or physical issues. On the contrary, balanced interactions between workplace conditions and personal resources can create a feeling of mastery and self-confidence, enhance motivation, performance, and job satisfaction, and improve health (ILO 2016).

Research on work-related stress has shown that the interplay of psychosocial work factors and individual elements can impact employee stress levels, particularly in high-demand working environments, such as the healthcare sector (Hernández-Rodríguez et al. 2022). Previous studies have examined the association between psychosocial safety environment, social support, and stress levels among healthcare professionals, highlighting the significance of these factors in shaping the work environment and employee welfare (Hernández-Rodríguez et al. 2022). The adverse effects of psychosocial factors have been a great concern, and there is a wider perception that work-related stress has significant implications on workers' health and safety, as well as the performance of the organisation (ILO 2014; Cox et al. 2000).

Between 2020 and 2021, the HSE estimated that 822,000 workers experienced work-related stress, depression or anxiety responses, accounting for 50% of all

work-related ill health cases. Comparing these figures to the previous Labour Force Survey (LFS) (2018), the prevalence of work-related stress among workers in 2020 increased to 79% from 59% in 2018. Notably, of these workers, healthcare professionals reported significantly high rate of work-related stress (HSE 2021). The Health and Well-being at Work Survey (Chartered Institute of Personnel and Development 2021) corroborated these findings, accentuating that while work-related stress was predominant, the SARS-CoV-2 pandemic exacerbated the situation, becoming a principal cause of stress at work.

The nursing profession is widely considered to be one of the most stressful professions within the healthcare sector, exemplifing the profound impact of work-related stress (Chien and Yick 2016; Alomari et al. 2021; Kowshik et al. 2024). Chien and Yick (2016) in their study about the role of work-related stress and strain on nurses from an international perspective asserted that globally nurses are the most stressed and strained professionals compared with other healthcare professionals, with similar findings across both public and private sectors. Nurses are tasked with providing comprehensive, humane, empathetic, and evidence-based care while managing intense psychosocial demands (NMC 2018; Khamisa et al. 2015). These expectations, combined with challenges such as inadequate staffing, excessive workload, increased healthcare complexity, emotional labour, difficult working conditions, shift work, violence and abuse from patients and their families, quality of leadership and management, and constantly changing patient care demands, often lead to severe work-related stress (Labrague et al. 2018; Alomari et al. 2021; Ghorbani et al. 2022).

Multiple studies have highlighted the complex and multifaceted nature of work-related stress in hospital settings, with variations across different healthcare systems and geographical locations. Taking a global perspective, and despite differences in sources of public and private healthcare funding, the findings reflect both commonalities and region-specific challenges. For instance, Ashraf et al. (2024) examined the prevalence of stress among hospital nurses in Pakistan (*n=400*) and identified heavy workloads (70%), long working hours (60%), and poor working relationships (45%) as major stressors. While these findings align with broader global trends, they also reflect region-specific challenges, such as resource constraints and staffing shortages, which may exacerbate work-related stress in low- and middle-income countries.

Conversely, Peter et al. (2020) conducted research in Switzerland and found that opportunities for professional development, managerial behaviour, and workplace incentives were key predictors of stress. Their study highlighted that nurses and midwives had fewer opportunities for career advancement compared to other healthcare professionals, contributing to heightened stress levels. This disparity suggests that, while structural factors such as workload are universal, organisational culture and leadership significantly shape stress experiences within high-income healthcare systems. Similarly, Saparniene et al. (2023) investigated stressors in Lithuanian hospital settings and identified poor communication, strained relationships with colleagues and authorities, rapid decision making, work-related errors, and high patient demand as significant contributors to stress. These findings indicate that, beyond workload and professional development, interpersonal and systemic factors also play a crucial role in influencing stress levels.

Moreover, studies have consistently shown that nurses working during viral influenza outbreaks, such as SARS, MERS, and H1N1 experienced significantly higher levels of occupational stress compared to healthcare professionals with less direct exposure to infected patients (Chung et al. 2005; Honey & Wang 2013; Kim 2018). This pattern highlights the compounded psychological burden placed on nurses during public health crises, reinforcing the need for robust institutional support systems to mitigate stress and protect their mental well-being in future public health emergencies.

2.1.2. Effect of work-related stress on nurses

Work-related stress has become a prevalent, costly, and pervasive issue in the workplace (Babapour et al. 2022). In nursing, this issue has long been recognised as a significant challenge that cannot be overlooked (Akpor et al. 2023). The negative impacts of work-related stress in the nursing profession are well-evidenced, impacting nurses' well-being, staff outcomes, and the quality and safety of patient care (Labrague et al. 2018). Previous research has indicated that nursing is a highly stressful occupation with various stressors such as workload, patient-related demands, low wages, long working hours, time pressure, job-related pressure, and emotional labour (Alanazi et al. 2019; Gopinath et al. 2021). While work-related stress is inherent to the nursing profession and can be useful in a small amounts (Botha et al. 2015; Babapour et al. 2022), continuous or excessive exposure to stress can profoundly affect staff, patients, and organisational outcomes (Shirey et al. 2013). This could also be detrimental to the quality and efficiency of healthcare services (O'Malley et al. 2014). Literature has consistently shown that the prevalence of work-related stress among nurses is notably high, with a significant percentage experiencing elevated levels of stress (Wang 2023). Work-related stress can

adversely affect the mental and physical health of nurses, thereby affecting their overall performance (Hersch et al. 2016).

Studies have demonstrated that work-related stress can have negative consequences on nurses' general health, including increased risk of depression and decreased life satisfaction (Al-Ghabeesh et al. 2022; Xu et al. 2021), burnout (Li et al. 2020; Jannati et al. 2011), and the development of physical disorders, including musculoskeletal and cardiovascular diseases (Faraji et al. 2019). There is growing evidence indicating a correlation between an unfavourable working environment and a range of physiological disorders, including diabetes and cardiovascular disease among workers (Liang et al. 2018). Physiological symptoms, such as elevated blood pressure, headaches, heart disease, dissatisfaction, loss of appetite, and disturbed sleeping patterns, have been reported among nurses (Meri and Mustika 2024). Smart (2024) revealed the significant stress that the pandemic had placed on nurses, leading to compassion fatigue and intention to leave the profession. Furthermore, Al-Hrinat (2024) explored the impact of stress on nurses' quality of life. Findings indicated that work-related stress was associated with increased sleep disturbance, which in turn led to poorer quality of life outcomes. These findings emphasise that stress can negatively affect nurses' professional performance and the quality of care they provide (Al-Hrinat 2024).

The implications of work-related stress extend beyond personal well-being and influence the quality of job performance and patient-care outcomes. Work-related stress among nurses is also associated with decreased job performance, increased errors, reduced job satisfaction, burnout, absenteeism, and turnover (Faraji et al. 2019; Mohammed 2019). A systematic review by Alkhawaldeh et al. (2019)

demonstrated that nurse stress can lead to decreased patient engagement and a lower quality of patient care, all of which can compromise the overall quality of care delivered in healthcare settings. Additionally, research by Ali (2024) suggested that high levels of stress among nurses can lead to reduced efficiency, productivity, job satisfaction, and quality of nursing care, and highlighted the multifaceted consequences of stress on nurses and patient outcomes. Stress among nurses has been shown to significantly impact both their well-being and concurrently, the quality of care they provide to patients (Babapour et al. 2022). In their study, Babapour et al. (2022) emphasised that work-related stress can adversely affect the physical and mental well-being of nurses, diminish their energy and work efficiency, and impair the provision of adequate nursing care, which ultimately results in negative patient outcomes. Thus, it is necessary for nurses to develop effective coping strategies to deal with work-related stress (Salamati and Jahromi 2022). Additionally, when examining the impact of stress on nurses, it is equally important to consider diverse, targeted approaches to managing stress within healthcare systems to maintain quality care (Alraimi 2023) and the well-being of nurses.

2.2 The concept of coping

Lazarus and Folkman (1984) defined coping as: *"constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person".* In other words, the cognitive and behavioural efforts individuals use to manage stress or challenge difficult situations they encounter (Folkman and Moskowitz 2003). According to this definition, the phenomenon of coping occurs following stress appraisal and incorporates cognitive and behavioural strategies that aim to effectively manage stressful experiences and their subsequent outcomes. Evidence has shown that the

effectiveness of coping strategies can significantly impact an individual's mental health, well-being, and ability to successfully navigate stressful situations (Bondarchuk et al. 2024). Budimir et al. (2021) reported that coping strategies are crucial tools for managing stress and enhancing mental health, particularly during the SARS-CoV-2 pandemic. Assessing and improving coping strategies can be essential in supporting healthcare workers, patients, and individuals affected by stressors, such as those related to the SARS-CoV-2 pandemic or specific health conditions (Cox 2024).

Coping strategies can vary according to individual characteristics, experiences, and context. Researchers have proposed different coping classifications to examine how individuals manage stressful situations. Brown and Nicassio (1987) distinguished between active and passive coping strategies. Active coping involves individuals proactively dealing with stressful events using available resources. This approach has been linked to lower depression levels, reduced functional impairment, and higher general self-efficacy. Passive strategies, on the other hand, are characterised by helplessness and reliance on others. It is associated with increased depression, greater functional impairment, and lower general self-efficacy (Brown and Nicassio 1987). Carver and Connor-Smith (2010) offered another classification: engagement versus disengagement coping strategies. Engagement coping strategies involve accepting and confronting stressful events and managing related emotions, whereas disengagement coping strategies involve distractions, avoidance, and denial. The literature indicates that disengagement coping strategies are generally less effective in dealing with stressors, often leading to negative outcomes, compared to engagement coping strategies (Dijkstra and Homan 2016). For example, a survey of how people in the US coped during the early phase of the SARS-CoV-2 pandemic

identified that while disengagement coping strategies such as distraction and avoidance were popular and temporarily improved individuals' well-being in the long term, they were associated with a decline in emotional well-being (Waugh et al. 2022).

Compas et al. (2001, 2006) classified coping into three categories: primary control engagement which involves problem-solving, changing the situation, and regulating emotions; secondary control engagement which involves positive thinking, acceptance, and distraction; and disengagement coping which mirrors the denial and avoidance strategies discussed previously. Evidence has shown that coping with primary and secondary control is associated with adaptive outcomes, such as better emotional well-being and physical health (Surachman and Almeida 2018). This study followed Lazarus' (1993) classification of coping. He categorised coping into problem-focused strategies aimed at addressing stressors and emotion-focused strategies designed to regulate emotional responses to stressors (Lazarus 1993). Lazarus' copying classifications are further discussed in Section 2.3 of this thesis.

Positive coping strategies, such as resilience factors and adaptive strategies, have been shown to improve an individual's ability to cope with stressors and maintain mental well-being during challenging times, thereby mitigating the negative impact of stress on mental health and overall quality of life (Bondarchuk et al. 2024). Nurses employ different coping strategies, including cognitive, affective, and behavioural techniques, to mitigate the impact of work-related stress (Elliason 2021).

A cross-sectional descriptive study by Sutharshan et al. (2021) examined the coping strategies used by nurses to manage the work-related stress experienced in hospital settings. They differentiated between emotion-focused coping, which regulates

emotional responses to stressors, and problem-focused coping, which involves actively addressing and resolving stressful situations through individual behaviour (Sutharshan et al. 2021). They revealed that nurses used coping strategies, such as regular engagement in religious activities, positive thinking, time management, and social support, to overcome work-related stress (Sutharshan et al. 2021). Additionally, a mixed-methods study unravelling the dynamics of job stressors and coping strategies among nurses in the UK revealed that while these stressors can have detrimental effects on nurses' physical and mental health, nurses possess an array of adaptive strategies that involve a combination of problem-focused and emotion-focused coping strategies (Austen et al. 2023). These coping strategies include using social support, personal resilience building, accessing stress management training, use of reflective practices, and organisational strategies such as balanced rosters and enhanced professional development opportunities (Austen et al. 2023). Lee and Cho (2016) examined gender differences in coping strategies among nurses, and found that, the use of challenging, emotion-focused, and avoidant coping strategies varied according to both gender and years of professional nursing experience. Understanding these differences can guide the development of interventions to support nurses, based on their coping preferences and needs. It is imperative for nurses to develop effective coping mechanisms to deal with the effects of stress in their demanding profession (Satoh 2016). Studies have also highlighted the importance of interventions aimed at improving nurses' occupational commitment to enhance their job satisfaction and retention in the profession (Varma et al. 2016).

2.3. Stress and Coping theories

Theories have been developed and extensively researched to understand work-related stress and coping strategies. These theories highlight the central role of

psychological processes such as perception, cognition, and emotion (Hassard and Cox 2015). They help in understanding how individuals recognise, experience, and respond to stressful situations; how they cope with these experiences; and how stress affects their physical, psychological, and social health (Hassard and Cox 2015). The literature generally categorises stress theories into physiological, psychological, and theoretical models, interpreting stress as a stimulus, response, or transaction.

Physiological stress theories

Physiological stress theories view stress as a natural and adaptive response. These stress responses can be both acute, such as the “fight or flight” reaction, and chronic, as seen in Selye’s General Adaptation Syndrome. As described by O’Brien and Cooper (2022), these theories are associated with allostasis, the body's mechanism for maintaining balance (homeostasis). Selye’s General Adaptation Syndrome was one of the earliest physiological stress theories to describe the stress process at the system level, including the threat and the individual’s reaction to it. Selye (1976) labelled this process general because it was produced only by agents which have a general effect on large portions of the body, adaptive because it stimulated defence and, thereby, helped in the acquisition and maintenance of a state of acclimatisation, and syndrome because individuals’ manifestations are coordinated and, even partly, dependent upon one another (p. 38). The response to stimuli included the direct effect of stress on the organism, internal responses that stimulated tissue defence to destroy the damaging threat, and internal responses that caused tissue surrender by inhibiting unnecessary or excessive defence (Selye 1978). Selye noted that resistance and adaptation depend on a proper balance of the three factors that occur during general adaptation syndrome (p. 56). However, if

the initial alarm stage is too severe or too chronic, adaptation is ineffective and the final stage of exhaustion occurs. According to this model, stress responses are thought to be non-specific, with organisms reacting uniformly to any threat regardless of their nature or source. This implies that an employee's reaction to a workplace stressor mirrors their reaction to stress outside of work. However, subsequent research has demonstrated that stress responses are often stimulus-specific and vary significantly, depending on the type and context of the stressor (Jacoby et al. 2021).

Psychological theories of stress

Psychological stress theories view stress as the interaction between individual characteristics and environmental demands. These theories assume that stress arises when there is a discrepancy or mismatch between the individual characteristics or resources and the demand placed on them (Rif et al. 2021). The focus is on an individual's perception and evaluation of the potential damage caused by external environmental demands (Surachman and Almeida 2018). Largely, these theories are categorised into interactional models, which focus on the structural relationship between individuals and their environment, and transactional models, which consider the dynamic processes of appraisal and coping. The transactional model which guides this study is discussed further in this chapter.

Interactional models assume a direct cause and effect relationship between stressors and stress responses. These models assert that stress is a result of specific external stimuli, and focus is on identifying and mitigating these stressors to reduce stress levels (Harris 2020). Examples of such models are the person-

environment fit theory (French et al. 1974), the job demand-control model (Karasek 1979), and the effort-reward imbalance model (Siegrist 1996).

The person-environment fit theory proposed by French et al. (1974) suggests that stress occurs when there is a misfit between individuals and their environments. A good fit between an individual's attributes and environmental demands promotes mental and physical well-being, while a poor fit can lead to maladjustment, which typically generates tension in both the person and environment (Cooman and Vleugels 2022). The person-environment fit theory addresses three core principles of fit: fit is a more powerful predictor of individual outcomes than either the person or the environment alone; outcomes are optimal when personal attributes and environmental attributes are compatible, regardless of whether the level of attributes is low, medium, or high; and misfit between personal and environmental attributes produces negative outcomes irrespective of the direction of the discrepancies (Vianen 2018).

While the person-environment fit theory has been extensively used to study work-related stress (Herkes et al. 2019; Bauer and Herbig 2019; Tiwari 2021), it has been criticised for its lack of practical applications. Challenges such as an unclear distinction between different types of fit, confusion between different functional forms of fit, methodological problems related to the poor measurement of fit components, and inappropriate analysis of the impact of fit on stress have been identified in the literature (Ahmad et al. 2023).

Another prominent example of an interactional model is the job demand-control model which claims that stress arises when there are high job demands such as increased workload, increased responsibilities, low autonomy, and skillset (Karasek

1979). Job demands refer to the quantity and pace of work associated with a job which includes both psychological and physical demands (Ibukun and Perotin 2023). Psychological demands often include time-related pressures such as tight deadlines, whereas physical demands may arise from the need to adapt to new or evolving workplace tasks and processes, which require employees to continuously update or acquire relevant skills (Ibukun and Perotin 2023). This model argues that high job demands can lead to stress, however, this can be mitigated by providing individuals with job control. High psychological demands in the workplace together with low autonomy are associated with poorer psychological well-being, worse job dissatisfaction, burnout, and work-related distress (Reif et al. 2021). Although this model is deemed to be the best measure of stress levels at work (Bouillon-Minois et al. 2022), it has been criticised. Critics argue that job control does not always interact with psychological demands, as suggested by the job demand-control model, challenging its applicability in effectively examining work-related stress (Burr et al. 2021).

Siegrist's effort-reward imbalance model (1996) offers another interactional perspective, suggesting that stress is a result of a combination of extrinsic factors, such as effort and reward, and intrinsic factors including over-commitment. The model maintains that a lack of reciprocity generates negative emotions and stress responses, with adverse long-term effects on health (Siegrist and Li 2016). The model hypothesises that the individual components of effort, reward, and over-commitment are associated with negative outcomes; the imbalance between effort and reward has a stronger association with the outcome than any of the individual factors in isolation; and that over-commitment moderates the effects of effort-reward imbalance on poor health (Siegrist and Li 2016). Studies have shown that an

imbalance between effort and reward can lead to mental health and physiological disorders (Nasirpour et al. 2024; Coelho et al. 2024; Riopel et al. 2023). The model has received support from previous reviews focusing on the health indicators of cardiovascular and cardiometabolic risks (Airaksinen et al. 2018; Eddy et al. 2017). Although widely supported, this model has also been criticised. For instance, Montano and Peter (2021) in their cohort study questioned the model's assumption that over-commitment exacerbates the effect of effort-reward imbalance on health. They argued that high over-commitment with high effort-reward imbalance does not always lead to increased absenteeism, rather, complex motivational processes may be at play (Montano and Peter 2021).

The Transactional Model of Stress and Coping (Lazarus and Folkman 1984) informed this study, given its relevance to the context of nursing stress, as evidenced by de Cordova et al. (2024) and other scholarly works. This model was selected due to its foundation in pragmatic epistemology (Kaur, 2016), which aligns with the philosophical worldview outlined in Chapter 4. Its application facilitated a comprehensive exploration of registered nurses' experiences, perceptions, and coping strategies in managing work-related stress during the SARS-CoV-2 pandemic.

The Transactional Model of Stress and Coping (Lazarus and Folkman 1984) proposes a comprehensive perspective on how individuals experience and manage stress. This model examines stress and the coping process, describing it as a product of transactions between individuals and their complex environments. Rather than viewing stress as static, the model contends that stress is an evolving process that develops from constant interaction between individuals and their environments.

This model suggests that the way individuals interpret a stressful situation determines their response, which is influenced by external factors. For instance, individuals may respond differently to similar situations and experience reactions, such as anger, depression, anxiety, or guilt. Some individuals may exhibit acceptance, whereas others may use denial as a coping strategy in the same situation. For example, an individual might ignore an insult, while another might be angry and seek revenge (Lazarus and Folkman 1984). As acknowledged by Lazarus and Folkman (1984), positivist counterarguments contend that, since human environments are never the same, individual differences are not necessarily due to individual characteristics. Nevertheless, the transactional model proposes that, to comprehend individual differences, it is important to consider the cognitive processes that mediate between the encounter and the response, and the factors that influence this mediation. Thus, the model identified two core processes: cognitive appraisal and coping.

Cognitive appraisal entails the evaluation of the meaning and significance of what is happening in the person-environment relationship and the appraisal of resources to meet demands. Lazarus and Folkman (1984) proposed that cognitive appraisal of a stressor involves both primary and secondary appraisals. Primary appraisal involves evaluating a situation to determine whether it is irrelevant, benign-positive or stressful. When the situation has no implication for an individual's well-being, it becomes irrelevant and therefore, no action is taken. On the other hand, benign-positive appraisal occurs when the outcome of a situation is favourable. This type of appraisal is often accompanied by emotions such as joy, love, happiness, exhilaration, or peacefulness (Lazarus and Folkman 1984). By contrast, the model posits that stress appraisals include harm or loss, threats, and challenges. In harm or

loss, some damage to the person has already occurred, such as injury, illness, or realisation of damage to a loved one. While a threat refers to potential dangers or losses that have not yet occurred but are anticipated, challenge appraisals focus on the potential for gain or growth inherent in a situation. Whereas the emotions associated with a challenge are positive, such as eagerness, excitement, and exhilaration, threats generally elicit negative emotions, such as fear, anxiety, and anger (Lazarus and Folkman 1984). In contrast to threats, challenges have significant implications in adaptation. As exemplified by Lazarus and Folkman (1984), individuals who are motivated by their circumstances to embrace challenges are likely to thrive compared to those who are discouraged or feel threatened.

Whether the situation presents itself as a threat or challenge, the model proposes a second appraisal to manage the situation, which is referred to as secondary appraisal. This appraisal involves evaluating what might and can be done as well as what is at stake. It considers the resources or coping options available and can be applied effectively. Dual appraisal processes (primary and secondary) interact simultaneously to determine the significance and meaning of events concerning well-being. For instance, people appraise stressful situations as either potentially threatening or challenging and potentially beneficial for their well-being, performance, and self-development. If a situation is perceived as a hindrance stressor (negative), it is considered a threat and therefore negative. Alternatively, if a situation or event is interpreted as challenging and individuals feel that they can meet demands, the situation is perceived as a challenge stressor (positive) (Folkman and Lazarus 1988; Lazarus and Folkman 1987).

Effective coping mechanisms not only improve an individual's quality of life but also reduce healthcare costs and enhance organisational productivity (Johari 2020). Coping profiles differ across professions, and studies conducted in fields such as education, healthcare, and law enforcement have identified sector-specific stressors and coping strategies (Iwanowicz-Palus et al. 2022). The SARS-CoV-2 pandemic has introduced new workplace stressors, necessitating the use of theoretical frameworks to address employee health and well-being (Gauer and Germann 2021). The transactional model categorises coping strategies primarily into problem-focused and emotion-focused strategies. Problem-focused coping entails practical strategies to address and change the stressful situation, whereas emotion-focused coping aims to modify the relationship between the stressor and its perceived impact, often through denial, avoidance, or cognitively reframing a situation (Lazarus and Folkman 1984). Maladaptive coping strategies typically provide short-term relief from stress, but may exacerbate the problem in the long term. In contrast, adaptive coping strategies equip individuals with resources for managing stressors in the long term and can lead to resilience (Lazarus and Folkman 1984).

The Transactional Model of Stress and Coping (Lazarus and Folkman 1984) is widely used as a guiding theory to understand and address stress in various occupational settings (Frydenberg and Lewis 2004). Evidence has shown that professionals in various fields, such as healthcare (Hundah et al. 2024; de Cordova et al. 2024; Elliason 2021a), teaching (Woods et al. 2023), and management (McCarthy et al. 2019) have effectively used this model to manage stress and create interventions to boost job performance and resilience. For instance, in nursing, this model has been used to identify coping strategies adopted by nurses and midwives in developing countries to mitigate the effects of occupational stress. Both problem-

focused and emotion-focused coping strategies were identified, with a greater emphasis on problem-focused coping strategies (Elliason 2021b). These results suggest that nursing staff are more likely to adopt coping strategies to manage occupational stress, leading to recommendations for interventions that could mitigate and reduce perceived stress among nurses and midwives (Elliason 2021b). Another study also employed the Lazarus and Folkman model to explore the coping strategies adopted by radiologists during the SARS-CoV-2 pandemic, providing baseline information for enhancing preparedness and developing interventions to support staff during future health crises (Hundah et al. 2024). These findings have contributed to the development of tailored mental health interventions to support radiologists during future health outbreaks (Hundah et al. 2024).

Although the transactional model is criticised for its applicability (Falconier and Kuhn 2019; Lim et al. 2023) compared to other models such as the Systemic Transactional Model (Bodenmann 1995), the Interaction Model of Client Health Behaviour (Cox 1982), and the Conservation of Resources theory (Hobfoll 1989), it offers a flexible and dual process. This facilitates a richer understanding of stress and coping strategies, and has substantial implications for research and practice. The model provides a framework for investigating how individual characteristics and subjective experiences affect stress and coping. Additionally, it enables researchers to explore the intricate relationships between stressors, appraisals, and coping mechanisms, thereby providing a comprehensive understanding of stress management. Practically, a model's focus on an individual's assessment and specific coping styles can help inform bespoke interventions (Korbmacher and Wright 2020).

2.3.1. Measuring stress and coping

Measurements of stress and coping strategies are needed to gain insight into how individuals respond to stressors and the effectiveness of their adopted coping strategies. Psychological models of stress and coping offer a comprehensive framework for assessing the sequence of stress experiences and the coping strategies employed. These models often define the processes involved in experiencing stress, including the identification of both physiological and psychological dimensions, as well as the coping strategies utilised to manage stressors.

Stress and coping strategies can be assessed through self-report measures, behavioural coding, or physiological measurements (Crosswell et al. 2020). Numerous self-report measures have been developed to evaluate stress and coping strategies. Some widely used measures in stress and coping research include the Perceived Stress Scale (Chen et al. 1983), the Social Readjustment Rating Scale (Holmes and Rahe 1967), the Hassles and Uplifts Scale (Kanner et al. 1981), the Coping Self-Efficacy Scale (Chesney et al. 2006), the Brief Resilient Coping Scale (Sinclair and Walston 2004), and the Proactive Coping Inventory (Greenglass and Schwarzer 1998). According to Folkman (2011), the choice of measure depends on the research aims, questions, or hypotheses to be tested and the outcome of interest.

2.4. Overview of viral influenza outbreaks

Viral influenza outbreaks, such as epidemics and especially those that become pandemics, pose a substantial threat to public health and have profound economic implications for societies (Falcinelli et al. 2016). Previous respiratory infection

outbreaks have resulted in high fatality rates, disrupted healthcare systems, and affected the general population and the healthcare workforce (Madhav et al. 2017; Asplin et al. 2024). Outbreaks such as SARS (Maunder 2004), H1N1 (swine flu) (Fitzgerald 2009), MERS (Kim 2018), and the recent SARS-CoV-2, lately called COVID-19 (WHO 2019), are unpredictable, extremely contagious and can cause high morbidity and mortality rates in the population (WHO 2017).

The recent SARS-CoV-2 pandemic has brought viral influenza outbreaks to the forefront of public health concern (Noor and Maniha 2020). COVID-19 respiratory disease, which is caused by the SARS-CoV-2 virus, has emerged as the most severe viral respiratory illness the world has encountered since the Spanish flu in 1918 (Alharbi et al. 2022). Notably, the virus poses severe risks in the highly developed countries, with the utmost severity of the pandemic reported in the United State of America (USA), Italy, Spain, Germany, France, UK and Iran (Noor and Maniha 2020). Three years after the emergence of the SARS-CoV-2 pandemic, more than 765 million confirmed cases and 7 million deaths have been reported globally (WHO 2023).

2.4.1. Clinical presentation of SARS-CoV-2 and public measures

The transmission of Covid-19 from human to humans is primarily airborne through respiratory droplets, either by contact with contaminated objects and surfaces or close contact with infected persons (Burke et al. 2020; Ong et al. 2020; Brewster et al. 2020; Lauer et al. 2020). A virological study on the incubation period of Covid-19 infection based on 88 confirmed cases estimated a median gestation period of 6.4 days (95% credible interval (CI): 5.6–7.7days), with a range of 2.1 to 11.1 days (Backer et al. 2020). Other Covid-19 clinical analysis estimated a median incubation

period of 5.0 days; 5.1 days (CI, 4.4 to 5.6 days; 95% CI, 4.5–5.8 days) with a range of 2 to 14 days (Lauer et al. 2020; Linton et al. 2020). These studies projected that within 2.2 days (CI, 1.8 to 2.9 days) of exposure, less than 2.5% of infected individuals will show symptoms, whereas 97.5% of individuals who develop mild to severe symptoms do so within 11 days (95% CI, 8.2–15.6 days). These projected gestation periods of Covid-19 are comparable to those of previous influenza outbreaks, such as SARS (range 2 - 10 days) (Varia et al. 2003).

Confirmed cases ranged from asymptomatic (showing no symptoms) to symptomatic cases (showing mild to severe symptoms). The clinical presentation of Covid-19 symptomatic cases is generally in the form of a respiratory infection, often with cough, high temperature, shortness of breath, blood oxygen saturation of <93%, chest pain, fatigue, sore throat, loss of appetite, anosmia, myalgia, and headache (Wang et al. 2020; Chen et al. 2020). In addition to respiratory symptoms, other manifestations associated with gastrointestinal and neurological disorders have also been reported. Most commonly, gastrointestinal symptoms such as abdominal discomfort, nausea, vomiting, and diarrhoea are prevalent among infected patients (Ye et al. 2020; Gurung et al. 2023). For instance, Gurung et al. (2023) reported that gastrointestinal symptoms were observed in 165 patients with COVID-19, with diarrhoea in 67 patients (40.6%) and nausea and/or vomiting in 66 patients (40%). Additionally, Kerzhner et al.'s (2024) systematic review revealed that patients with COVID-19 continue to experience gastrointestinal discomfort for up to a year after recovery. Neurological manifestations, such as headache, anxiety, dizziness, depression, and confusion, have also been identified (Helms et al. 2020; Díaz-Ramírez et al. 2023).

Most patients with COVID-19 return to their baseline state of health following acute infection with SARS-CoV-2 (Soriano et al. 2022). However, an increasing number of individuals continue to experience persistent and often debilitating symptoms, a condition referred to as Long-COVID, also referred to as post-acute sequelae of SARS-CoV-2 infection (PASC) (Soriano et al. 2022; Finamore et al. 2024) The World Health Organization defines Long-COVID or PASC as a condition that affects individuals with a history of probable or confirmed SARS-CoV-2 infection, which typically manifests three months after the onset of the initial infection and is characterised by symptoms that persist for a minimum of two months, which cannot be attributed to an alternative diagnosis (Soriano et al. 2022). Several systematic reviews have reported that 30%–50% of individuals experience enduring symptoms lasting up to a year (Fahriani et al. 2021; Chen et al. 2022; Han et al. 2022; Luo et al. 2024), which subsequently affects their quality of life (Carlile et al. 2024).

Viral influenza outbreaks in hospitals have been linked to imported coronaviruses, emphasising the role of international travel in the spread of these infections (Wilson and Zumla 2019). The symptoms of viral respiratory infections are often non-specific in the early stages, leading to the delayed recognition of outbreaks (Geis et al. 2013). Viral influenza outbreaks pose significant challenges in healthcare settings, highlighting the importance of infection control measures and genomic epidemiology in outbreak investigations (Javaid et al. 2020). The emergence of novel respiratory viruses, such as SARS-CoV-2, has further emphasised the need for proactive measures to prevent and control viral influenza outbreaks (Kılıç et al. 2021), both in the community and within hospitals and other healthcare settings. In the context of viral influenza outbreaks, the role of zoonotic transmission from infected animals to humans has been highlighted, with various zoonotic events leading to significant

outbreaks in the past, such as avian influenza, SARS, and other viral diseases (Habib 2021).

In response to the spread of the SARS-CoV-2 virus, several public health interventions have been implemented (Sibley et al. 2020). Worldwide, stringent mitigation measures such as travel restrictions, stay-at-home orders, school closures, targeted public space and workplace closures, quarantine and isolation orders, universal guidance on handwashing, social distancing, and the use of face covering have been implemented by policymakers and governments (Ayouni et al. 2021; Groves et al. 2021; Al Barak 2024). Previous viral influenza outbreaks have shown that such restrictive measures could effectively reduce the spread of the virus (Ayouni et al. 2021). Nevertheless, the imposed public restrictions necessitated individuals to adapt to the “new normal”, which in turn had an impact on their mental health due to the unpredictability and frequent changes in restrictions (Al Barak 2024).

2.4.2. The significance of SARS-CoV-2 pandemic on nursing

The emergence of SARS-CoV-2 has had a profound impact on nursing practice and has exacerbated existing challenges in the workforce. The literature indicates that the pandemic has placed immense pressure on an already strained nursing workforce (Couper et al. 2021). Nurses have encountered a range of work-related stressors, including frequent protocol changes, inadequate personal protective equipment (PPE), staff shortages, excessive workloads, moral distress, emotional difficulties, role conflicts, and fear of contracting the virus (Ashraf et al. 2024; Galanis et al. 2021; Melander et al. 2024; Iddrisu et al. 2023). These challenges have not

only impacted the well-being of nurses, but have also had repercussions on patient care and organisational performance (Iddrisu et al. 2023).

The impact of SARS-CoV-2 on nursing practice has been extensively documented, particularly among nurses working in hospitals and inpatient healthcare facilities. These nurses face heightened risks due to various interconnected factors, such as increased susceptibility to the virus and multiple challenges within their working environments (Asha et al. 2024). COVID-19 infections have been prevalent and devastating in hospitals and inpatient healthcare facilities, highlighting the profound impact of the virus on nursing practice (Helanne et al. 2023; Rafie et al. 2021; Kain et al. 2023). Furthermore, the high rates of infection in hospitals have emphasised the need for regular screening to prevent outbreaks (Garg et al. 2023; Constantin et al. 2024). The risk factors associated with SARS-CoV-2 infection in these settings have highlighted patients and nurses vulnerability and the resulting challenges in care provision (Atashi et al. 2023). Difficulties in meeting patient needs during outbreaks further complicate nursing care, highlighting the importance of evaluating nurses' knowledge and practices to enhance patient safety (Sugg et al. 2021; Asha et al. 2024; Al-Smadi et al. 2022).

Healthcare workers, particularly nurses, have borne the brunt of the pandemic, while the general population remains at home due to restrictions (Liss 2021). These professional groups face the dual threat of disease transmission and overwhelming workloads, leading to significant psychological distress (Lim et al. 2023a). Nurses have experienced increased physical stress, disruptions in their personal and social lives, and a general sense of unpreparedness in dealing with pandemics, all of which have affected their ability to perform their duties effectively (Bártlová 2024;

Widyastuti and Nurjannah 2022). Research has also focused on the psychosocial difficulties faced by nurses, especially during the initial phases of pandemics like SARS-CoV-2, highlighting the importance of identifying resources to support their well-being, particularly in high-demand settings, such as critical care (Guttormson et al. 2022). The challenges of maintaining patient safety during pandemics have also been a cause for concern, with studies examining how nurses uphold safety standards amid crises (Lin et al. 2021).

The resilience and dedication of nurses during pandemics and epidemics have been widely acknowledged (WHO 2022). Studies have observed the unprecedented challenges they faced, which led to increased turnover intentions and significantly impacted their well-being and work environments (Falatah 2021; Raso et al. 2021). The pandemic has also had transformative effects on nursing education and training, as evidenced by experiences of nursing administrators, educators, and students (Farsi et al. 2021).

Furthermore, societal perceptions of nursing have evolved during pandemics with increased recognition of nurses' contributions to healthcare systems (Uysal and Demirdağ 2022; Hoşgör 2024). The effects of mental health on nurses working during pandemics have been a significant focus, with studies emphasising the need for support interventions to address the psychological impact of high-stress environments (García-Vivar et al. 2022).

The direct care of patients with COVID-19 has significantly increased the risk of infection among nurses, thereby affecting their mental health (Dziedzic et al. 2022). Nurses face unique challenges that have significantly affected their mental health during the pandemic. High levels of stress, anxiety, and depression are common

among healthcare professionals during events like the SARS-CoV-2 pandemic (Pool 2024). Factors such as increased social and occupational risks, fear of viral exposure, and concerns about infecting others have contributed to the psychological burden on nurses (Pool 2024). The sudden and unprecedented nature of pandemics often leaves healthcare workers feeling insufficiently prepared and unsupported, negatively affecting their work environments (Babore et al. 2020). Research has shown that healthcare workers treating patients with COVID-19 are particularly susceptible to secondary trauma, emphasising the need for effective preventive strategies in future pandemic situations (Vagni et al. 2020).

Coping mechanisms play a pivotal role in navigating the challenges posed by pandemics. Nurses have employed a range of strategies, including emotion regulation, adaptation to new circumstances, and seeking social support, to effectively manage stress and enhance their mental health (Tahara et al. 2020). However, the unique circumstances of pandemics can intensify feelings of anxiety, stress, and depression among healthcare workers (Akanko, 2023).

While some studies have suggested that healthcare workers may experience similar or even greater mental health outcomes than non-healthcare workers during pandemics (Noordt 2023), other studies have emphasised the significant impact on nurses' well-being, particularly the emotional strain resulting from witnessing patient suffering and death (Ireland et al. 2022). To bolster mental well-being during these challenging times, effective coping strategies have been identified, such as social support, being informed, engaging in regular exercise, and utilising humour as a coping mechanism (Lee 2023; Canestrari et al. 2021). Additionally, spiritual coping methods have proven beneficial for emergency department nurses and medical staff

in reducing stress during pandemics (Soola et al. 2022). The ramifications of pandemics extend beyond the professional lives of healthcare workers, impacting their personal well-being and work-life balance. Nurses, in particular, play a vital role in managing viral influenza outbreaks by facing significant hurdles that frequently result in burnout and persistent psychological distress. The SARS-CoV-2 pandemic has underscored the need for comprehensive support systems to address the mental health challenges faced by nurses (Ahmed 2023). Understanding nurses' experiences during pandemics offers valuable insights into the development of strategies aimed at supporting their well-being and fortifying healthcare systems in readiness for future crises.

2.5. Chapter Summary

This chapter provided a review of stress and coping strategies in the nursing work environment. It began by critically examining the concept of stress and tracing its evolution and definitions across disciplines. Key psychosocial factors contributing to work-related stress were explored, along with the effects of stress on nurses demanding roles. Particular emphasis was placed on the potential implications for nurses' physical and mental health, job satisfaction, and professional retention. Furthermore, the chapter discussed the concept of coping, key theories on stress and coping, and provided an in-depth analysis of the theoretical framework underpinning this study in relation to other models.

Finally, the chapter concluded with an overview of viral influenza outbreaks, providing context for the challenges healthcare professionals, particularly nurses, encountered during health crises. The significance of the SARS-CoV-2 pandemic

and its profound impact on the nursing workforce and healthcare systems were also examined.

Chapter 3: Nurses' coping strategies for caring for patients during severe viral pandemics: A mixed-methods systematic review (Temeng et al. 2023)

3.0. Introduction

This chapter presents a published article that forms part of this thesis: Nurses' coping strategies for caring for patients during severe viral pandemics: A mixed-methods systematic review (MMSR) (Temeng et al. 2023). The MMSR offers empirical insights and a broader narrative on work-related stress and coping within the nursing profession, highlighting the challenges nurses face during health crises. Through a critical review of nurses' perceptions of health threats, emotional responses, and coping strategies, this review identifies gaps in the literature. In addition, an updated systematic review was conducted to incorporate recent studies and expand the knowledge base in this area. The chapter concludes with a summary of the key findings of the MMSR and offers recommendations for future research.

A preliminary search of the PROSPERO, Cochrane Database of Systematic Reviews, and Joanna Briggs Institute (JBI) Database of Systematic Reviews and Implementation Reports was conducted to identify existing systematic reviews of nurses' experiences during viral influenza pandemics or health emergencies. This search revealed two relevant systematic review protocols addressing nurses' experiences with emerging infectious diseases: a quantitative review (Rozwaha et al. 2020) and one qualitative review (Fernández et al. 2020). Unlike these two reviews, this MMSR integrated qualitative, quantitative, and mixed-methods studies to enhance the understanding of nurses' experiences and to inform responses to the ongoing SARS-CoV-2 pandemic and potential future infectious disease outbreaks.

3.1. Review questions

This MMSR addressed the question: What is known about nurses' experiences of caring for patients with severe viral diseases during influenza outbreaks?

Specifically, this review aimed to address the following sub-questions:

I. What factors influence the experiences of nurses caring for patients during severe viral influenza outbreaks?
II. How do these experiences affect nurses' health and well-being (physical, social, and psychological)?
III. How do these experiences affect nurses' professional identity and intention to remain in the profession?
IV. How have these experiences influenced patients' care?
V. How have these experiences affected collaboration with other healthcare professionals (multidisciplinary teamwork)?
VI. What lessons can be learned from previous viral influenza outbreaks to inform the management of SARS-CoV-2 pandemic and future health crises?

3.2. Methods

3.2.1 Review design

The mixed-methods systematic review was informed by the JBI methodology for mixed-methods systematic review (MMSR) (Lizarondo et al. 2020) and reported using the updated Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (Page et al. 2021). A prior protocol for this MMRS was developed and registered with the International Prospective Register of Systematic Reviews database (PROSPERO CRD42021253378, see Appendix A).

3.2.2. Review search strategy

With assistance from a specialist librarian and using a structured search strategy to locate both published and unpublished studies, five electronic databases, Medline, Cumulative Index to Nursing and Allied Health Literature (CIHAHL), PsychInfo, ASSIA, and Scopus, were searched on 4th May 2021. Keywords and index terms from relevant article titles and abstracts were used to create a comprehensive search string, that was applied to all five databases. The following keywords were used in the search string: “Experience” (MeSH) OR perception OR “lived experience” OR opinion OR understanding OR belief OR view OR judgement OR attitude OR perspective AND “influenza outbreak” (MeSH), OR “pandemic” OR “epidemic” OR “disaster” OR “severe acute respiratory syndrome” OR “SARS-CoV” OR “Middle East respiratory syndrome coronavirus” OR “MERS-CoV” OR “Swine flu”, OR “H1N1” OR “Avian Influenza” OR “H5N1” OR “Covid-19” OR “SARS-CoV-2” OR “coronavirus” AND “Nurse” (MeSH) OR “Registered Nurse” OR “nursing staff”. Full search strategies are provided in Appendix B.

Since the initial search in May 2021, several new studies have been published, providing new insights and perspectives into the experiences of nurses caring for COVID-19 patients during the SARS-CoV-2 pandemic. To capture this emerging literature, an updated search was conducted on 24 August 2024. The updated review followed the same search strategy, selection criteria, and quality appraisal methods as the initial review, and included articles published between 2022 and 2024.

3.2.3. Eligibility criteria

Peer-reviewed primary research articles, including qualitative, quantitative, and mixed-methods studies published in English between 2003 and 2024, were eligible for inclusion. While these criteria may introduce language bias and exclude earlier foundational studies that could offer historical insights, they were necessary to ensure consistency, methodological rigor, and reliability of the review findings. In this review, the WHO definition and classification of diseases were used to categorise severe viral influenza outbreaks. Influenza is an acute viral infection that spreads easily from person to person in any age group and can cause serious complications (WHO 2016a). Given the timeframe of this review, five severe viral influenza pandemics and epidemics were covered: SARS, MERS, Swine flu (H1N1), Avian influenza, and SARS-CoV-2 (COVID-19). Consequently, only articles related to these five outbreaks were eligible for inclusion, whereas systematic reviews and other review types were excluded.

3.2.4. Inclusion and exclusion criteria

All identified citations were uploaded to EndNote X9.2 (Clarivate Analytics, PA, USA) and duplicates were removed. Using Covidence v 2627, titles and abstracts were screened against the inclusion criteria for the review. Studies meeting the inclusion criteria were retrieved for full-text and assessed independently by three reviewers (ET, RP, and RH). Full-text studies that did not meet the inclusion criteria were excluded, with reasons provided in Table 3.0. Any disagreements that arose between the reviewers were resolved by a fourth reviewer (DW).

Table 3.0: Inclusion and exclusion criteria employed in the selection process

Inclusion Criteria	Exclusion Criteria
• Reported on severe viral respiratory disease (epidemic/pandemic)	• Reviews (systematic, rapid, integrated and other reviews), Case studies, Commentaries, conference abstracts, editorials, unpublished empirical data, grey literature, validation studies, theoretical models
• Study population of nurses involved in direct care of patients with viral respiratory disease (SARS, MERS, Swine flu H1N1, Avian influenza and SARS-CoV-2 (Covid-19)	• Not published in the English language
• Peer Reviewed	• Social care, primary care, residential care or care home setting
• Reported on the experiences and/or coping strategies of adult/mental health nurses who cared for infected patients	• Nurses not in direct care of patients with viral respiratory disease
• Hospital /Tertiary care setting	• Study population of Midwives, Neonatal nurses, School nurses, Students nurses, Nurse assistants, Veterinary nurses, Healthcare professionals (hcp)
	• Pooled analysis of healthcare professionals' data
	• Studies on the non-influenza pandemic or epidemic (for example Ebola).

3.2.5. Quality appraisal

Eligible studies were imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI) and critically appraised by two independent reviewers (ET and AS) for methodological quality using the JBI critical appraisal tools. Qualitative studies and the qualitative component of mixed-methods studies were evaluated using the standardised JBI qualitative critical appraisal tool. Similarly, the included quantitative studies and the quantitative component of mixed-

methods studies were appraised using the standardised JBI quantitative critical appraisal tool. Any disagreements that arose between the reviewers were resolved through discussion.

Each parameter of the appraisal tool was scored and converted into percentages. Each parameter of the JBI appraisal tool was scored and converted into a percentage to ensure objective and rigorous quality assessment. Studies scoring below 50% were deemed by the review team to be of low quality and were, therefore, excluded. This threshold minimised the risk of bias, ensuring that only methodologically robust evidence contributed to the synthesis. By applying this approach, the review maintained transparency, replicability, and adherence to the established systematic review standards, thereby enhancing the credibility and reliability of the findings. A list of excluded studies and the reasons for their exclusion can be found in Appendix C. Some of the included studies scored below 70%, owing to methodological inconsistencies. While all included quantitative studies identified confounding factors, only 45% clearly stated strategies for addressing confounding factors. Of the 48 qualitative studies reviewed, only 20 explicitly included statements outlining researchers' beliefs, values, and potential influence on the study. Additionally, one cohort study (Laudanski et al. 2021) and one prevalence study (Su et al. 2007) were included. Tables (3.1; 3.2; 3.3; 3.4) below summarise the quality appraisal results for the identified studies.

Table 3.1: Quality appraisal results for included analytical cross-sectional studies

Citation	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Results (%)**
Abu Sharour et al. (2021)	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*Y*	*88%*
Al Muharraq (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*88%*
Bahadir-Yilmaz and Yüksel (2020)	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*88%*
Cho and Kim (2021)	*Y*	*N*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*75%*
Cinar et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Crowe et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*88%*
Doo et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Emad et al. (2023)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*88%*
Feifei et al. (2022)	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*75%*
Nur and Şentürk (2023)	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*75%*
Franco et al. (2020)	*N*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*75%*
Gonzalez-Gil et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*88%*
Han et al. (2020)	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*88%*
Heo et al. (2021)	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*88%*
Honey et al. (2013)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*U*	*63%*
Hong et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*

Hoseinabadi et al. (2020)	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*88%*
Labrague and Santos (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Lee et al. (2005)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*88%*
Leng et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*88%*
Li X et al. (2021)	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*88%*
Logiudice and Bartos (2021)	*Y*	*N*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*75%*
Lyu et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*88%*
Murat et al. (2021)	*N*	*N*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*63%*
Park et al. (2018)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Pasay-an (2020)	*Y*	*N*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*75%*
Pourteimour et al. (2021a)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Sagherian et al. (2020)	*Y*	*N*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*75%*
Santos et al. (2021)	*Y*	*N*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*75%*
Wang et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Zhan et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Zhang et al. (2020)	*Y*	*N*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*75%*
%	*88*	*55*	*92*	*89*	*100*	*46*	*92*	*97*	

Y - Yes, N - No, U - Unclear, N/A - not applicable

1. Were the criteria for inclusion in the sample clearly defined? 2. Were the study subjects and the setting described in detail? 3. Was the exposure measured in a valid and reliable way? 4. Were objective, standard criteria used for measurement of the condition? 5. Were confounding factors identified? 6. Were strategies to deal with

confounding factors stated? 7. Were the outcomes measured in a valid and reliable way? 8. Was appropriate statistical analysis used?

Table 3.2: Quality appraisal results for included cohort study

Citation	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Results (%)**
Laudanski et al. (2021)	*Y*	*Y*	*Y*	*U*	*U*	*Y*	*Y*	*Y*	*Y*	*N/A*	*Y*	*73%*
%	*100*	*100*	*100*	*50*	*0*	*50*	*100*	*50*	*50*	*0*	*100*	

Y - Yes, N - No, U - Unclear, N/A - not applicable

1. Were the two groups similar and recruited from the same population? 2. Were the exposures measured similarly to assign people to both exposed and unexposed groups? 3. Was the exposure measured in a valid and reliable way? 4. Were confounding factors identified? 5. Were strategies to deal with confounding factors stated? 6. Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)? 7. Were the outcomes measured in a valid and reliable way? 8. Was the follow up time reported and sufficient to be long enough for outcomes to occur? 9. Was follow up complete, and if not, were the reasons to loss to follow up described and explored? 10. Were strategies to address incomplete follow up utilized? 11. Was appropriate statistical analysis used?

Table 3.3: Quality appraisal results for included prevalence study

Citation	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Results (%)**
Su et al. (2007)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
%	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	

Y - Yes, N - No, U - Unclear, N/A - not applicable

1. Was the sample frame appropriate to address the target population? 2. Were study participants sampled in an appropriate way? 3. Was the sample size adequate? 4. Were the study subjects and the setting described in detail? 5. Was the data analysis conducted with sufficient coverage of the identified sample? 6. Were valid methods used for the identification of the condition? 7. Was the condition measured in a standard, reliable way for all participants? 8. Was there appropriate statistical analysis? 9. Was the response rate adequate, and if not, was the low response rate managed appropriately?

Table 3.4: Quality appraisal results for included qualitative studies

Citation	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Results (%)**
Arcadi et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Catania et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*U*	*U*	*Y*	*Y*	*Y*	*80%*
Chiang et al. (2007)	*Y*	*Y*	*Y*	*Y*	*Y*	*U*	*N*	*N*	*Y*	*Y*	*70%*
Chung et al. (2005)	*Y*	*Y*	*Y*	*Y*	*Y*	*U*	*Y*	*Y*	*Y*	*Y*	*90%*
Crowe et al. (2021)	*U*	*N*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*60%*
Cui et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
Danielis et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*90%*
Deliktas et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*U*	*Y*	*Y*	*Y*	*Y*	*90%*
Esthika et al. (2022)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Fawaz and Itani (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*U*	*Y*	*Y*	*Y*	*Y*	*90%*
Fernández et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
Galehdar et al. (2021)	*N*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*70%*
Galehdar et al. (2021)	*N*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*70%*
Gordon et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
Gunawan et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
He et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*U*	*Y*	*Y*	*70%*
Jia et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*

Jordan et al. (2023)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Kackin et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*90%*
Kalateh et al. (2021)	*N*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*90%*
Kang et al. (2018)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Karimi et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*90%*
Kim (2018)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*90%*
Lam and Hung (2013)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Lapum et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
Lee et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Lee and Lee (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*90%*
Liu and Liehr (2009)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*90%*
Liu et al. (2020)	*N*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*80%*
Moradi et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*90%*
Moradi et al. (2021b)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*90%*
Muz and Erdoğan (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
Ohta et al. (2020)	*N*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*70%*
Rasmieh et al. (2022)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*90%*
Rezaee et al. (2020)	*N*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*80%*

Robinson and Kellam (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
Schroeder et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*90%*
Seyed et al. (2022)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*90%*
Sheng et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
Shih et al. 2007)	*N*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*70%*
Sun et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*90%*
Tan et al. (2020)	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*Y*	*100%*
Tetik et al. (2023)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
Xu et al. (2021)	*U*	*Y*	*Y*	*Y*	*Y*	*N*	*Y*	*Y*	*Y*	*Y*	*80%*
Yıldırım et al. (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*Y*	*Y*	*Y*	*80%*
Logiudice and Bartos (2021)	*Y*	*Y*	*Y*	*Y*	*Y*	*N*	*N*	*N*	*Y*	*Y*	*70%*
Santos et al. (2021)	*U*	*U*	*Y*	*Y*	*Y*	*N*	*N*	*U*	*Y*	*Y*	*50%*
Honey et al. (2013)	*Y*	*Y*	*Y*	*N*	*Y*	*N*	*U*	*N*	*Y*	*Y*	*60%*
%	*74*	*89*	*96*	*94*	*94*	*28*	*36*	*87*	*96*	*98*	

Y - Yes, N - No, U - Unclear, N/A - not applicable

1. Is there congruity between the stated philosophical perspective and the research methodology? 2. Is there congruity between the research methodology and the research question or objectives? 3. Is there congruity between the research methodology and the methods used to collect data? 4. Is there congruity between the research methodology and the representation and analysis of data? 5. Is there congruity between the research methodology and the interpretation of results? 6. Is there a statement locating the researcher culturally or theoretically? 7. Is the influence of the researcher on the research, and vice- versa, addressed? 8. Are participants, and their voices, adequately represented? 9. Is the research ethical

according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body? 10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?

3.2.6. Data extraction

Data extraction was performed using a modified version of the standardised JBI data extraction tool in the JBI SUMARI. Extracted data elements information included author, year of publication, geographical location, study methods, year and timeframe for data collection, participant characteristics, measured outcomes, measurement methods, analysis, and description of the main results. Some eligible studies included data on nurses who cared for patients with non-severe viral diseases, however, the review team extracted only data for nurses in direct contact with patients with severe viral influenza disease in a hospital setting.

3.2.7. Data transformation

Quantitative data, including the quantitative components of mixed-methods studies, were converted into ‘qualitised data’. This transformation entailed converting the quantitative findings into textual narratives that described the study results while also answering the review questions.

3.2.8. Data synthesis and integration

Data synthesis and integrations were carried out using JBI SUMARI following the JBI convergent integrated approach. This process entailed combining the ‘qualitised data' and qualitative data. To develop a collection of integrated findings, the gathered data were categorised and pooled together based on similarities in meaning.

3.3. Results

A total of 4,351 citations were retrieved from the electronic database searches, of which 684 were duplicates. After screening titles and abstracts, 115 citations were included in the full-text review. Of these, 39 articles were excluded for the reasons given in the PRISMA flow diagram (Figure 3.0). Using the JBI critical appraisal tools, five articles were excluded at the appraisal stage for scoring below 50% due to methodological inconsistencies. A total of 71 peer reviewed articles were included in the initial review. However, to ensure that the systematic review remained comprehensive and up to date, an updated review was conducted on 24 August, 2024. The updated search identified eight additional peer-reviewed articles, which were incorporated into the final synthesis, bringing the total number of included studies to 79. The updated PRISMA flow diagram (Figure 3.0) reflects these additions, ensuring transparent and systematic reporting in accordance with PRISMA guidelines.

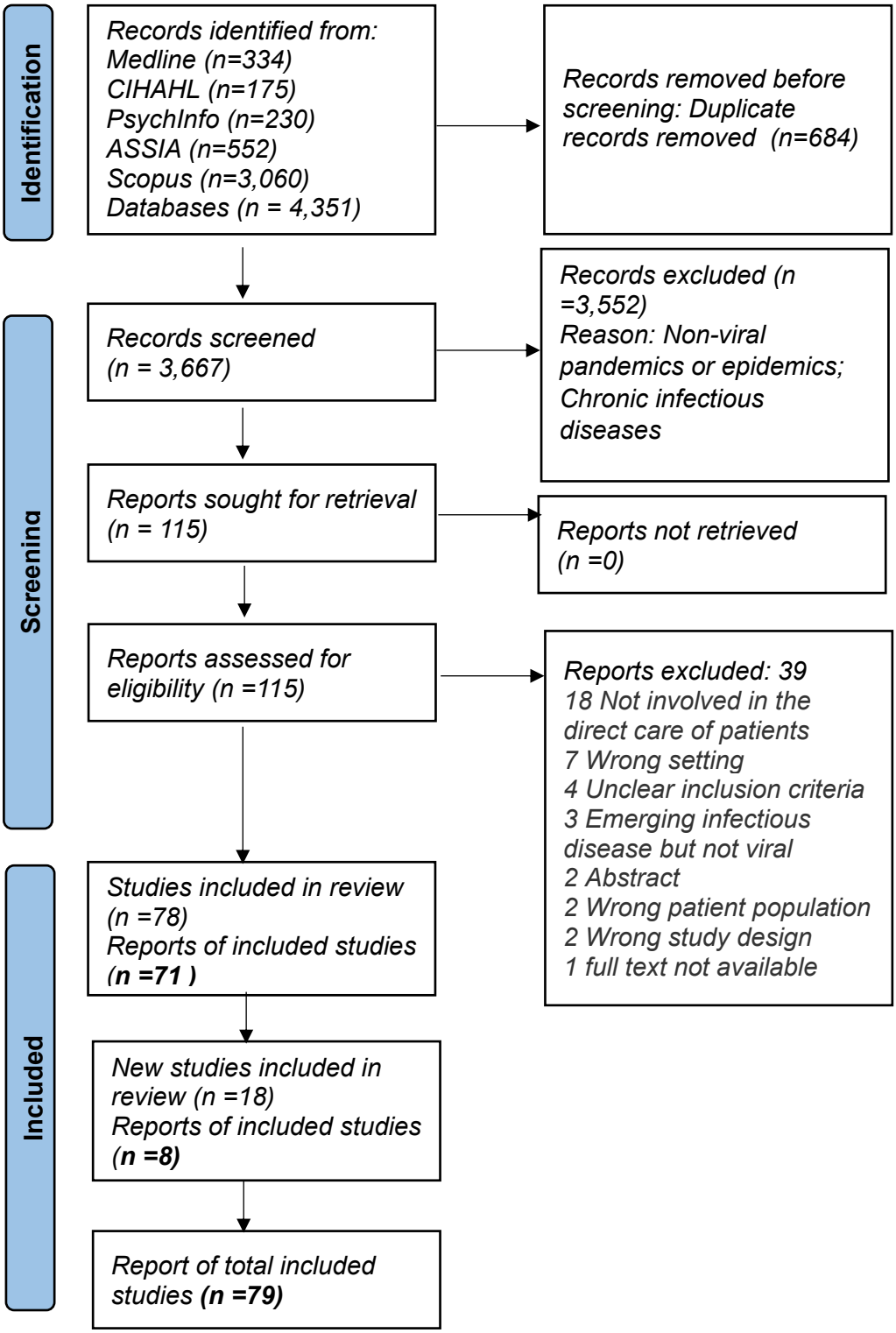


Figure 3.0: PRISMA updated flow diagram (Page et al. 2021)

3.3.1. Study characteristics

Of the 79 included papers, 31 were quantitative, 42 were qualitative, and 6 were mixed-methods studies. The quantitative studies and quantitative components of the mixed-methods studies were mainly cross-sectional, while the qualitative studies and qualitative components of the mixed-methods studies were predominantly descriptive phenomenological studies. Studies were published between 2005 and 2023; however, 15 studies did not specify the year or time frame for data collection. Participants worked in various hospital settings and cared for patients with severe viral influenza diseases. Female nurses were more prevalent in most studies, although two studies (Hoseinabadi et al. 2020; Tetik et al. 2023) reported more male participants (*n=82; n=5*) than female participants (*n=69; n=3*), respectively. As shown in Figure 3.1, the geographical distribution of the included studies was as follows: China (*n=18*), Iran (*n=11*), South Korea (*n=8*), Turkey (*n=8*), the United States (*n=6*), Italy (*n=4*), Taiwan (*n=3*), Hong Kong (*n=2*), Canada (*n=2*), Saudi Arabia (*n=3*), Spain (*n=2*), Lebanon (*n=1*), Ecuador (*n=1*), Jordan (*n=2*), Brazil (*n=1*), Japan (*n=1*), the Philippines (*n=1*), Indonesia (*n=3*), New Zealand (*n=1*) and the UK (*n=1*). The characteristics, outcomes, and main results of the included studies are presented in Table 3.5.

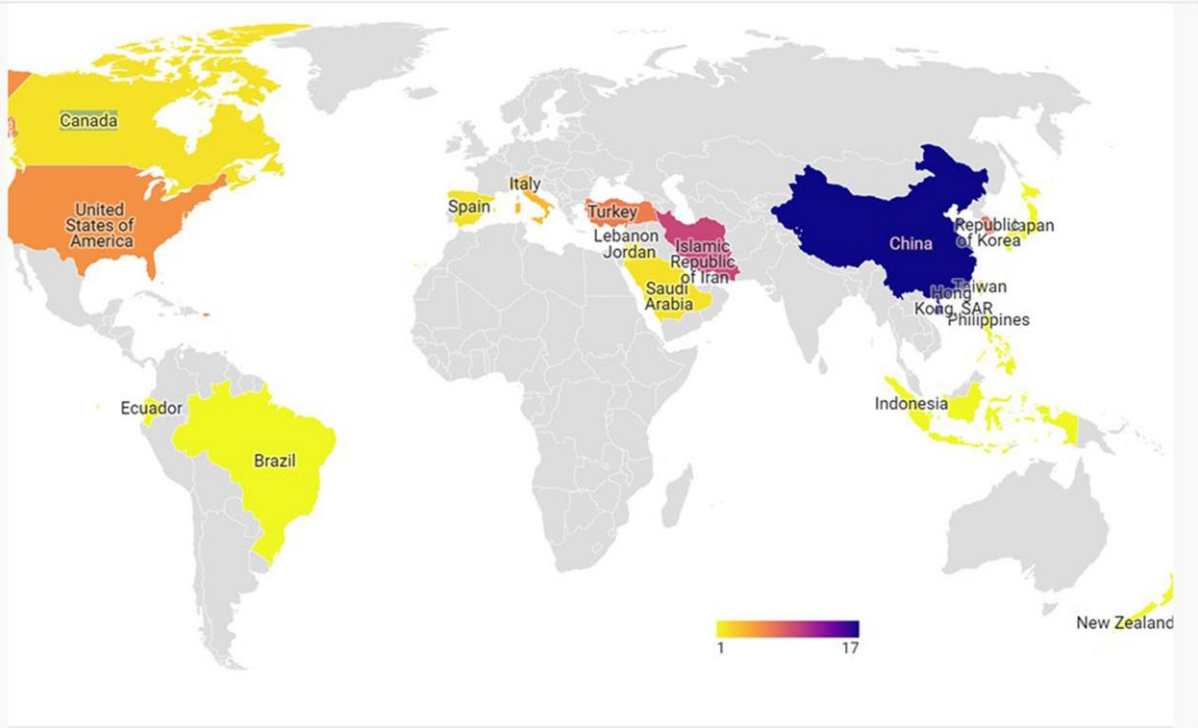


Figure 3.1: Geographical distribution of the included articles

Table 3.5: Characteristics of the included studies (n=79)

#ID	Citation	Country	Study design	Year/timeframe for data collection	Participant characteristics	Outcomes measured, measurement methods and analysis	Description of main results
1.	Abu Sharour et al. (2021)	Jordan	Quantitative Cross-sectional study	DNS	120 Nurses who cared for patients with COVID-19. Male (*n=56*) Female (*n=64*)	Nurses' self-efficacy, confidence, and nurse-patient interaction during caring of patients with coronavirus disease 2019 (COVID-19). Survey questionnaire: Self-efficacy scale; Self-confidence scale; Caring nurse-patient interaction scale. Descriptive analysis	• Participants had a moderate level of self-efficacy, self-confidence and interaction. • Positive relationships were found between nurse' self-efficacy, self-confidence, and nurse-patient interaction. • Significant differences were found in self-efficacy according to years of experience, academic qualifications and position.

2.	Al Muharraq (2021)	Saudi Arabia	Quantitative Cross-sectional observational study	01 August 2020 -31 August 2020	215 Frontline Nurses who directly provided care to suspect or confirmed cases of COVID-19. Male (*n=53*) Female (*n=162*)	Psychological impact of COVID-19 on nurses and their coping strategies. Survey questionnaire: SARS questionnaire (modified version). Descriptive analysis	• Roughly two-thirds of the participants reported moderate to high levels of nervousness and fear at work. • Ethical and moral responsibility has been determined as the main motivator for frontline nurses to practice their profession, with 88% of them expressing a willingness to work even if the situation deteriorated further. • Participants were extremely concerned about transmitting the disease to their family members. • The most common coping strategy adopted by the nurses appeared to

							be adherence to strict protective measures, and the acquisition of more knowledge about the disease.
3.	Arcadi et al. (2021)	Italy	Qualitative Phenomenological hermeneutic study	March 2020 - April 2020	20 Nurses involved in the care of COVID-19-positive patients. Male (*n=13*) Female (*n=7*)	Experience of Italian nurses engaged in caring for patients with COVID-19 during the out- break period. Interviews: Video calls semi-structured interviews. Hermeneutic phenomenological analysis.	Four themes were extracted: • Uncertainty and fear, • Alteration of perceptions of time and space, • Change in the meaning of 'to care' and • Changes in roles and relationships.
4.	Bahadir-Yilmaz and Yüksel (2020)	Turkey	Quantitative Cross-sectional study	25 April 2020 – 07 May 2020	1457 Nurses providing care for patients with COVID-19. Male *(n=277*) Female (*n=1180*)	Anxiety levels of nurses providing care to patients with COVID-19. Survey questionnaire:	• Nurses' state anxiety levels were high. • Participants evaluated for state anxiety were female; who were

						State-Trait Anxiety Inventory (STAI). Descriptive analysis	married; worked in intensive care units; were service nurses, having more professional experiences; and experienced hand irritation.
5.	Catania et al. (2021)	Italy	Qualitative Descriptive study	15 April 2020 - 16 May 2020	23 Nurses who had directly cared for patients affected by COVID-19. Male (*n=2*) Female (*n=21*)	Italian front-line nurses' experiences during the COVID-19 pandemic, with an emphasis on exploring the issues associated with nursing management. Testimonies via online portal or messaging software or telephone recording. Braun and Clark's (2006) 6-phase thematic analysis.	Six themes were identified as follows: • Organisational and logistic change. • Leadership models adopted to manage the emergency. • Changes in nursing approaches. • Personal protective equipment issues. • Physical and psychological impact on nurses. • Team value/spirit.

6.	Chiang et al. (2007)	China	Qualitative	October 2003 - April 2004	21 Registered Nurses who cared for SARS patients during the outbreak. Female (*n=NR*) Male (*n=NR*)	Nurses' experiences of role strain when taking care of patients with severe acute respiratory syndrome (SARS). Interviews: Focus groups Thematic analysis	The self-state of nurses during the SARS outbreak evolved into that of professional self as: • Self-preservation. • Self-mirroring; and • Self-transcendence
7.	Cho and Kim (2021)	South Korea	Quantitative Q Methodological Approach	17 September 2020 - 15 October 2020	22 Nurses who had experienced caring for COVID-19 patients. Male (*n=0*) Female *(n=22*)	Psychological responses of nurses who have experienced COVID-19 patient care. 34 statement cards made from the Q-sample Component. Factor analysis.	Three categories were identified based on the following psychological responses: • Fear of social stigma, • Anxiety about the risk of infection, • Burden of infection prevention and control nursing.

8.	Chung et al. (2005)	Hong Kong	Qualitative Phenomenological study	DNS	8 Nurses who cared for SARS patients. Male (*n=4*) Female *(n=4*)	Experiences of nurses' caring for SARS patients. Interviews: Non-structured face to face interviews. Colaizzi's (1978) 7-steps analysis.	The three major themes explicated were: • Various emotions experienced in caring for SARS patients, • Concept of uncertainty and • Revisiting the 'taken for granted' features of nursing.
9.	Cinar et al. (2021)	Turkey	Quantitative Cross- sectional descriptive study	April 2020 - August 2020	169 Emergency Nurses (153 cared for COVID-19 patients). Male (*n=43*) Female (*n=126*)	Stress and affecting factors related to the COVID-19 pandemic of emergency nurses at the first stage of the pandemic. Survey questionnaire: Information Form developed by the researchers;	The factors that significantly affect the perceived stress score of emergency nurses during the COVID-19 pandemic included: • Applying respiratory isolation, • Changing the way of life, • Not being able to access protective equipment,

						Perceived Stress Scale (PSS) Descriptive analysis	• Insufficient nurses in the unit and • Thinking that COVID-19 will be transmitted to oneself.
10.	Crowe et al. (2021)	Canada	Convergent mixed method study	DNS	Registered Nurse working in the ICU or HAU. Survey (*n=109*); Interviews (*n=15*)	The mental health of Critical Care Registered Nurses providing direct patient care during the initial phase of the COVID-19 pandemic. Survey questionnaire: Impact of Event Scale – Revised (IES-R); Depression, Anxiety and Stress Scale (DASS-21).	In the surveys, the participants reported clinical concern for: • Post-traumatic stress disorder, • Mild to severe depression (57%), • Anxiety (67%) and • Stress (54%). In the interviews, psychological distress was described as anxiety, worry, distress and fear related to: • Rapidly changing policy and information,

						Interviews: Face-to-face semi-structured interviews. Descriptive analysis; Thematic analysis	• Overwhelming and unclear communication, • Meeting patient care needs in new ways while staying safe, and • Managing home and personal commitments to self and family. Conclusions:
11.	Cui et al. (2020)	China	Qualitative Descriptive study	10 April 2020 - 07 May 2020	12 Nurses involved in efforts to combat COVID-19 in Hubei Province. Male (*n=0*) Female (*n=12*)	Experiences and psychological adjustments of nurses who voluntarily travelled to Hubei Province in China to provide support during the COVID-19 epidemic. Interviews: Semi-structured face-to-face interviews.	The following themes emerged from the analysis: • Motivations for supporting the hardest-hit areas (professional commitment, family support, and media propaganda); • Challenges faced during the support missions (heavy workloads, changes in working patterns,

						Content analysis.	communication barriers, and barriers associated with wearing personal protective equipment); • Psychological experiences (a sense of uncertainty, fear of infection, loneliness, stressful events, and sleep disorders); • Psychological adjustments (adequate training and personal protective equipment, positive responses to stress, and social support); and • Personal and professional growth (a strong professional identity, a positive work attitude, a

							perception of expanded possibilities, realization of the value of learning, and cherishing life).
12.	Danielis et al. (2021)	Italy	Qualitative Descriptive study	May 2020	24 Nurses who worked in sub-intensive care unit for COVID-19 patients. Male (*n=7*) Female (*n=17*)	Experiences of Italian nurses who have been urgently and compulsorily allocated to a newly established COVID- 19 sub-intensive care unit. Interviews: Focus group. Thematic analysis.	The experience of nurses was summarized along three lines: • 'Becoming a frontline nurse', • 'Living a double-faced professional experience' and • 'Advancing in nursing practice'.
13.	Deliktas et al. (2021)	Turkey	Qualitative Grounded theory study	June 2020	15 Nurses working in COVID-19 pandemic units. Male (*n=1*) Female (*n=14*)	Experiences and coping strategies of Turkish nurses working in pandemic units.	The study generated a core category showing that all nurses felt heroic via the satisfaction of touching patients' lives and uncertain.

						Interviews: In-depth telephone interviews. Grounded theory Comparative analysis.	Four main categories emerged: • Being caught in the pandemic, • Empowerment for coping with the struggle, • Challenges during the coping process and effects of the pandemic on life.
14.	Doo et al. (2021)	South Korea	Quantitative Descriptive research study	05 October 2020 –20 October 2020	64 Nurses who directly worked in COVID- 19 unit. Male (*n=2)* Female (*n=62*)	The relationship between anxiety, resilience and depression in COVID- 19 and non- COVID- 19 unit. Survey questionnaire: Generalised Anxiety Disorder-7 (GAD- 7); Depression screening tool Resilience screening tool.	• Anxiety and depression were significantly higher in nurses working with patients suspected to have COVID- 19 rather than nurses working with confirmed COVID-19 patients and non- COVID- 19 patients.

						Descriptive analysis	
15.	Emad et al. (2023)	Saudi Arabia	Quantitative Cross-sectional study	January 2022 to April 2022	123 nurses involved in the directed care of confirmed cases of COVID-19 for more than two hours.	The prevalence of anxiety and depression among nurses caring for COVID-19 patients. Survey questionnaire: Patient Health Questionnaire (PHQ-9), and the Generalized Anxiety Disorder-7 (GAD7) questionnaire. SPSS version 23.0	• Depression and anxiety symptoms were highly prevalent among nurses. • Nurses' housing situation had a significant effect on depression and anxiety levels.

16.	Esthika et al. (2022)	Indonesia	Qualitative Interview study Phenomenological approach	May-June 2021	8 nurses who had treated COVID-19 patients in a negative pressure room at the hospital.	The psychological experience of nurses caring for COVID-19 patients. Colaizzi's technique	3 themes were identified: • Stress as the First Response to the COVID-19 Pandemic, • Positive Psychological Experiences, and • Changing Negative Experiences to Positive After Adapting to the Work Environment.
17.	Nur and Şentürk (2023)	Turkey	Quantitative Cross-sectional study	DNS	205 nurses caring for COVID-19 patients	The burnout status and commitment to the profession of nurses who provide care to patients diagnosed with COVID-19. Survey questionnaire: Burnout Scale (BS) and Commitment to the Profession in	• All nurses working in pandemic service and intensive care units and providing care to COVID-19 patients experienced burnout, Their level of professional commitment was above the average level, and commitment to the profession decreased as

						Nursing Scale (NPCS) IBM SPSS 27.0	the level of burnout increased
18.	Fawaz and Itani (2021)	Lebanon	Qualitative Phenomenological exploratory study	January 2021	18 Nurses working on the frontlines of the COVID-19 pandemic in the COVID-19 units, intensive care units, and COVID-19 emergency departments. Male (*n=8*) Female (*n=10*)	The psychological experiences of Lebanese frontline nurses serving in ground zero hospital during the current COVID-19 outbreak. Interviews: Virtual interviews. Thematic content analysis.	Thematic analysis identified five themes: • Helplessness and impending doom, • Increased mortality rates and depressive mood, • Fear of death and obsessive thinking, • Flashbacks, panic, and incompetence, and • Public recklessness, governmental responsibility, and anger.

19.	Feifei et al. (2022)	China	Quantitative Cross-sectional study	February 2020 - March 2020	774 nurses who cared for covid-19 patients	Cognition, attitudes, subjective norms, self-efficacy, and behavioural intentions of clinical nurses while caring for COVID-19 patients. Survey questionnaire: Author developed questionnaire SPSS version 20.0 and AMOS version 24.0	• The study results indicated that attitude, ethical cognition, and self-efficacy were the main factors influencing nurses' behavioural intention
20.	Fernández-Castillo et al. (2021)	Spain	Qualitative Descriptive study	12 April 2020 – 30 April 2020	17 Nurses who were working with COVID-19 patients in ICU. Male (*n=6*) Female (*n=11*)	Experiences and perceptions of nurses working in an ICU during the COVID-19 global pandemic. Interviews: Video call semi-structured interviews.	Four main themes emerged from the analysis: • Providing nursing care, • Psychosocial aspects and emotional lability,

						Interpretative analysis.	• Resources management and safety and Professional relationships and fellowship.
21.	Franco et al. (2020)	Ecuador	Quantitative Cross-sectional descriptive study	March 2020 - May 2020	127 Nurses who cared for patients with COVID-19. Male (*n=18*) Female (*n=109*)	Feelings, stress factors, and adaptation strategies of nurses during the COVID-19 pandemic. Survey questionnaire: MERS-CoV staff questionnaire (modified version) Descriptive analysis	• The data showed the priority of humanist feelings and professional duty for these nurses, mostly young (59% under 35 years of age and with the professional exercise of three and fewer years), against the fear of contagion and the stress of strenuous work. • They also revealed the great importance for them of the institutional support, recognition to the

							staff, and strict organization of safe care, like strategies for coping with this difficult experience.
22.	Galehdar et al. (2020)	Iran	Qualitative Study	March 2020 – May 2020	20 Nurses taking care of patients with COVID-19. Male (*n=5*) Female (*n=15*)	To explore nurses' experiences of psychological distress during care of patients with COVID-19. Interviews: Semi-structured in-depth telephone interviews. Graneheim and Lundman's content analysis.	• The nurses' experiences in this study showed that they endured a great deal of psychological distress during care of patients with COVID-19. • The sources of such distress were related to patients' death, the disease's unknown dimensions, the atmosphere of the working environment, professional commitments, and individual characteristics.

23.	Galehdar et al. (2021)	Iran	Qualitative study	March 2020 – April 2020	13 Nurses who cared for patients with COVID-19. Male(*n=2*) Female(*n=11*)	Nurses' perceptions towards taking care of patients with this disease. Interviews: Semi-structured in-depth telephone interviews. Conventional content analysis.	• The study showed that nurses experienced many challenges such as bad feeling of inefficiency, stress, excessive physical fatigue, dilemma between care delivery and pollution and enclosed in protective equipment during taking care of patients with COVID-19. • As a result, this can lead to decrease of the quality of patient care.
24.	González-Gil et al. (2021)	Spain	Mixed- methods study Quantitative part: Cross-sectional study	01 April 2020 – 15 April 2020	557 Nurses who cared for patients with COVID-19 and patients suspected to	Safety, organisation, decision making, communication and psycho-socio-emotional needs perceived	• 37.5% reporting working with the fear of becoming infected and its consequences, • 28.2% reported elevated

					have COVID-19. Male (*n=66*) Female (*n=487*) NR *(n=4*)	by critical care and emergency nurses. Survey questionnaire: SARS Team Questionnaire (modified version); Practice Environment Scale of the Nursing Work Index (PES-NWI); Medical Office Survey on Patient Safety Culture (MOSPSC); Granada Burnout Questionnaire Descriptive analysis	workloads, high patient-nurse ratios and shifts that did not allow them to disconnect or rest, while taking on more responsibilities when managing patients with COVID-19 (23.9%). • They also reported deficiencies in communication with middle management (21.2%), inability to provide psycho-social care to patients and families and being emotionally exhausted (53.5%), with difficulty in venting emotions (44.9%).

25.	Gordon et al. (2021)	United States	Qualitative Descriptive study	DNS	11 ICU Nurses who cared for COVID-19 patients. Male (*n=4*) Female (*n=7*)	To explore the experiences of critical care nurses working in central Texas amidst the pandemic. Interviews: Semi-structured face-to-face interviews. Content analysis	The experiences among critical care nurses caring for patients diagnosed with COVID-19 were categorized into five themes: • Emotions experienced; • Physical symptoms; • Care environment challenges; • Social effects and • Short term coping strategies.
26.	Gunawan et al. (2021)	Indonesia	Qualitative Phenomenological study	March 2020 – June 2020	17 Nurses providing direct care to patients with COVID-19. Male (*n=5*) Female (*n=12*)	The lived experience of nurses in combatting COVID-19. Interviews: Semi-structured online video and chat interviews. Van Manen's thematic analysis	Seven themes emerged: • Feeling "nano-nano", • Lack of N95 masks, • We are just pawns, • Being rejected, • "Please do not spread our identity", • We miss home, and

							• Feeling betrayed by regulation.
27.	Han et al. (2020)	China	Quantitative Cross-sectional survey	07 February – 10 February 2020	21,199 Registered Nurses Male (*n=290*) Female *(n=20,909*)	Anxiety and depression levels of frontline clinical nurses working in 14 hospitals in Gansu Province, China, during this period. Survey questionnaire: Questionnaire Related to Novel Coronavirus-Infected Pneumonia; Self-Rating Anxiety Scale (SAS); Self-Rating Depression Scale (SDS)	• Results show that nurses faced with the COVID-19 outbreak are at risk for experiencing anxiety and depression. • Demographic back- ground, psychosocial factors, and work-related factors predicted the psychological responses. • The family responsibilities and burdens of women may explain the higher levels of anxiety and depression among nurses with these obligations as

						Descriptive analysis (SPSS v25.0)	compared to those without.
28.	He et al. (2021)	China	Qualitative Phenomenological study	DNS	10 Nurses who cared for the COVID-19 patients. Male (*n=2*) Female (*n=8*)	Experiences of Chinese nurses who countermarched to the outbreak city for medical support in the very first period of this global infection. Interviews: Telephone interviews. Content analysis	• Chinese nurses experienced different psychological stages, work pressure, and challenges. • New concepts of nursing also emerged during their clinical care for COVID-19 patients.
29.	Heo et al. (2021)	South Korea	Quantitative Cross- sectional study	13 August 2020 - 10 September 2020	232 Nurses with experience in providing care for suspected or confirmed COVID-19 patients.	Nurses' stress, self-efficacy and nursing intentions when caring for COVID-19 patients and identify the predictors of	• Stress was negatively correlated with self- efficacy and nursing intentions • Infection- related education and self-efficacy were

					Male (*n=37*) Female (*n=195*)	nursing intentions during the pandemic. Survey questionnaire: Perceived Stress Scale (KPSS-10 Korean version); Self-Efficacy Scale (Kprean version); Predictive Nursing Intention Scale (Korean Version). Descriptive analysis	identified as predictors of nurses' intention to provide care for patients with COVID- 19.
30.	Honey et al. (2013)	New Zealand	Mix methods study Quantitative part: Survey	January 2010	18 ECMO nurses who worked in ICU. Male (*n=NR*) Female (*n=NR*)	ECMO nurses' views and experiences of looking after adult patients with influenza A. Survey questionnaire: Self-administered questionnaire.	The survey identified issues including: • the acuity and high mortality rate of those affected, • nurses working in an isolated environment because of infection control requirements,

						Excel spread sheet	• limited support and being asked to work extra shifts
31.	Hong et al. (2021)	China	Quantitative Cross-sectional survey	08 February 2020 – 14 February 2020	4,692 Nurse working in frontline for the COVID-19. Male (*n=144*) Female (*n=4,548*)	Psychological impact on frontline nurses in China. Survey questionnaire: Patient Health Questionnaire-9 (PHQ-9); Generalized Anxiety Disorder 7-item Scale (GAD-7); Patient Health Questionnaire; Somatic Symptom Severity Scale-15 (PHQ-15). Descriptive analysis	• 9.4% (n= 442) were considered to have depressive symptoms, • 8.1% (n= 379) represented anxiety, and • 42.7% (n= 2,005) had somatic symptom. • About 6.5% (n= 306) respondents had suicidal ideation.

32.	Hoseinabadi et al. (2020)	Iran	Quantitative Cross-sectional study	10 March 2020 - 03 April 2020	151 Frontline Nurses exposed to COVID-19 (Exposure group) Male (*n=82*) Female (*n=69*)	Burnout level during an outbreak of COVID-19 and to identify influencing factors between frontline nurses and nurses from other wards. Survey questionnaire: Burnout and job stress questionnaires (Persian version); Oldenburg Burnout Inventory (OLBI); Job Stress Questionnaire (JSQ); Hospital Resources scale; Family and friend supports scale. Descriptive analysis	• The scores of job stress and burnout in the exposure group with COVID-19 infection were significantly higher than in the non-exposure group. • Employment status, experience in taking care of patient confirmed or suspected with COVID-19 infection, hospital resources, and job stress were considered as significant risk factors for COVID-19-related burnout. • Job stress was considered as an only factor that has a significant relationship with COVID-19-related burnout.

33.	Jia et al. (2021)	China	Qualitative Descriptive study	February 2020 - March 2020	18 Nurses who cared of COVID-19 patients. Male (*n=5*) Female (*n=13*)	The ethical challenges of nurses treating COVID-19 patients. Interviews: Structured in-depth interviews (Video; voice calls). Content analysis	The findings revealed three main themes: • Ethical challenges: people with COVID-19, inequality, professional ethics, and job competency; • Coping styles: active control and planning, seeking support as well as catharsis, and staying focused; and • Impacts on career: specialized nursing skills, scientific research ability, and management skills.
34.	Jordan et al. (2023)	UK	Qualitative Interview study	05 May 2021-13 May 2022	28 critical care nurses (CCN) working in ICU.	The experience of critical care nurses during the COVID- 19 pandemic.	• The most difficult job demands were the pace and amount, complexity,

						Interviews were guided by the constructs of the Job- Demand Resource model. Framework analysis	physical and emotional effort of their work. • Prolonged high demands led to CCN experiencing emotional and physical exhaustion, burnout, post-traumatic stress symptoms and impaired sleep. • Support from colleagues and supervisors was a core job resource. Sustained demands and impaired physical and psychological well- being had negative organizational consequences with CCN expressing increased intention to leave their role.

35.	Kackin et al. (2020)	Turkey	Qualitative Descriptive phenomenological study	09 May 2020 - 12 May 2020	10 Nurses who cared for patients diagnosed with COVID-19. Male (*n=2*) Female (*n=8*)	Experiences and psychosocial problems among nurses caring for COVID-19 patients. Interviews: Semi-Structured Interviews; Questionnaire Form. Colaizzi's (1978) 7-steps analysis.	Three themes emerged: • Effects of the outbreak was divided into working conditions, psychological effects and social effects; • Short-term coping strategies was divided into normalisation, refusal to dwell on experiences, avoidance, expression of emotions and distraction; and • Necessities was divided into psychosocial support and resource management.

36.	Kalateh et al. (2021)	Iran	Qualitative study	March 2020	24 Nurses who worked at hospitals specified for COVID-19 treatment. Male (*n*=*NR*) Female (*n*=*NR*)	Nurses' perceptions and experiences of COVID-19 outbreak. Interviews: open-ended questions. Braun and Clark's 6-steps analysis	• The participants had faced a mysterious world created by the virus. • No one had clear understanding of the new virus and knew how to tackle with such a virus. • The main experiences were related to defected preparedness, the worst perceived risk, family protection, social stigma and sacrificial commitment
37.	Kang et al. (2018)	South Korea	Qualitative Descriptive study	August 2015 - December 2015	27 Nurses working in hospitals that had confirmed or suspected cases of MERS. Male (*n*=*2*)	Working experiences of nurses during Middle East respiratory syndrome outbreak.	Four major themes emerged: • "Experiencing burnout owing to the heavy workload," • "Relying on personal protective

					Female (*n=25*)	Interviews: Focus groups Semi-structured interviews. Content analysis	equipment for safety," • "Being busy with catching up with the new guidelines related to Middle East respiratory syndrome," and • "Caring for suspected or infected patients with caution."
38.	Karimi et al. (2020)	Iran	Qualitative Descriptive phenomenology study	DNS	12 Nurses caring for patients with COVID-19. Male (*n=4*) Female (*n=8*)	The lived experiences of nurses caring for patients with COVID-19. Interviews: Semi-structured interviews (WhatsApp chat and video calls) Colaizzi's (1978) 7-steps analysis	Three main themes were identified: • Mental condition (subthemes included "anxiety and stress" and "fear"), • Emotional condition (subthemes included "suffering and affliction" and "waiting for death"), and • Care context (subthemes

							included “turmoil” and “lack of support and equipment”).
39.	Kim (2018)	South Korea	Qualitative Phenomenological study	15 December 2016 - 20 March 2017	12 Nurses with experience caring for MERS-CoV patients. Male (*n=4*) Female (*n=8*)	Psychological stress in nurses who cared for MERS-CoV patients and to identify systemic problems of the Korean healthcare system. Interviews: In-depth face-to-face interviews. Colaizzi’s (1978) 7-steps analysis.	Nurses’ experiences of care for patients with MERS-CoV were categorized as follows: • “Going into a dangerous field,” “ • Strong pressure because of MERS-CoV,” • “The strength that make me endure,” “Growth as a nurse,” and • “Remaining task.”
40.	Labrague and Santos (2021)	Philippines	Quantitative Cross-sectional research design	DNS	261 Registered Nurses who worked in a private or public hospital that provides services to	The relative influence of fear of COVID-19 on nurses' psychological distress, work satisfaction and intent to leave	• Overall, the composite score of the fear of COVID-19 scale was 19.92. • Job role and attendance of COVID-19-related

					coronavirus patients. Male (*n=69*) Female (*n=192*)	their organisation and the profession. Survey questionnaire: Fear of COVID-19 Scale; Job Stress Scale (JSS); Job Satisfaction Index (JSI); Organisational and Professional turnover intentions scale. Descriptive analysis	training predicted fear of COVID-19. • An increased level of fear of COVID-19 was associated with decreased job satisfaction, increased psychological distress and increased organisational and professional turnover intentions.
41.	Lam and Hung (2013)	Hong Kong	Qualitative Exploratory study	September 2010 - March 2011	10 Emergency Nurses. Male (*n=0*) Female *(n=10*)	Perception of Hong Kong emergency nurses regarding their work during the human swine influenza pandemic outbreak.	The three following categories emerged from the interview data: • Concerns about health, comments on the administration, and attitudes of professionalism. • Nurses viewed the human swine

						Interviews: Semi-structured face-to-face interviews. Content analysis.	influenza as a threat to their personal and families' health. • However, nurses perceived that the severity of the disease was exaggerated by the public.
42.	Lapum et al. (2021)	Canada	Qualitative Narrative study	DNS	20 Nurses working on units caring for COVID-19 patients. Male (n=NR) Female (n=NR)	Nurses are emotionally affected working in COVID-19 acute care hospital environments. Interviews: Semi-structured interviews. Narrative analysis	We identified three themes about working in COVID-19 acute care hospital environments: • The emotional experience, • The agency of emotions, and • How emotions shape nursing and practice.
43.	Laudanski et al. (2021)	United States	Qualitative Observational study	DNS	39 ICU registered nurses assigned to coronavirus disease 2019	To characterize the toll of caring for coronavirus disease 2019 patients by registered nurses.	• There are indications that registered nurses providing care for coronavirus disease 2019 in

					versus non coronavirus disease 2019 Male (n=NR) Female (n=NR)	Survey questionnaire: National Aeronautics; Space Administration TLX survey. Descriptive analysis	the ICU reported increased thermal discomfort coinciding with elevated energy expenditure and a more pronounced self-perception of effort, stress, and mental demand.
44.	Lee et al. (2020)	South Korea	Qualitative Phenomenological study	01 April 2016–10 May 2016	17 Nurses with experience of caring for patients with MERS. Male (*n=4*) Female (*n=13*)	Experiences of Korean nurses who had directly cared for patients with Middle East respiratory syndrome (MERS) and to derive the structure and meaning of these experiences. Interviews: Semi-structured face-to-face interviews. Colaizzi's (1978) 7-steps analysis.	Seven themes of clusters were identified: • "Fear of Uncertainty," • "Beyond Hesitation," • "A Scene Like a Battlefield," • "Chaotic Nursing Identity," • "Buttresses for Sustainability," • "Lingering Trauma" and • "Expanded Horizon of Nursing." • The final analysis revealed that the

							core theme was "Beyond the fear of uncertainty."
45.	Lee and Lee (2020)	South Korea	Qualitative Descriptive phenomenological study	July 2020 - September 2020	18 Nurses who worked in a COVID-19 isolation ward. Male (*n=0*) Female (*n=18*)	Experiences of COVID-19-designated hospital nurses in South Korea who provided care for patients based on their lived experiences. Interviews: In-depth telephone interviews. Giorgi's phenomenological analysis.	Nine themes were identified: • Pushed onto the Battlefield Without Any Preparation, • Struggling on the Frontline, • Altered Daily Life, • Low Morale, • Unexpectedly Long War, • Ambivalence Toward Patients, • Forces that Keep Me Going, • Giving Meaning to My Work, and • Taking Another Step in One's Growth. • The nurses who cared for patients with COVID-19 had

							both negative and positive experiences, including post-traumatic growth.
46.	Lee et al. (2005)	Taiwan	Quantitative Descriptive study	May 2003 - June 2003	26 Female nurses from the SARS team. Male (*n=0*) Female (*n=26*)	Staff stress and coping strategies among a SARS team of nursing staff during the outbreak. Survey questionnaire: SARS Team Questionnaire developed by the researchers. Descriptive analysis	• SARS had both positive and negative psychological impacts on the nurses. • While worrying about infecting their families and colleagues, nurses were able to cope with the situation through various means. • Additional findings include the need for more psychiatric staff to provide flexible and continuous service, the importance of meetings to improve teamwork and reduce conflict

							between doctors and nurses and the useful discovery that video cell phones provided needed reassurance from afar to the worried families of the nurses.
47.	Leng et al. (2021)	China	Quantitative Cross-sectional survey	11 March 2020 - 18 March 2020	90 Nurses who cared for patients with COVID-19 in the ICU. Male (*n=25*) Female (*n=65*)	Severity of nurses' post-traumatic stress disorder (PTSD) symptoms and stress and explore the influencing factors of their psycho-logical health when caring for patients with COVID-19. Survey questionnaire: PTSD Checklist—Civilian Version (PCL-C); Perceived Stress Scale (PSS-14);	• This study showed that even relatively highly resilient nurses experienced some degree of mental distress, including PTSD symptoms and perceived stress. • Major stress sources included working in an isolated environment, concerns about personal protective equipment shortage and

						Open ended questions developed by the researchers. Descriptive analysis	usage, physical and emotional exhaustion, intensive workload, fear of being infected, and insufficient work experiences with COVID-19.
48.	Li et al. (2021)	China	Quantitative Predictive study design	January 2020 - March 2020	356 Frontline Nurses who worked in the COVID-19 units. Male (*n=49*) Female (*n=307*)	Psychological well-being and factors associated with post-traumatic stress disorder (PTSD) among front-line nurses during the coronavirus dis-ease-2019 (COVID-19) pandemic. Survey questionnaire: Perceived Stress Scale (PSS); Post-traumatic stress disorder checklist (PCL-5);	• Stress level and the prevalence of PTSD were significantly increased after they worked at COVID-19 units. • Nurses who had work experience less than 2 years were significantly associated with a high risk of developing PTSD. • Nurses who worked in COVID-19 inpatients wards had significantly higher odds of being PTSD than

						Connor-Davidson Resilience Scales (CD-RISC) STATA/SE 14	those who worked in other COVID-19-related units. • Resilience was negatively associated with PTSD.
49.	Liu et al. (2020)	China	Qualitative study	26 January - 05 February 2020.	15 Nurses with experience in providing health care services for COVID-19 patients. Male (*n=5*) Female (*n=10*)	Experiences of front-line nurses combating the coronavirus disease-2019 epidemic. Interviews: Semi-structured in-depth interviews. Thematic analysis	Four theme categories emerged from the data analysis: • "Facing tremendous new challenges and danger"; • "Strong pressure because of fear of infection, exhaustion by heavy workloads and stress of nursing seriously ill COVID-19 patients"; • "Strong sense of duty and identity as a healthcare provider";

							• "Rational understanding of the epidemic—the nurses believed that the epidemic would soon be overcome and would like to receive disaster rescue training."
50.	Liu and Liehr (2009)	China	Qualitative Descriptive exploratory study	2003	6 Nurses who cared for SARS patients. Male (NR) Female (NR)	Instructive messages to guide nursing practice in future epidemics by examining the stories of Chinese nurses who cared for severe acute respiratory syndrome (SARS) patients. Interviews: Face-to-face interviews. Conventional content analysis	• Chinese nurses faced personal challenge, focused on the essence of care and experienced self-growth while caring for SARS patients. • They cited structured support, meaningful disease-related information and sensitivity to the importance of a collaborative spirit as factors which enabled their

							caring nursing practice.
51.	Logiudice and (Bartos 2021)	United States	Convergent mixed-methods study Descriptive phenomenology; Cross-sectional	May 2020 - June 2020	43 Nurses who worked during the COVID-19 pandemic. Male (*n=1*) Female (*n=42*)	Nurses' lived experiences during the COVID-19 outbreak and to examine their resiliency. Survey questionnaire: Brief Resiliency Coping Scale (BRCS); open-ended questions. Descriptive statistics; Colaizzi (1978) 7-steps analysis	• Nurses working during the COVID-19 pandemic demonstrated medium resilience scores. • The qualitative themes from this study reflect both uncertainty ("What's the protocol today?") and certainty ("Proud to be a nurse").

52.	Lyu et al. (2020)	Iran	Quantitative Survey study	February 2020 - March 2020	216 Registered Nurses who were in direct contact with confirmed or suspected cases. Male (*n=11*) Female (*n=205*)	Organizational identity and psychological resilience affect work engagement of the front-line nurses in the prevention and control of coronavirus disease 2019 (COVID-19). Survey questionnaire: Organizational Identity scale (OIQ); Psychological Resilience scale (CD-RISC); Utrecht Work Engagement Scale (UWES). Descriptive analysis	• Both organizational identification and psychological resilience had a positive impact on work engagement. • The structural equation model indicated that psychological resilience had a significant partial mediating effect on the relationship between organizational identity and work engagement.

53.	Moradi et al. (2021a)	Iran	Qualitative Descriptive study	DNS	17 ICU Nurses who cared for COVID- 19 patients. Male (*n=5*) Female (*n=12*)	The challenges experienced by ICU nurses throughout the provision of care for COVID- 19 patients. Interviews: Semi-structured face-to- face interviews. Content analysis	The nurses reported the four following challenges throughout the provision of care for COVID- 19 patients: • 'organization's inefficiency in supporting nurses', • 'physical exhaustion', • 'living with uncertainty' and • 'psychological burden of the disease'.
54.	Moradi et al. (2021b)	Iran	Qualitative Descriptive study	DNS	14 ICU Nurses who cared for patients with COVID-19. Male *(n=4*) Female *(n=10*)	The protective reactions of ICU nurses providing care for patients with COVID-19. Interviews: Semi-structured face-to-face interviews. Content analysis	• Two themes were extracted from the analysis of data: "Unbalanced self-protective reactions" and "Responsible self-protective reactions". • The present study results showed that nurses exhibit different self-

							protective reactions when faced with an epidemic and lack of PPE. These reactions may be unbalanced or responsible.
55.	Murat et al. (2021)	Turkey	Quantitative Cross-sectional and descriptive design	May 2020 - July 2020	705 Nurses who worked in COVID-19 wards/Units. Male (*n=148*) Female (*n=557*)	Stress, depression and burnout levels of front-line nurses during the COVID-19 pandemic. Survey questionnaire: Perceived Stress Scale (PSS); Beck Depression Inventory (BDI); Maslach Burnout Inventory (MBI) Descriptive analysis	• The result shows that nurses had high levels of stress and burnout and moderate depression. • Those who were younger and had fewer years of work experience felt inadequate about nursing care and had higher levels of stress and burnout. • More burnout was detected in nurses who had a positive COVID-19 test and did not want to work voluntarily

							during the pandemic.
56.	Muz and Erdoğan (2020)	Turkey	Qualitative Phenomenological study	June 2020 - August 2020	19 Nurses care of COVID-19 patients. Male (*n=2*) Female (*n=17*)	Experiences of nurses who care for COVID-19 patients during this process. Interviews: semi-structured interviews (video; voice calls). Colaizzi's (1978) 7-steps analysis	Five themes were identified after the interviews; • first meeting and getting caught unprepared, • social isolation and loneliness, • dilemma and conflict in professional roles, nursing: • power born from difficulties and • organisational expectations.
57.	Ohta et al. (2020a)	Japan	Qualitative Ethnography Study	DNS	16 Nurses working in the COVID-19 ward. Male(n=NR) Female(n=NR)	Nurses' changing perceptions of preparing for COVID-19 and working in COVID-19 wards.	• The nurses initially felt unpredictable fear. However, the establishment of standard

						Interviews: Ethnography; semi-structured interviews. Grounded Theory	approaches and practices for COVID-19 gave them confidence in their safety and helped them re-gain sympathy for patients. • Nevertheless, working on COVID-19 cases negatively affected their activities outside of the ward, and some of them developed an identity crises as they feared for the future.

58.	Park et al. (2018)	South Korea	Quantitative Cross-sectional exploratory design	30 August 2015 – 21 September 2015	187 Registered Nurse working in high-risk areas for the MERS-CoV. Male (*n=0*) Female (*n=187*)	Stigma and hardiness exert both direct effects on mental health and also indirect (mediated) effects on mental health through stress in nurses working at a government-designated hospital during a Middle East Respiratory Syndrome coronavirus (MERS-CoV) epidemic. Survey questionnaire: Short Form-36 (SF-36); Perceived Stress Scale-10 (PSS-10); Dispositional Resilience Scale-15(DRS-15); Stigma scale.	• The influences of stigma and hardiness on mental health were partially mediated through stress in nurses working at a hospital during a MERS-CoV epidemic. • Their mental health was influenced more by direct effects than by indirect effects.

						Descriptive analysis	
59.	Pasay-an (2020)	Saudi Arabia	Quantitative Comparative-correlational approach	01 April 2020 - 05 May 2020	176 Frontline Nurses Male (*n=42*) Female (*n=134*)	Vulnerability to COVID-19, demographic variables and perceived stress of frontline nurses. Survey questionnaire: Perceived Vulnerability to Disease (PVD) scale; Perceived Stress scale SPSS analysis	• The frontline nurses showed high perceived infectability and germ aversion but were moderately stressed. • Of the examined variables, only years of experience resulted in significant differences in germ aversion. • There was no statistically significant difference in perceived infectability and stress. • Perceived infectability and

							germ aversion were negatively correlated to perceived stress.
60.	Pourteimour et al. (2021b)	Iran	Quantitative Cross- sectional study	April 2020 - May 2020	139 Nurses providing care to patients with COVID- 19. Male (*n=64*) Female (*n=75*)	The relationship between mental workload and job performance among nurses providing care to patients with COVID- 19. Survey questionnaire: NASA- Task Load Index questionnaire; Paterson's job performance questionnaire. Descriptive analysis	• Majority of the nurses had high mental workload and job performance levels. • The results indicated a weak positive correlation between mental workload and the mean score of job performance(r = .057). • Unlike the mental demand (r = .175, p = .04) and temporal demand (r = .307, p < .001) that had a significant positive correlation with job performance, frustration had a

							significant negative correlation with job performance (r = −.183, p = .032). • The following variables explained 33% of the variance of nurses' job performance: age, gender, type of ward, working shift, experience of providing care to patients with COVID- 19 and frustration.
61.	Rasmieh et al. (2022)	Jordan	Qualitative Descriptive phenomenological approach Semi-structure interviews Interviews	November - December 2020.	10 nurses who provided hands-on care for patients with active COVID-19.	Nurses' experience with providing hands-on care to patients with active COVID-19 infection. Colaizzi approach	Three themes were generated from the data: • impact of the COVID-19 outbreak on nurses' health; • unfamiliar work and social environments; and • conforming to professional standards

62.	Rezaee et al. (2020)	Iran	Qualitative study	September 2020 – October 2020	24 Nurses working in COVID-19 intensive care units. Male (*n=9*) Female (*n=15*)	Nurses' perception of ethical challenges in providing care for patients with coronavirus disease in 2019 (COVID-19). Interviews: Semi-structured interviews (voice calls; video calls). Content analysis.	• Nurses' narratives indicated that ethical challenges in caring for patients with COVID-19 included threats to professional values and the absence of a holistic COVID-19 care approach. • The first category was subcategorized into the risk of declining quality of patient care and a stigmatized public image about COVID-19 care. • The second category was divided into poor spiritual care, poor compassionate care, and lack of family-centred care.

63.	Robinson and Kellam (2021)	United States	Qualitative Hermeneutic Phenomenological study	DNS	14 Nurses working directly with COVID-19–positive patients. Male (*n=0*) Female (*n=14*)	Experiences of registered nurses working with hospitalized COVID-19 patients. Interviews: Semi-structured telephone interviews. Colaizzi's (1978) 7-steps analysis.	Three major themes were evident: • "the human connection," • "the nursing burden," and • "coping."
64.	Sagherian et al. (2020)	United States	Quantitative Cross-sectional study	27 May 2020–25 June 2020	587 Hospital nurses and nursing assistants. Male (*n=25*) Female (*n=396*) NR (n=*166*)	Insomnia, fatigue and inter shift recovery, and psychological well-being and to examine differences in these measures based on work-related char-acteristics among nursing staff during COVID-19 pandemic. Survey questionnaire:	• The sample had subthreshold insomnia, moderate-to-high chronic fatigue, high acute fatigue and low-to-moderate intershift recovery. • The sample experienced increased emotional exhaustion and depersonalisation, increased personal

						Insomnia severity Index (ISI); Occupational Fatigue and Exhaustion Recovery (OFER-15); Maslach Burnout Inventory-Human Services Survey (MBI-HSS); Short Post-Traumatic Stress Disorder Rating Interview (SPRINT); Patient Health Questionnaire-4 (PHQ-4). Descriptive analysis	accomplishment, moderate psychological distress and high post-traumatic stress. • Nurses who cared for COVID-19 patients had significantly scored worse on almost all measures than their co-workers. • Certain factors such as working hours per week and the frequency of 30-min breaks were significant.
65.	Santos et al. (2021)	Brazil	Convergent mixed-methods study Cross sectional design	April 2020 – June 2020	104 Nurses who were working or with the perspective of working in the care of suspected or infected	Nurses' work environment in university hospitals during the COVID-19 pandemic. Survey questionnaire:	• The quantitative results showed that the responses to 'I received training on the correct use of personal protective equipment' and 'I am afraid of being

					COVID-19 patients. Male (*n=17)* Female (*n=87*)	self-made instrument with open-ended questions. Descriptive analysis; Content analysis	infected' items had the best and worst evaluations, respectively. • The qualitative findings revealed five themes: feeling of insecurity, lack of personal protective equipment, lack of diagnostic tests, changes in the care flow and fear of the unknown.
66.	Schroeder et al. (2020)	United States	Qualitative Descriptive study	March 2020 – April 2020	21 Nurses that cared for or was caring for patients with COVID-19. Male (*n=2*) Female (*n=19*)	Experience of being a registered nurse caring for patients with COVID-19 at an urban academic medical centre during the early stages of the pandemic. Interviews: Individual in-person semi-	• Registered nurses perceived the clinical context as highly dynamic, but quickly adapted to pandemic-related care delivery. • They felt a "sense of duty "to care for patients with COVID- 19, despite being fearful of acquiring

						structured interviews. Content analysis.	or spreading infection. • Compared to clinical colleagues, registered nurses reported increased patient exposure and performed tasks previously assigned to other clinical team members.
67.	Seyed et al. (2022)	Iran	Qualitative Semi-structured Interviews	01 April - 04 May 2020	30 nurses working in COVID-19 wards.	The problems and adaptation techniques of nurses caring for COVID-19 patients. Conventional content analysis	Two themes and sixteen subthemes were identified: • experiences and challenges (lack of protective equipment, high work pressure, marginalized physical health, problems related to the use of protective equipment, being excluded, a lack of a supportive work environment, problems related to patients,

							psychological problems, fear, marginalized personal and family life, and the challenge of communicating with patients' families); and • adaptation strategies for work conditions (performing religious-spiritual activities, creating an empathetic atmosphere in the workplace, spiritualizing their work, trying to convince the family and gaining their support, and strengthening their sense of self-worth and responsibility).
68.	Sheng et al. (2020)	China	Mixed-method study Phenomenological qualitative part	March 2020 – May 2020	14 Nurses who cared for COVID-19 patients in an isolation ward. Male (*n=3*) Female (*n=11*)	Experiences of involvement in the COVID-19 res-cue task on professional identity among Chinese nurses.	The main factors affecting the professional identity of rescue nurses were: • The 'impression of exhaustion and fear', • 'feeling the unfairness',

						Interviews: Semi-structured face-to-face video interviews. Colaizzi's (1978) 7-steps analysis	• 'perceiving incompetence in rescue task' and • 'unexpected professional benefits'
69.	Shih et al. (2009)	Taiwan	Qualitative Triangulation study	DNS	200 Nurses taking care of SARS patients in medical centres or teaching hospitals. Male *(n=9)* Female (*n=191*)	Stage-specific difficulties encountered by Taiwan's frontline nurses and reveal the background context framing this life-threatening phenomenon to better understand the nurses' needs during the anti-SARS process. Interviews: focus groups interviews; Open-ended questionnaires. Thematic analysis.	The first-layer findings of this study regarding nurses' difficulties were sought and organized according to three stages of the caring process: • pre-caring, • tangible caring, and • post-caring.

70.	Su et al. (2007)	Taiwan	Quantitative Prevalence study	30 June 2003	102 Nurses from SARS units. Male (*n=0*) Female (*n=102*)	Psychological status of nurses during the acute phase of the 2003 SARS outbreak. Survey questionnaire: Beck depression inventory (BDI); Spielberger trait anxiety inventory (STAI); DSM-IV; Pittsburgh sleep quality index (PSQI); Attitude scale; Sheehan's disability scale; Family APGAR index Comparative analysis	• Results showed that depression and insomnia were greater in the SARS unit nurses than the non-SARS unit nurses. • No difference between these two groups was found in the prevalence of post-traumatic stress symptoms, yet, three-unit subjects (SARS ICU, SARS regular and Neurology) had significantly higher rate than those in CCU. • For the SARS unit nurses, significant reduction in mood ratings, insomnia rate and perceived negative feelings as well as increasing knowledge and under-standing of

							SARS at the end of the study indicated that a gradual psychological adaptation had occurred. • The adjustment of nurses in the more structured SARS ICU environment, where nurses care for even more severely ill patients, may have been as good or better than that of nurses in the regular SARS unit.
71.	Sun et al. (2020)	China	Qualitative Phenomenological study	20 January 2020 – 10 February 2020	20 Nurses caring for patients with COVID-19. Male (*n=3*) Female (*n=17*)	Psychological experience of nurses caring for COVID-19 patients. Interviews: Face-to-face; telephone. Colaizzi (1978) 7-steps analysis.	The psychological experience of nurses caring for COVID-19 patients can be summarized into 4 themes. • Negative emotions present in early stage consisting of fatigue, discomfort, and helplessness

							was caused by high-intensity work, fear and anxiety, and concern for patients and family members. • Self-coping styles included psychological and life adjustment, altruistic acts, team support, and rational cognition. • Growth under pressure, which included increased affection and gratefulness, development of professional responsibility, and self-reflection. • Positive emotions occurred simultaneously with negative emotions.

72.	Tan et al. (2020)	China	Qualitative Phenomenological study	January 2020 – February 2020	30 Nurse at the forefront of the epidemic. Male (*n=6*) Female (*n=24*)	The real feelings of first-line clinical nurses, their needs during clinical first-line work and the problems they face. Interviews: Semi-structured interviews (face to face; telephone; video). Content analysis.	The results demonstrate that success depends upon; • strengthening emergency training and knowledge of infectious diseases for nurses, • providing adequate protective equipment and • improving the emergency response plans of hospitals for public health emergencies.
73.	Tetik et al. (2023)	Indonesia	Qualitative Descriptive phenomenological approach	September–October 2021	8 nurses who worked in a Covid-19 referral hospital.	Nurses' role as the nursing care provider to Covid-19 patients. Creswell approach	Four themes emerged: • the role of the nurse as a caregiver, procedures for handling COVID-19 patients, • treatment provided for COVID-19 patients, and

							support from hospital management and families for the nurses.
74.	Vitale et al. (2021)	Italy	Quantitative Observational descriptive survey study	25 Mars 2020 - 25 April 2020	219 Nurses who worked in a Covid-19 Intensive Care Unit (ICU). Female (*n=212*) Male (*n=79*)	The potential psychological malaise factors that upset Italian nurses directly involved in the treatment of patients affected by the SARS-CoV-2 infection. Survey questionnaire: 58 item questionnaire developed by the researchers; Assessment test Generalized Anxiety Disorder scale (GAD); Impact of Event Scale – Revised (IES-R); Insomnia Severity Index;	• Nurses worked in Northern Italy registered higher anxiety scores than others • The total impact of event (IES-R) values evidenced that women recorded higher “Avoidance” and “Hyperarousal” values than men. • More women than men showed insomnia conditions • Nurses with a number of years of work experience not exceeding 10 years recorded greater levels of

						Patient Health Questionnaire (PHQ). Exploratory factor analysis	depression than the others • The psychological factors affected nurses included: “Pleasure, “Uncontrollable Thinking”, “Unsatisfactory sleep/ wake rhythm” and “Unmanageable pain and weakness”.
75.	Wang et al. (2021a)	China	Quantitative Cross- sectional survey	09 March 2020 - 25 March 2020	5521 Nurses who worked in hospitals designated to treat COVID-19. Male (*n=355*) Female (*n=5166*)	Physical and psychological responses of nurses during the pandemic. Survey questionnaire: Self-report questionnaire developed by the researchers Descriptive analysis	• A considerable proportion of nurses had symptoms of physical discomforts and emotional distress. • Nurses who were directly involved in the care of patients, with irregular work schedules, and working overtime were at a higher

							risk for physical discomforts. • Nurses who were directly involved in the care of patients, with irregular work schedules, and working overtime were at a higher risk for emotional distress.
76.	Xu et al. (2021)	China	Qualitative	31 December 2019- 14 February 2020	10 triage Nurses who worked during the pandemic period. Female (*n*=*7*) Male (*n*=*3*)	The working experience of triage nurses in the emergency department (ED) of a large teaching general hospital during the pandemic. Interviews: In-depth interviews Colaizzi (1978) 7-steps analysis.	During the COVID-19, the work experience of triage nurses mainly included: • the fear of infection and transmission, • the high work pressure, • the sense of team strength and the care of leaders.

77.	Yildirim et al. (2021)	Turkey	Qualitative Phenomenological study	27 May 2020 – 25 August 2020	17 Nurses assigned to work in COVID-19 units. Male (*n=2*) Female (*n=15*)	Experiences of front- line nurses caring for coronavirus-infected patient. Interviews: Semi-structured skype interviews. Colaizzi (1978) 7-steps analysis.	From the analyses of the data, four key themes have emerged as follows: • Needs include visibility, support, adaptation and sleep/rest. • Nurses were angry because of their unmet expectations, feelings of injustice, and selfish and insensitive behaviours they faced. • They questioned their profession and decided to either alienate from the profession or continue with the gains they had made.

78.	Zhan et al. (2020)	China	Quantitative Survey study	09 February 2020 – 31 March 2020	110 Frontline clinical nurses working during the COVID-19 epidemic. Male (*n=25*) Female (*n=85*)	Influencing factors of job stress among clinical first-line nurses fighting COVID-19. Survey questionnaire: Nurse Job Stressors Scale ANOVA analysis	• The average total job stress score of the participating frontline clinical nurses was moderately high in general. • Working hours per day, service years, number of night shifts per week, and level of academic qualification were the main factors influencing the job stress of nurses assisting in the fight against COVID-19.
79.	Zhang et al. (2020)	China	Quantitative Prospective observational survey design	10 March 2020 -14 March 2020	107 Nurses who cared for severe and critically ill COVID-19 patients. Male (*n=45)* Female (*n=97*)	Stressors and burnout among frontline nurses caring for COVID-19 patients and effective morale support strategies.	• Burnout was observed in the emotional exhaustion and depersonalization subscales with participants presenting mild levels of burnout.

						Survey questionnaire: developed by the researchers (Stressor subscale; Coping strategies subscale; Effective support subscale); Maslach Burnout Inventory (MBI) SPSS analysis	• Participants with longer working hours in COVID-19 quarantine units presented higher emotional exhaustion and depersonalization. • Participants with younger age experienced higher emotional exhaustion and less personal accomplishment.

3.4. Review findings

Data were synthesised and reported in the context of the Self-regulatory Common-Sense Model (CSM) (Leventhal et al. 1980; 1984). CSM describes how individuals process information about and respond to health threats (Leventhal et al. 1980; Leventhal et al. 2016). Individuals' perceptions of health threats determine their coping strategies and outcomes. According to Leventhal et al. (1980; 1984), individuals concurrently create parallel emotional reactions and engage in coping activities to regulate their emotions in addition to developing perceptions of health threats and adopting coping strategies to manage them. This continuous parallel process allows for the possible modification of the perceptions and coping mechanisms adopted. The model concludes that individuals' perceptions of and emotional reactions to health threats are interdependent. The CSM defines five dimensions of health threat perception: identity, causes, timeline, consequences, and control. The model offers a social cognition approach to evaluate the processes involved in perceiving a health threat, and how these processes affect adaptation and outcomes (Leventhal et al. 1980, 2016). The mixed-method systematic review questions were answered and reported on the bases of these dimensions, as illustrated in Figure 3.2.

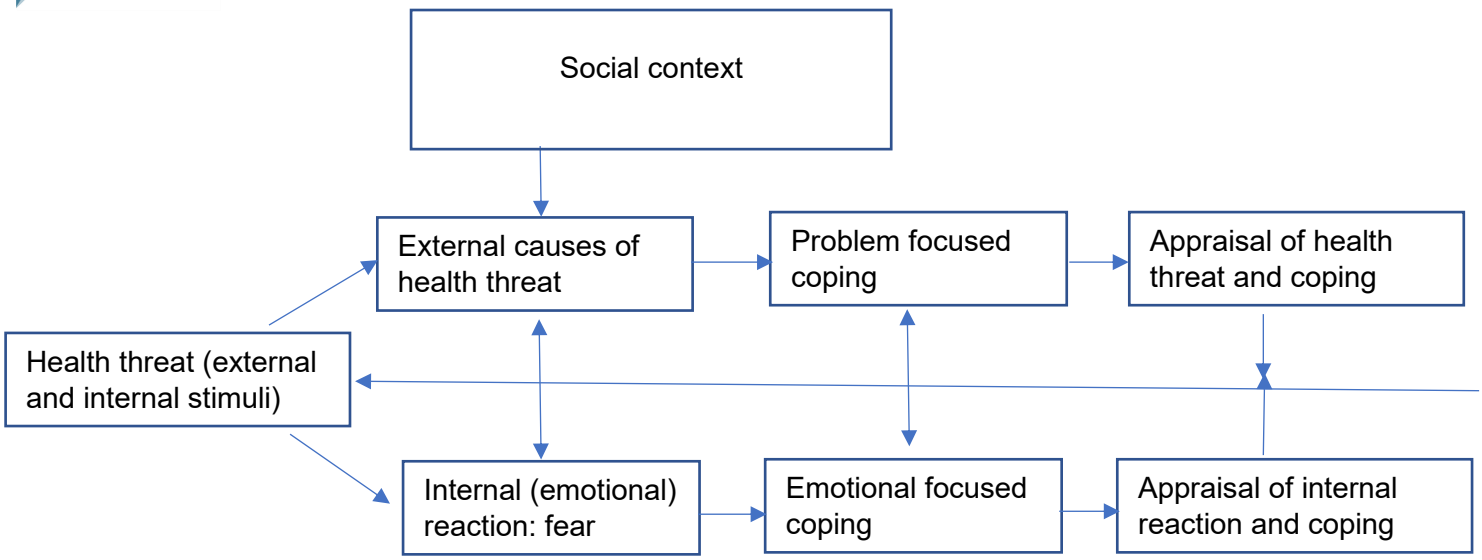


Figure 3.2: Diagrammatic illustration of the review findings in the context of Leventhal's parallel processing model

3.4.1. Causes

Individuals' beliefs about the perceived causes of health threats are mainly based on their own and others' experiences of the threat (Leventhal et al. 1980). The factors identified in this review were categorised as external (organisational) influential factors and internal (emotional) reactions.

3.4.1.1. External (organisational) influential factors

External influential factors included frequent changes in clinical guidelines and workplace protocols, heavy workloads and working hours, isolated working environments, and availability of PPE. Although many nurses were aware of workplace protocols and clinical guidelines (Labrague and Santos 2021), they felt "vulnerable" due to the pressure to keep up with constant changes in clinical guidelines and protocols (Shih et al. 2009; Lee et al. 2020; Catania et al. 2021; Crowe et al. 2021; Schroeder et al. 2020; Lee et al. 2005; Lee and Lee 2020; Santos et al. 2021; Robinson and Kellam 2021; Kim 2018; Logiudice and Bartos 2021; Lapum et al. 2021).

Responding to constantly changing and sometimes conflicting clinical guidelines was an extreme challenge for nurses (Crowe et al. 2021; Fernández-Castillo et al. 2021; González-Gil et al. 2021; Schroeder et al. 2020; Rasmiehet al. 2022; Esthika et al. 2022).

> *"The guidelines kept changing, and that was somewhat confusing. Even when the infection control office told us the guidelines, there were many ambiguities as we worked in the field, so we kept asking questions . . ." (Lee and Lee 2020).*
>
> *"They changed the protocol many times, this will reduce the quality of care" (Rasmieh et al. 2022)*

In addition, nurses were exposed to excessive workloads and long working hours (Emad et al. 2023; Catania et al. 2021; Zhan et al. 2020; Vitale et al. 2021; Wang et al. 2021; Doo et al. 2021; Cui et al. 2020; González-Gil et al. 2021; Fernández-Castillo et al. 2021; Gunawan et al. 2021; He et al. 2021; Kang et al. 2018; Shih et al. 2009; Seyed et al. 2022; Sagherian et al. 2020; Sun et al. 2020; Tan et al. 2020; Moradi et al. 2021; Pourteimour et al. 2021; Hong et al. 2021; Hoseinabadi et al. 2020; Karimi et al. 2020; Labrague and Santos 2021; Li et al. 2021; Tetik et al. 2023).

> *"We have a lot of work, we don't have a break, I'm becoming weary, I'm getting less" (Rasmieh et al. 2022)*

The unprecedented accounts of inadequate PPE supply heightened nurses' anxiety and reduced their work efficiency (Lee et al. 2005; Catania et al. 2021; Cinar et al. 2021; Xu et al. 2021; Franco et al. 2020; González-Gil et al. 2021; Gunawan et al. 2021; Kalateh et al. 2021; Moradi et al. 2021b; Murat et al. 2021; Sun et al. 2020; Lee and Lee 2020; Santos et al. 2021; Leng et al. 2021; Seyed et al. 2022; Feifei et al. 2022). However, despite concerns about PPE shortages, nurses believed their

employers made efforts to provide adequate PPE (Robinson and Kellam 2021; Schroeder et al. 2020).

> *"We didn't have PPE from the start. We had to make contact with people who were suspected of having COVID-19 without PPE on several occasions. The situation has improved recently…." (Seyed et al. 2022)*

Caring for infected patients in isolated environments also exacerbated nurses' fears and concerns. Changes in their working environments (Gordon et al. 2021; Catania et al. 2021; Sun et al. 2020; Lee and Lee 2020; Leng et al. 2021; Han et al. 2020), high mortality rates (Kackin et al. 2020; Karimi et al. 2020; Shih et al. 2009; Rasmieh et al. 2022; Esthika et al. 2022) and unclear treatments and diagnostic tests (Santos et al. 2021) were some of the external factors influencing nurses' experiences.

3.4.1.2. Emotional (internal) reaction

Fear was common, and nurses were concerned about their safety, as well as that of their families, colleagues, and patients.

> *"I am afraid of being infected with MERS-CoV while caring for patients. I worry about bringing the MERS-CoV infection from the hospital to my family" (Kang et al. 2018).*
>
> *"All of my concerns are that I will pass the sickness on to my family, because my father got a kidney transplant and lives with us." (Seyed et al. 2022)*

Owing to the unclear information and evidence about the health occurrences (Chiang et al. 2007; Ohta et al. 2020; Arcadi et al. 2021; Lee and Lee 2020; Feifei et al. 2022), nurses were anxious and concerned they were at high risk of contracting the virus and transmitting it to their families and people they cared about (Cho and Kim 2021; Franco et al. 2020; Galehdar et al. 2021; González-Gil et al. 2021; Gordon et

al. 2021; Chiang et al. 2007; Al Muharraq 2021; Doo et al. 2021; Arcadi et al. 2021; Kim 2018; Labrague and Santos 2021; Liu et al. 2020; Murat et al. 2021; Sheng et al. 2020; Vitale et al. 2021; Xu et al. 2021; Zhang et al. 2020; Shih et al. 2009; Lam and Hung 2013; Liu et al. 2020; Leng et al. 2021; Kackin et al. 2020; Seyed et al. 2022).

> *"The other big fear is bringing the virus home and infecting the people you care about, which is why I've been self-isolated [speaks with a trembling voice] and decided to rent a house and go live alone where I am now" (Arcadi et al. 2021).*
>
> *"When my father got infected with COVID-19, I was badly depressed I kept on blaming myself. What if my father dies?" (Rasmieh et al. 2022)*

The fear of becoming infected was reported in all 79 included studies, highlighting the significance of "self-preservation" among nurses (Chiang et al. 2007). Keeping family members safe was a priority, causing some nurses to opt for self-isolation and restricting their social interactions and contact with family and friends (Lam and Hung 2013; Esthika et al. 2022; Han et al. 2020; Emad et al. 2023).

> *"It is hard to feel that you are trying to keep some social distancing with your parents. It is important….."(Rasmieh et al. 2022)*

However, these measures can lead to adverse emotional consequences, as outlined below. This fear caused uncertainty and insecurity in the lives of nurses (Moradi et al. 2021; Santos et al. 2021; Jordan et al. 2023). Nurses expressed feeling "frightened" (Danielis et al. 2021; Jordan et al. 2023) due to the uncertainty and the unpredictable nature of the situation they were facing (Lee and Lee 2020; Santos et al. 2021; Arcadi et al. 2021; Su et al. 2007; Cui et al. 2020; Deliktas et al. 2021; Fernández-Castillo et al. 2021; Nur and Şentürk 2023; Jia et al. 2021), which often

resulted in obsessive thinking (Fawaz and Itani 2021; Galehdar et al. 2021; Seyed et al. 2022).

> *". . .you can't control the thought it is quite intrusive so you start compulsively repeating your actions to make sure that you have done all that you can. . " (Fawaz and Itani 2021).*
>
> *"I'm constantly thinking about bad things" (Seyed et al. 2022).*
>
> *"I keep on thinking…this causes me anxiety and stress; I can't run from such thoughts." (Rasmieh et al. 2022)*

The findings also indicated that some nurses felt overwhelmed and incompetent when caring for infected patients. Training is an important factor for reducing fear among nurses (Labrague and Santos. 2021; Sun et al. 2020; Cui et al. 2020). However, the urgent nature of viral influenza outbreaks often requires an swift response, thereby leaving nurses with inadequate time to train and gain sufficient requisite knowledge to enable them to care safely and effectively for infected patients (Ohta et al. 2020; Lee and Lee 2020; Liu et al. 2020; Shih et al. 2009; Feifei et al. 2022; Esthika et al. 2022). Some nurses acknowledged that they had received a brief training (Liu et al. 2020; Han et al. 2020; He et al. 2021).

> *"…before you came down here (Covid-19 isolated ward), you were given training from the Infection Prevention and Control team." (Esthika et al. 2022).*

However, others had no training at all (Catania et al. 2021). As a result, some nurses felt inadequate, experienced a low sense of responsibility, and lacked relevant knowledge (Leng et al. 2021; Seyed et al. 2022; Tan et al. 2020; He et al. 2021; Murat et al. 2021; Lee et al. 2020; Jia et al. 2021; Lee et al. 2005; Nur and Şentürk 2023; Danielis et al. 2021; Arcadi et al. 2021; Gordon et al. 2021) and a strong sense of powerlessness (Chung et al. 2005; Fernández-Castillo et al. 2021; Lapum et al.

2021; Lee et al. 2005; Lee et al. 2020; Sheng et al. 2020; Shih et al. 2009; Sun et al. 2020; Tan et al. 2020; Jia et al. 2021).

> *"I have worked for more than 10 years and nursed many critically ill patients, but this was the first time I had contact with patients in this kind of public health emergency and I lacked the knowledge to deal with this infectious disease" (Liu et al. 2020).*

3.4.2. Timeline

With no clear treatment protocols, vaccinations, inadequate resources, and uncertain disease timelines, nurses felt overwhelmed (Arcadi et al. 2021; Liu et al. 2020; Robinson and Kellam 2021; Sheng et al. 2020; Nur and Şentürk 2023; Feifei et al. 2022; Su et al. 2007; Emad et al. 2023). This impact extended to their families, colleagues, and patients. One nurse expressed:

> *"…..I feel desperate because I feel I do not know when it will end" (Deliktas et al. 2021)*

3.4.3. Impact

CSM depicts consequences as individuals' beliefs about the outcomes of health threats and how this will impact them physically, psychologically, and socially. In this review, the impact of nurses' experiences on their well-being was categorised into physical, psychological, and social well-being. In addition, the health threats experienced by nurses have implications for their professional identity, career intentions, patient care, and collaborative work.

3.4.3.1. Physical well-being

To protect themselves from viral influenza diseases, nurses had to wear PPE for extended periods of time. The overwhelming physical exhaustion and discomfort associated with wearing PPE compromised nurses' ability to meet the needs of

several patients (Sheng et al. 2020; Sun et al. 2020; Leng et al. 2021; Moradi et al. 2021b; Logiudice and Bartos 2021; Liu et al. 2020; Kim 2018; Lapum et al. 2021; Lam and Hung 2013; Honey et al. 2013; Franco et al. 2020; Sagherian et al. 2020; Robinson and Kellam 2021; Liu and Liehr 2009).

> *"……had to wear the PPEs, and I felt thirsty because it is a hot outfit. . . after that I developed a headache, which affected my capacity to provide care." (Rasmieh et al. 2022).*

Physical symptoms, such as headaches, dizziness, muscle pain, breathlessness, dermatitis, raised body temperature, sweating, and impaired vision, were widely reported (Lee et al. 2020; Gordon et al. 2021; Chung et al. 2005; Wang et al. 2021; Muz and Erdoğan 2020; Moradi et al. 2021; Leng et al. 2021; Cui et al. 2020; Lee and Lee 2020; Kang et al. 2018; Galehdar et al. 2021; Cui et al. 2020; Bahadir-Yilmaz and Yüksel 2020; Galehdar et al. 2021; Hong et al. 2021; Vitale et al. 2021; Laudanski et al. 2021).

> *"When I wear isolation clothes (PPE), I get very hot, so I sweat a lot and my skin burns" (Seyed et al. 2022).*

These symptoms adversely affected nurses' sleep, resulting in chronic sleep disturbances (Galehdar et al. 2021; Gordon et al. 2021; Yildrim et al. 2021; Leng et al. 2021; Su et al. 2007; Vitale et al. 2021; Sagherian et al. 2020; Cui et al. 2020; Jordan et al. 2023; Seyedet al. 2022).

> *"There has been a tremendous disruption in my sleeping patterns" (Sagherian et al. 2020).*
>
> *"So, your sleep is also disturbed, sleep time is getting longer, 1-2 hours late, ... it's easy to get tired because you are sleepless" (Esthika et al. 2022).*

Furthermore, nurses reported being unable to eat, drink, or use the bathroom due to wearing PPE (Crowe et al. 2021; Galehdar et al. 2021; Leng et al. 2021; Liu et al. 2020; Moradi et al. 2021; Seyed et al. 2022).

> *"The clothes we wear make us very tired during the shift. Besides, with these on, we cannot eat or use the bathroom, especially during night shifts. Pardon me, many women have UTI, and some suffer from constipation because they have sluggish bowel" (Moradi et al. 2021).*

3.4.3.2. Psychological well-being

Studies have pointed out that uncertainty surrounding health occurrences led to high levels of anxiety, stress, depression, panic attacks, frustration, self-blame, emotional detachment, and poor mental health among nurses (Bahadir-Yilmaz and Yüksel 2020; Crowe et al. 2021; Chung et al. 2005; Doo et al. 2021; Fawaz and Itani 2021; Gordon et al. 2021; Lee et al. 2005; Kim 2018; Karimi et al. 2020; Logiudice and Bartos 2021; Lee and Lee 2020; Sun et al. 2020; Tan et al. 2020; Vitale et al. 2021; Yildrim et al. 2021; Zhan et al. 2020; Liu et al. 2020; Zhang et al. 2020; Murat et al. 2021; Robinson and Kellam 2021; Hong et al. 2021; Heo et al. 2021; Feifei et al. 2022; Rasmieh et al. 2022; Seyed et al. 2022; Emad et al. 2023; Jordan et al. 2023; Tetik et al. 2023).

> *"When the first wave came to an end, it really felt like a wave. Like, you just tried to keep your head over the water and not drown……the second wave broke me. And I ended up with burnout…and I'm seeing psychotherapy ever since" (Jordan et al. 2023).*

Additionally, significant psychological symptoms, such as PTSD, burnout, emotional exhaustion, obsessions, suspicions, loneliness (Li et al. 2021; Crowe et al. 2021; Sagherian et al. 2020, Su et al. 2007; Deliktas et al. 2021, González-Gil et al. 2021;

Galehdar et al. 2021; Galehdar et al. 2021; Gunawan et al. 2021; He et al. 2021; Hoseinabadi et al. 2020; Kackin et al. 2020; Labrague and Santos 2021; Lapum et al. 2021; Leng et al. 2021; Moradi et al. 2021; Moradi et al. 2021b; Ohta et al. 2020; Shih et al. 2009; Wang et al. 2021) and suicidal ideation were reported (Hong et al. 2021).

Among the participants, females and younger nurses reported higher levels of psychological distress (Pasay-an, 2020; Cinar et al. 2021; Zhang et al. 2020; Emad et al. 2023). For instance, Emad et al. (2023) in their study reported that 74.4% of female participants showed significantly higher scores for depression and anxiety compared to their male counterparts. Doo et al. (2021) reported that resilience, defined as the ability to recover quickly from difficulties or the ability to spring back into shape (Oxford English Dictionary), was considerably lower in nurses who cared for infected patients, while Logiudice and Bartos (2021) reported the opposite. This finding suggests that perceptions of resilience may play a key role in shaping nurses' emotional experiences. This is supported by Lapum et al. (2021), who indicated that the resilience acquired through this experience will provide protection in future situations.

> *"…..empty emotionally ... going through the uncertainty generated a shield, so we give up a little, but then we also get a little in terms of our strength ... just toughens you and makes you stronger" (Lapum et al. 2021).*

3.4.3.3. Social well-being

Nurses were perceived to be at a higher risk of contracting viral influenza diseases due to their working environment (Deliktas et al. 2021; Muz and Erdoğan, 2020; Kaleteh 2021; Lee and Lee 2020; Cho and Kim 2021). Some reported that nurses

were even thought of as the virus itself (Deliktas et al. 2021), a source of viral transmission (Lee and Lee 2020; Moradi et al. 2021; Kackin et al. 2020), and virus carriers (Kaleteh 2021; Galehdar et al. 2021). Consequently, friends, family members, and colleagues from other units approached these nurses with fear and caution (Muz and Erdoğan, 2020; Ohta et al. 2020; Deliktas et al. 2021). Some nurses shared:

> *"My friends, my earlier colleagues and apartment friends, who know I am working at pandemic units, approached me in fear. They thought of me as a virus and made me feel it. This made me very sad" (Deliktas et al. 2021).*
>
> *"….. Three days before I knew I had corona, I visited my uncle…..he had symptoms, and he has been on oxygen therapy. He kept on calling me and telling me that I have infected him, as if I am to be blamed. I did not know I had corona when I visited him, and the whole family were stigmatizing me as a person who transmitted it to others." (Rasmieh et al. 2022).*

Nurses felt alienated, isolated, and forced to separate from their families (Karimi et al. 2020; Lee et al. 2020; Lapum et al. 2021; Murat et al. 2021; Moradi et al. 2021b; Galehdar et al. 2021; Robinson and Kellam 2021; Feifei et al. 2022). This affected their social lives, relationships, and job performance. Some reported being stigmatised and discriminated against by society (Lee and Lee 2020; Gordon et al. 2021; Gunawan et al. 2021; Kackin et al. 2020; Kim 2018; Park et al. 2018; Rezaee et al. 2020; Yildrim et al. 2021). Furthermore, discrimination even extended to their family members. In order to prevent rejection and ostracisation, some nurses avoided disclosing their profession (Chiang et al. 2007).

"My child goes to kindergarten. When the kindergarten staff realised that I work at the hospital, they didn't want my kid to come….." (Kim 2018).

"When people discover that we are nurses; they treat us terribly. I once grabbed a cab and told the driver I needed to go to the hospital. When he discovered I was a nurse working in the COVID-19 unit, he refused to drive me there and forced me to get out of the car….." (Seyed et al. 2022).

3.4.3.4. Impact on the nursing profession

Substantial evidence indicates that during any health occurrence, nurses have a great sense of ethical and moral obligation towards patients and the community (Arcadi et al. 2021; Al Muharraq 2021; Chiang et al. 2007; Kalateh et al. 2021; Lapum et al. 2021; Logiudice and Bartos 2021). They embrace the situation regardless of the challenges (Chiang et al. 2007; Cui et al. 2020). In effect, this gives them the opportunity to mature professionally (Galehdar et al. 2021; Chiang et al. 2007; Kang et al. 2018; Lee et al. 2020; Lyu et al. 2020; Yildrim et al. 2021; Wang et al. 2021), to gain new competencies (Cui et al. 2020; Danielis et al. 2021; González-Gil et al. 2021; Muz and Erdoğan, 2020), job satisfaction from being valued by society (Robinson and Kellam 2021; Deliktas et al. 2021; Galehdar et al. 2021; Honey et al. 2013; Kim 2018; Muz and Erdoğan, 2020; Tan et al. 2020; Yildrim et al. 2021), to gain new experience (Lee et al. 2020; Sheng et al. 2020), and an increase in confidence (Liu et al. 2020; Lee and Lee 2020; Sun et al. 2020; Shih et al. 2009).

"This is a meaningful experience. I have become qualified for care of critically ill patients and my communication skills have also improved… which can be helpful for my career development" (Sheng et al. 2020).

Although several nurses expressed pride as frontline nurses, some raised concerns regarding their increased vulnerability (Schroeder et al. 2020). These findings suggest that nurses were confronted with ethical conflicts and dilemmas (Lee et al. 2020; Muz and Erdoğan 2020; Rezaee et al. 2020; Jia et al. 2021) with some experiencing a lack of professional accomplishment (Zhang et al. 2020). Nurses reported feeling guilty for being unable to provide adequate holistic care due to the reduced time that could be spent with patients. The inability to fulfil ethical obligations resulted in nurses experiencing moral distress:

> *"I was suffering from extreme remorse for shortening the duration of the patient's care……." (Muz and Erdoğan 2020).*

Considering the levels of stress and risks encountered by nurses, some have questioned their professional intentions (Yildrim et al. 2021). Some nurses reported an intention to retire or quit their jobs, while others had a low desire to work and even regretted being a nurse (Labrague and Santos 2021; Moradi et al. 2021; Lee and Lee 2020: Chung et al. 2005). The conflict between their personal safety at work and their role as nurses made them reassess their purpose as nurses (Lee and Lee 2020).

> *"I became very alienated from the nursing profession. I mean, I am discouraged by how the profession is regarded… I've decided to quit the profession" (Yildrim et al. 2021).*

> *"Every two weeks when I come to work there's a new card to be signed for a member of staff that's leaving. And it's like for God's sake, that's someone that's been here for 15 years and now they're leaving to go do PIP [different job] assessments. It's just like, oh that's just sad" (Jordan et al. 2023)*

Although some nurses expressed these intentions, Lee et al. (2005) and Jordan et al. (2023) reported that few nurses who cared for SARS patients actually left their jobs. Some nurses who cared for SARS-CoV-2 patients took leave off work or avoided reporting to work (Han et al. 2020). Given this, managers took further steps to encourage staff's career development and strengthen their sense of organisational identity (Lyu et al. 2020).

On the other hand, an updated review revealed that while nurses were aware of the risk posed by viral influenza outbreaks, they remained committed to their ethical obligations and continued to provide care to infected patients (Esthika et al. 2022; Rasmieh et al. 2022).

> *"I am a person 'who accepted to be identified as a nurse,' so, I decided to act as a nurse in accordance with my career ethics…..This is my career, I should serve no matter what, and I have to care." (Rasmieh et al. 2022)*
>
> *"… There is a feeling of pride because not everyone can take care of it (pandemic) like that, for example, many people resign, right?" (Esthika et al. 2022).*

3.4.3.5. Disturbance in patient care

A recurrent theme raised by the nurses in these studies was their ability to deliver patient care. Amidst these crises, two studies (Abu Sharour et al. 2021; Heo et al. 2021) reported that nurses exhibited good high levels of "self-efficacy" and "self-confidence" in caring for infected patients. Nurses provided person-centred, compassionate care (Chiang et al. 2007; Wang et al. 2021) while regularly updating patients' family members on their progress (Chung et al. 2005). Whiles nurses are obliged to meet their professional communication and caregiving requirements (Abu Sharour et al. 2021; Wang et al. 2021; Chiang et al. 2007), the lack of time (Muz and

Erdoğan 2020); staff shortages (Rezaee et al. 2020); fatigue (Galehdar et al. 2021; Rezaee et al. 2020) and rapidly changing protocols (Gordon et al. 2021; Muz and Erdoğan 2020) were reported to threaten this obligation (Zheng 2020; González-Gil et al. 2021; Jia et al. 2021; Galehdar et al. 2021). These and other factors have been detrimental to the optimal delivery of patient care (Lee and Lee 2020; Deliktas et al. 2021) and have put nurses' accountability at risk (Rezaee et al. 2020; Fernández-Castillo et al. 2021; Fawaz and Itani 2021; Catania et al. 2021).

> *"Declining sense of responsibility and accountability in patient care is really painful ... These problems are caused by factors such as the limited number of nurses or fatigue due to consecutive shifts. I have to tell you that under these challenging conditions, we cannot be at the patient's bedside when he/she needs us; although, this is part of our nursing duties." (Rezaee et al. 2020).*

> *"Personal care took a massive back seat. Sometimes people would go four or five days without being washed, because we just physically couldn't, you didn't have the time to do it" (Jordan et al. 2023).*

3.4.4. Control

The control element of CSM depicts an individual's beliefs about how much the health threat can be managed or kept under control. In the early stages of the pandemic or epidemic, nurses were dismayed by sudden interruptions in their work and lives (Hong et al. 2021; Catania et al. 2021; Yildrim et al. 2021). They had little or no control over health threats at work and in their personal lives.

> *"There has been a complete reorganization: the hospital where I work has been closed to become the first COVID hospital… one morning they said that the hospital was closed and we did not know where to go" (Catania et al. 2021).*

Information overload, for instance, from social media, also hindered nurses' ability to control health threats (Ohta et al. 2020b). Uncertainty and constant bombardment by the media led to a feeling of lack of control; frontline nurses did not know what to believe, as the media circulated contradictory information (Fernández-Castillo et al. 2021; Schroeder et al. 2020). As expressed by the participants:

> *"In the first 2 weeks, the TV reporters hourly placed stress on the terrible conditions in a certain hospital as a showcase for the high mortality and nurses' complaints; it was so discouraging……" (Shih et al. 2009)*

3.4.4.1. Response

As a consequence of threat perception, participants reported a range of coping strategies in the context of problem-focused and emotion-focused coping. Nurses across the studies utilised various problem-focused coping mechanisms, including increasing their knowledge about the disease (Abu Sharour et al. 2021; Al Muharraq 2021; Zhang et al. 2020; Franco et al. 2020), obtain support from family and friends (Deliktas et al. 2021; Crowe et al. 2021; Jia et al. 2021; Franco et al. 2020), fostering positive thoughts (Kackin et al. 2020) and engaging in different hobbies both old and new (Crowe et al. 2021; Jia et al. 2021).

> *"..., just think positive with Allah." (Esthika et al. 2022)*

To reduce the perceived stress associated with viral influenza outbreaks, some nurses recounted using emotion-focused coping mechanisms, such as humour, isolation, avoidance behaviour, reduced working hours, mindfulness, and distraction (Pasay-an 2020; Lam and Hung 2013; Cinar et al. 2021; Sun et al. 2020). Nurses also described finding comfort in activities such as cooking, reading, painting, shopping, watching movies, exercising (Kackin et al. 2020; Deliktas et al. 2021;

Gordon et al. 2021; Lee et al. 2005; Robinson and Kellam 2021) and participating in healing programmes (Kang et al. 2018). Social support from family, friends, or the public was utilised as both problem-focused and emotion-focused coping strategy, with nurses revealing that it motivated them to care for infected patients.

> *"My family helps me get through stuff too" (Gordon et al. 2021)*

Nurses also felt motivated by the support, social recognition, and praise bestowed on them by their families and the public (Sun et al. 2020; Kang et al. 2018; Kalatah et al. 2021; Leng et al. 2021; Su et al. 2007; Sheng et al. 2020).

> *"I received support from my wife who always prepared and cooked my food every day. I also received vitamin, dates juice, and all kinds of support…..there was also no bullying like the news, all people gave me support instead" (Tetik et al. 2023).*
>
> *"It makes me happy to know that everyone praises us and thinks about us" (Seyed et al. 2022).*

Some studies have identified a variety of institutional supports implemented to assist nurses during viral influenza disease outbreaks. These supports included financial incentives or bonuses (Abu Sharour et al. 2021; Jia et al. 2021; Sheng et al. 2020, Kang et al. 2018; Franco et al. 2020), frequent communication from leaders (Leng et al. 2021; Jia et al. 2021), counselling sessions (Cui et al. 2020), improved working conditions (Abu Sharour et al. 2021; Deliktas et al. 2021; Hoseinabadi et al. 2020; Lyu et al. 2020; Lam and Hung 2013), and regular education programmes (Lee et al. 2005; Kang et al. 2018). Nurses stressed the need for these interventions (Yildrim et al. 2021), which boosted their morale (Lee et al. 2005). Nurses acknowledged the existence of organisational well-being resources, such as hospital well-being hubs, unit quiet rooms, chaplaincy and psychology input, exercise and relaxation classes,

and food and drink provisions. However, some expressed challenges in accessing these resources during the pandemic (Jordan et al. 2023).

> *“There are certain well-being things in situ. But what the NHS can do very, very well is…we have it sitting here. If you need it, come. But if you can't walk anymore because there is no energy left, these services don't come to you. So, they are here in situ but you lie on the floor, you have to get up first before you can do that. They are not helping you up from the floor” (Jordan et al. 2023)*

Though some nurses complained about role ambiguity and a lack of support from their colleagues (Shih et al. 2009; Kang et al. 2018; Jia et al. 2021; Honey et al. 2013), the majority of studies highlighted an increasingly strong sense of teamwork among clinical staff which motivated them during outbreaks (Xu et al. 2021; Sun et al. 2020; Schroeder et al. 2020; Robinson and Kellam 2021; Liu and Liehr 2009; Chiang et al. 2007; Lee and Lee 2020; Catania et al. 2021). According to nurses, pandemics or epidemics have led them to appreciate professional solidarity (Muz and Erdoğan 2020; Fernández-Castillo et al. 2021; Chung et al. 2005; Arcadi et al. 2021). A participant described:

> *"We are growing as a team: we feel like an army that is fighting against a common enemy" (Catania et al. 2021).*

Nurses described sharing ideas and experiences, and supporting and motivating each other, which made them feel safe (Sun et al. 2020; Ohta et al. 2020; Logiudoce and Bartos 2021; Leng et al. 2021; Lee et al. 2020; Kim 2018; Honey et al. 2013; He et al. 2021; Arcadi et al. 2021).

> *“I don't know if many of us would have been able to carry on the whole pandemic if we didn't have that support of comedy and like, love from our teams really” (Jordan et al. 2023).*

"It makes me happy to see my co-workers assisting me. I've only recently begun working. I feel wonderful when they support me" (Seyed et al. 2022).

3.5. Discussion

To the best of my knowledge, this is the first theoretically informed mixed-method systematic review to collate evidence on the experiences and coping strategies of nurses caring for patients with severe viral influenza disease during an outbreak. Most studies (*n=59*) were published within the last two years, reflecting a rapid increase in research publications during the SARS-CoV-2 pandemic. Across the studies, there were more female nurses than male nurses. In the WHO 2019 report on gender equity in the health workforce, a greater percentage of female employees make up the nursing and midwifery workforce, whereas the majority of male employees make up physicians, dentists, and pharmacists in most countries (Boniol et al. 2019). This was reflected in the recruitment observed in most studies.

Consistent with CSM (Leventhal et al. 1980; 1984), we found links between nurses' perceptions of health threats, emotional reactions, and coping strategies. Dominant perceptions of health threats included frequent changes in clinical guidelines and workplace protocols, heavy workloads and working hours, staff shortages, availability of PPE, and lack of knowledge and training. Although many of these challenges are fundamental to the nursing profession (Botha et al. 2015), they lead to emotional reactions of fear among nurses, generating unease while caring for infected patients. A qualitative study involving frontline international healthcare workers who responded to the Ebola outbreak found that these challenges took a toll on healthcare professionals' well-being (Gee and Skovdal 2017). They suggested that healthcare institutions must provide clear communication, a safe working

environment, and proactive psychosocial support. To ease this fear, the UK Royal College of Nursing (RCN) stresses that employers and the UK government must provide suitable and adequate PPE to staff, regardless of the health setting (RCN 2020). Furthermore, providing nurses with sufficient information, resources, and disaster-based training may help alleviate fear and increase nurses' self-efficacy and confidence (Lee et al. 2021). This aligns with the findings of an intervention study that identified training sessions as an evidence-based platform for preparing and building healthcare professionals' resilience to pandemics (Aiello et al. 2011).

The consequences of these challenges impact nurses' physical, psychological, and social well-being. Nurses had to endure wearing PPE for prolonged periods, which prevented them from performing the basic functions necessary for their well-being. Evidence-based guidelines suggest that PPE must be suitable for its purpose and protects against health or safety risks at work (Loveday et al. 2014). Nevertheless, this review indicates an association between physical exhaustion and PPE use. Nurses in the included studies reported discomfort in wearing PPE and associated physical symptoms, such as headaches, dizziness, muscle pain, breathlessness, dermatitis, raised body temperature, sweating, and impaired vision. Similar to previous studies (Xiang et al. 2020; Brooks et al. 2020; Lee 2018), nurses reported adverse psychological outcomes including high levels of anxiety, stress, depression, panic attacks, frustration, insomnia, self-blame, and poor mental health. Females and young nurses reported higher levels of psychological distress compared to male nurses. Similarly, a cross-sectional survey on psychological distress among nurses caring for victims of war reported that female nurses were the most significant predictors of psychological distress (Jayawardene et al. 2013).

In addition, nurses were stigmatised and yet perceived by society as heroes. A survey by the International Council of Nurses (ICN 2020) reported SARS-CoV-2 related cases of discrimination among nurses. Nurses were prevented from using public transport and were sprayed with chlorine, and their children were not allowed in childcare settings. Yet, nurses were portrayed by the media as the heroes of the pandemic (ICN 2020). This conflicting role impacted nurses' social lives, relationships, and job performance.

While nurses expressed a desire to quit their jobs due to the stress and risks encountered, they also reported having gained new experiences in caring for infected patients. Previous studies have shown that patient satisfaction and quality healthcare result from effective nurse-patient interactions (Norouzinia et al. 2015). Our review found that nurses displayed a strong sense of commitment to caring for infected patients. Consistent with previous studies (Fernandez et al. 2020), a profound sense of duty of care was made possible by increased teamwork among healthcare professionals. Despite the transitory nature of the teams, the nurses reported feelings of camaraderie and professional solidarity. Literature indicates that effective teamwork improves patient care, team efficiency, and organisation (Garrosa et al. 2011).

Subsequently, nurses adopted various coping strategies of both problem-focused and emotion-focused, to manage health threats. It can be gathered from this review that nurses reported using a mixture of coping strategies such as social support, attending educational programmes, increasing their knowledge about the disease, and engaging in different hobbies. A systematic review of stress and coping among Australian nurses reiterated that nurses with little social support experienced increased stress and decreased job satisfaction (Lim et al. 2010). Therefore, the

significance of support systems in the nursing workforce was highlighted. Other derived coping strategies included financial incentives, frequent communication networks, improved working conditions, and educational programmes. These findings resonate with previous studies exploring healthcare professionals' experiences in pandemics and epidemics (Koh et al. 2011) which draws on to the need to build on existing coping strategies among healthcare workers, particularly nurses (Raven et al. 2018).

3.5.1. Review strengths and limitations

This mixed-method systematic review provides extensive evidence on the experiences and coping strategies of nurses caring for patients with severe viral influenza disease during outbreaks. To reduce potential bias in the screening process, multiple experienced reviewers were involved. Quality assessment was conducted using standardised JBI critical appraisal instruments for both the qualitative and quantitative studies. Although there is a possibility of overestimating the quality of the included studies, all studies included in the review were of high and medium quality. Another strength of this review is that data synthesis and findings were drawn explicitly on an established theoretical framework; guiding the interpretation and presentation of the empirical evidence identified and reducing the author's bias in reporting the review findings.

There are a few limitations worth mentioning. First, the review only included studies published in academic journals and in the English language, potentially missing relevant literature published in other languages. In addition, the majority of participants in the included studies were female nurses, which may limit the generalisability of our findings to the nursing workforce.

3.5.2. Review conclusion

Nurses play an essential role in responding to severe viral influenza outbreaks, which pose considerable challenges. These challenges can have profound physical, psychological, and social impacts on nurses' well-being, thereby affecting the delivery of care, collaborative work, and organisational performance. These factors can also impact job satisfaction, impede career progression and increase staff turnover. Social support, improved workplace environment, and training appear to be the most common coping strategies for managing these challenges. Therefore, stakeholders, policymakers, the government, and healthcare institutions need to recognise and monitor nurses' needs to develop and implement effective support systems before and after pandemics or epidemics.

3.6. Gaps in the literature

The literature shows that, globally, work-related stress is the main challenge for registered nurses (Chinenye et al. 2024), impacting their well-being, professional ambitions, and the quality of patient care. Evidence has shown that although stress is inherent in the nursing workforce, nurses experience higher than usual stress levels during pandemics (Dixit 2023). While several studies have researched the impact of such outbreaks on nurses, there are still gaps in the existing literature that need to be investigated. Of particular interest are the long-term effects of stress on nurses who have been on the frontline of viral influenza outbreaks, such as the SARS-CoV-2 pandemic. Although the studies included in the review have examined and obtained a deeper understanding of nurses' experiences during viral influenza outbreaks, there is minimal literature on how these challenges evolve over time and their long-term impact on nurses' well-being and profession.

Other notable research gaps identified in the exiting literature are as follows;

- Ascertaining whether training and support strategies mitigate psychological morbidities;
- Examining appropriate psychological interventions to help nurses;
- Verifying the effects of anxiety-relieving interventions on nurses working in infected patient units;
- Improving the physical and mental performance of nurses which can directly or indirectly improve the quality of care for infected patients;
- Follow-up studies on the short-term and long-term experiences of nurses during pandemics or epidemics;
- A mixed-methods study approach involving nurses caring for infected patients for a longer period to prepare the field of nursing for a novel emergent epidemic;
- Exploring positive emotions to understand how working in these environments can be rewarding;
- There is a need for wider, theoretically informed research to explore the negative and positive perceptions and emotions of nurses to understand their experiences in caring for infected patients during outbreaks.

Additionally, the specific coping strategies utilised by nurses to manage work-related stress during viral influenza outbreaks require further investigation. While this review revealed some of the coping strategies employed by nurses, there is a need for research that delves into the effectiveness of these coping strategies and how they change over time.

Understanding the challenges and coping strategies is essential for nurses in managing work-related stress during pandemics or epidemics, and can inform the

implementation of targeted interventions to support their well-being during such challenging times. Moreover, addressing gaps in the literature can offer comprehensive insights that will help guide policies and practices in nursing during health outbreaks.

3.7. Chapter summary

This chapter presented a published article which forms a fundamental part of this thesis: a mixed-methods systematic review of nurses' experiences with viral influenza outbreaks, their emotional responses to the challenge, coping strategies, and their perceptions of health risks. This review highlighted the extreme challenges nurses endured during these outbreaks and the need for continued support systems and interventions for mental health in order to improve nurses' quality of life and the ability to cope during future healthcare crises. Gaps in the literature were identified, and recommendations were made from a review of possible coping strategies to mitigate the lasting effects of pandemics and epidemics on the mental well-being of nurses.

Chapter 4: Methodology

4.0. Introduction

This chapter begins by providing an overview of the philosophical assumptions that informed this study. Subsequently, the study design is discussed, focusing on the explanatory sequential mixed-methods design (Creswell and Creswell 2018) that underpins this study. The rationale for selecting a mixed-methods research design to investigate the work-related stress experienced by registered nurses who cared for severely ill patients with COVID-19 in hospital settings during the SARS-CoV-2 pandemic in Wales and England is examined in relation to the study's goals and objectives outlined in Chapter 1.

Following this, a detailed overview of the data analysis procedures, integration strategies, and considerations for ensuring ethical rigour are provided.

4.1. Philosophical Worldview

Philosophical worldviews or paradigms are frameworks for understanding the world that shape both the thinking process and actions (Mertens 2014). In terms of research, these worldviews are fundamental sets of shared beliefs held by researchers regarding the understanding of problems and their perceptions of the world when conducting research (Creswell and Creswell 2018). The researcher's philosophical worldview significantly influences the nature of any research (Mertens 2014), establishing the intention, motivation, and expectations for the research (Mackenzie and Knipe 2006). While Hammersley (2006) acknowledged the indispensable role of philosophical worldviews in research, he contended that their contributions were limited because they did not inform researchers of how best to proceed with the investigation of specific topics. Patton (2002) shared a similar

perspective, asserting that adherence to a paradigm may restrict the scope of methodological choices and impede adaptability and creativity. This paradigm restriction can lead to unconscious biases and the predetermined nature of researchers' methodological decisions (Patton 2002).

Conflicting viewpoints surrounding philosophical worldviews are deeply rooted in the contrasting ontological and epistemological positions of quantitative and qualitative research (Bryman 2008). While ontology pertains to the nature of knowledge and reality, epistemology examines the relationship between knowledge and researchers during the investigative process (Killam 2013). The inherent conflict arises from core assumptions at the epistemological and ontological levels regarding what constitutes acceptable knowledge and how society and its institutions should be defined (Bryman 2008). Despite these conflicting viewpoints, a researcher's philosophical worldview serves as a conceptual foundation for a study's methodological approach and influences the interpretation of findings (Brown and Dueñas 2019). Four primary philosophical worldviews are commonly discussed in the literature: positivism, interpretivism, transformative, and pragmatism (Creswell and Creswell 2018).

Positivism

The positivist worldview is grounded in the ontological principle that a single reality exists (Konge and Artino 2020) and the epistemological assumption that the researcher is detached from the subject of study (Aliyu et al. 2014). Positivism posits that the principles of data collection and analysis in both natural and social sciences should be uniform and that there exists an external reality separate from our descriptions of it (Flick 2009). This viewpoint requires that the researcher's position be separate from and does not influence research outcomes (Cohen et al. 2018). To

achieve this separation, positivists strive for dualism and objectivity (Park et al. 2020), aiming for measurable, predictable, and controllable outcomes (Dieronitou 2014). The researcher maintains objectivity, ensuring that personal biases or feelings do not influence the study's findings. According to Howell (2013), differentiating between reason and emotion, as well as science and individual experience, enables positivist researchers to achieve precise comprehension of natural phenomena.

Positivism is also referred to as empirical science, or scientific research. It is based on the assumption that the universe is governed by consistent laws and causal relationships, and holds that knowledge can be acquired through careful observation and experimentation (Creswell 2013; Aliyu et al. 2014). This approach aims to establish causal relationships, which is a vital requirement for ensuring internal validity (Dieronitou 2014). This worldview is often considered reductionist as it involves breaking down ideas into smaller portions to be measured, tested, varied, and refined to understand the world (Creswell and Creswell 2018). While positivism is widely regarded as being inherently associated with quantitative research (Bryman 2008), it does not always use quantitative methods (Park et al. 2020), but can also be used in qualitative or mixed-methods studies.

Despite its enduring impact (Aliyu et al. 2014; Park et al. 2020), strict positivist thinking has been subject to criticism (Polit and Beck 2018) as inappropriate for certain types of research (Scotland 2012). Critics argue that positivism oversimplifies the intricate nature of human interactions and experiences, treating individuals as mere objects of study (Bryman 2008). They assert that quantitative methods alone are insufficient for comprehending social phenomena, as they tend to disregard the

subjective and interpretive aspects of human life (Zyphur and Pierides 2017; Powell 2020). Thus, there is increasing recognition of post-positivism, which embraces many critiques of the positivist view of science by acknowledging that there cannot be theory-neutral observations (Bryman 2008). Although post-positivism shares most of the notions of positivism, it differs in some respects. It challenges the conventional notion of the absolute truth of knowledge and recognises that we cannot be absolutely certain about our claims of knowledge when studying the behaviour and actions of humans (Creswell and Creswell 2018). While post-positivism maintains that there exists an independent and external reality similar to positivism, it acknowledges that the comprehension of this reality is restricted by the researcher's conceptual tools (Bryman 2008).

Interpretivism

In contrast, interpretivism posits that multiple realities exist, thereby shifting the focus of the researcher towards diverse perspectives rather than a single perspective (Creswell 2013; Creswell and Creswell 2018). The ontological stance of interpretivism is based on constructivist ontology, which emphasises the importance of cognitive orientation. They argued that social processes are driven by humans through interaction and action, thus rejecting the notion that social structures are naturally formed (Alharahsheh and Pius 2020). Accordingly, researchers who adhere to this worldview tend to derive subjective interpretations and understanding from complex human interactions (Creswell 2013), asserting that reality is socially constructed and constantly evolving (Goundar 2012) and that there are often multiple truths (Saunders et al. 2012). Unlike positivism, there is an interactive relationship between the researcher and the subject of investigation (Denzin and Lincoln 2018), which influences the research findings.

Interpretivism recognises the importance of subjective epistemology, acknowledging that human beings are inherently connected to knowledge (Junjie and Yingxin 2022). While the knowledge generated by this paradigm may not be universally applicable, it is capable of producing data-rich findings that inform decision making (Riyami 2015; Goundar 2012). Critics have argued that findings from interpretive studies are susceptible to bias because they only offer opinions rather than definitive solutions (Willis 2013). However, Pulla and Carter (2018) suggested that the concerns of bias in interpretive research can be addressed by researchers being reflexively aware of their impact on the research and research process. Furthermore, some critics contend that this worldview has failed to promote action plans to empower marginalised individuals and communities (Junjie and Yingxin 2022; Creswell and Creswell 2018). Therefore, the transformative paradigm has been acknowledged in literature.

Transformative Paradigm

The transformative paradigm is rooted in the assumption that research should be action-oriented, address inequality, amplify the voices of marginalised individuals or groups in society, and promote social justice (Mertens 2017). Reality is seen as multifaceted and shaped by a wide range of factors. Although there are no strict methodological assumptions associated with this worldview, great significance is placed on incorporating the perspectives of those marginalised in society at all stages of research (Mertens 2017). Users of this worldview predominantly adopt a "cyclical mixed-methods" research approach to ensure the active involvement of potential participants (Mertens 2018). Although the transformative worldview is recommended as a paradigm for mixed-method research, its applicability is limited to

a small range of social scientific studies (Hall 2013). Transformative researchers are seen as advocates, activists, and agents of social change (Mertens 2021).

Pragmatism

The pragmatist worldview contends that knowledge can be obtained by using “what works” and employing diverse approaches to understand the problem statement (Hanson et al. 2005; Creswell and Creswell 2018). It rejects a dichotomous stance between quantitative and qualitative approaches (Polit and Beck 2018, p. 309), instead emphasising the integration of both approaches to understand and solve problems (Creswell and Creswell 2018; Onwuegbuzie 2005). Pragmatism offers a flexible, abductive, and reflexive approach to research design (Morgan 2007), which is driven by the research question(s) and purpose of the research, rather than being dictated by a specific paradigm (Tashakkori and Teddlie 2010). Compared to positivism/post-positivism and interpretivism, pragmatist researchers focus on solving problems rather than making assumptions (Hall 2013).

Pragmatism posits that knowledge is purposely constructed to enhance one's existence and engagement with the world (Goldkuhl 2012). Researchers of this view argue that knowledge is inherently grounded in experience, and that each individual's knowledge is distinctive, and shaped by their unique experiences. However, a significant portion of this knowledge is socially shared as it emerges from experiences that are common to society. As such, knowledge is inherently social in nature (Morgan 2014). Moreover, pragmatists posit that the world is not static but changes constantly with every event. They argue that it is not possible to experience the same situation twice; thus, our beliefs about possible outcomes are provisional.

This means that beliefs about how to act in a particular situation are inherently provisional (Morgan 2014).

Pragmatists maintain that no two individuals have identical experiences; therefore, their worldviews are distinct. Nevertheless, there are varying degrees of common experiences between any two individuals that result in differing levels of shared beliefs. Consequently, worldviews can be both unique and shared collectively (Morgan 2014). The preference of pragmatist researchers to select one version of reality over another is determined by the practicality of that choice in achieving anticipated or desired results (Tashakkori and Teddlie 2008). For instance, a pragmatist would not categorise an object based on its intrinsic nature or the role it plays, but rather on how it helps the pragmatist attain their intended objective (Goles and Hirschheim 2000, p. 261). While Bergman (2008) has been critical of pragmatism, describing it as "vague" and lacking in clear application guidelines, it allows for the exploration of diverse research approaches and is commonly recommended for mixed-methods research (Creswell et al. 2011; Tashakkori and Teddlie 2003).

I share the pragmatic worldview discussed above, which emphasises the utilisation of multiple practical approaches to understand complex phenomena. The flexibility of this paradigm, along with its assumption that reality is shaped by both objective facts and subjective experiences, aligns well with the aims and objectives of this study as outlined below:

- Explore work-related stress experienced by nurses caring for severely ill patients with COVID-19;

- Consider nurses' perception of the work-related stress experienced in caring for severely ill patients with COVID-19 (Challenge/Positive or Hindrance/Negative) and to
- Examine how nurses cope with work-related stress experienced in caring for severely ill patients with COVID-19.

Conducting this study as an insider (registered nurse) required me to maintain ongoing reflexivity to manage my potential influence on the research process. From a pragmatist perspective, subjectivity is viewed as a vital part of the research process. It posits that knowledge is inevitably shaped by personal experiences rather than solely by objective truth, thereby acknowledging that my position as an insider (registered nurse) presents both advantages and potential biases. My professional background provided valuable insights into the study's aims and objectives with a deeper understanding of the participants' lived experiences. However, it was important to minimise my influence, as my personal experience could lead to exaggeration of certain issues. With a pragmatist worldview, this study aimed to generate original and applicable knowledge that could be practically applied to enhance nurses' well-being and inform healthcare policies and interventions. Therefore, strategies were implemented to ensure that the study remained credible and focused on participants' perspectives rather than my personal experience. A useful strategy that helped minimise these biases and challenges was engaging in regular reflexive discussions with my academic supervisors. These were essential in maintaining a balanced perspective and ensuring that I managed to maintain objectivity throughout the research process. The research process remained as objective and rigorous as possible, while still drawing on my insider knowledge to enrich the study.

4.2. Mixed-methods research design

Mixed-methods research has become increasingly prominent in the field of health-related research, facilitating deeper and more thorough comprehension of complex human phenomena (Doyle et al. 2016). Evidence in the literature demonstrates that the popularity of mixed-methods continues to increase (Klassen et al. 2012). The use of mixed-methods design dates back to approximately the late 1800s and the early 1900s, originating from scholars' contributions across different disciplines, such as evaluation, education, management, sociology, and health sciences (Creswell and Plano Clark 2011; Creswell and Creswell 2018). As documented by Hesse-Biber (2010), European researchers used mixed-methods to study poverty in families as early as the 1850s. Further significant advancements were made in the late 1950s by Campbell and Fiske, who introduced a multi-trait, multi-method matrix to enhance the accuracy of their research findings (Johnson and Onwuegbuzie 2007). The development and growth of mixed-methods design have gone through several stages of progress and continue to evolve (Creswell and Creswell 2018). Several terms have been used to describe this approach, such as critical multiplism (Cook 1985), triangulation (Denzel 1978), multiple operationalism (Campbell and Fiske 1959), mixed methodology (Tashakkori and Teddlie 1998) and the third methodological movement (Johnson and Onwuegbuzie 2007). However, recent writers have tended to use the term "mixed-methods" (Mayoh and Onwuegbuzie 2015; Doyle et al. 2016; Creswell 2015; Klassen et al. 2012). Within scholarly discourse, some confusion remains surrounding the concepts of mixed-methods and multi-methods research, as some authors use both concepts interchangeably (Anguera et al. 2018). While mixed-methods involve integrating both qualitative and

quantitative paradigms in a single study, multi-methods entail using multiple methods within the same paradigm (Morse 2010; Halcomb and Hickman 2015).

Although there continues to be ongoing tension and debate regarding the definitions of mixed-methods (Hesse-Biber 2015), for the purpose of this study, I was guided by Creswell and Creswell (2018), who defined mixed-methods as:

> *"An approach to enquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks. The core assumption of this form of enquiry is that the integration of qualitative and quantitative data yields additional insight beyond the information provided by either quantitative or qualitative data alone".* (p. 41)

Central to this is the integration of quantitative and qualitative data within a study (Maudsley 2011). Integration can occur at any stage of research design and analysis, such as merging the data, explaining the data, building from one database to another, or embedding the data within a larger framework (Creswell and Creswell 2018).

Mixed-methods design offers a viable alternative for nursing researchers to address complex issues more thoroughly than merely relying solely on either qualitative or quantitative research design (Halcomb and Hickman 2015). Health professionals, such as nurses, already have experience using mixed-methods to gather patient information. They conduct patient interviews, physical examinations, and diagnostic tests to make diagnoses and treatment decisions (Battistaa and Torre 2023). In mixed-methods research, a quantitative approach enables researchers to gather data from a large number of participants, thereby enhancing the potential for generalising the outcomes to a more extensive population (Dawadi et al. 2021). The

qualitative approach offers a more comprehensive understanding of the subject being studied, giving voice to the perspectives of participants (Dawadi et al. 2021).

There have been a growing number of mixed-methods studies in nursing journals, with some journals publishing special issues dedicated to this type of research. For example, the June 2017 special issue of the Journal of Research in Nursing highlighted how mixed-methods research can produce findings that are more easily implemented in healthcare practice (Lesser 2017). A mixed-methods research design has been used in nursing practice, education, and well-being studies to provide comprehensive insights by combining both qualitative and quantitative data. In nursing practice and education, this approach has been used to evaluate and develop clinical policies, protocols, interventions, and evidence-based practices (Penno et al. 2022; Aloisio et al. 2023; Palmar-Santos et al. 2023; Regragui et al. 2023). Aloisio et al. (2023) utilised mixed-methods design to evaluate guideline implementation in nursing practice. Using this approach, they developed indicators that could help promote evidence-based clinical practice (Aloisio et al. 2023). Furthermore, Wood et al. (2024) conducted a longitudinal mixed-methods study to investigate changes in the well-being, satisfaction, and motivation of advanced nurse practitioners (ANPs) over a four-year period. They used both quantitative measures, such as validated questionnaires, and a qualitative approach, using open-ended questions, to explore the impact of challenging working conditions on ANPs' well-being. This combination of approaches provides a deeper understanding of and diverse perspectives on the well-being, job satisfaction, and motivation of ANPs, which could not have been captured using only one research design (Wood et al. 2024).

4.2.1. Rationale for using mixed-methods design

Determining when to use mixed-methods research requires careful consideration of the overall purpose of the study (Battistaa and Torre 2023). After reviewing the literature on nurses' experiences during pandemics, it became clear that most studies utilised a single design approach, either quantitative or qualitative, with only a few incorporating a mixed-methods design (Crowe et al. 2021; González-Gil et al. 2021; Sheng et al. 2020; Santos et al. 2021; LoGiudice and Bartos 2021). These mixed-methods studies effectively captured the diverse challenges faced by nurses, ensuring that their voices and perspectives were represented in the findings. For example, the study by LoGiudice and Bartos (2021) demonstrated that qualitative narratives complemented quantitative findings to provide a more comprehensive understanding of nurses' challenges and coping strategies. The research approach emphasised the importance of integrating quantitative data from online surveys with qualitative insights from interviews, using each type of data to validate the other and establish a solid foundation for answering the research question (LoGiudice and Bartos 2021). Similarly, Santos et al. (2021) used a mixed-methods design to explore nurses' working environments in hospital settings during the SARS-CoV-2 pandemic in Brazil. By combining qualitative data in the form of written comments with quantitative surveys, the researchers were able to identify the challenges faced by hospital nurses caring for patients with COVID-19, providing valuable insights for health policy and practice.

The mixed-methods research design has proven to be a useful tool for exploring nurses' experiences during pandemics and epidemics, offering diverse perspectives and experiences. Based on this, I chose to use mixed-methods design in this study due to its numerous benefits. First, it allows one method to complement the findings

of the other, providing a more comprehensive and varied viewpoint (Teddlie and Tashakkori 2009). This approach helps to develop stronger and more precise conclusions by using one method to guide or influence one another (Plano and Ivankova 2016). As a result, mixed-methods research design offers a comprehensive understanding of a phenomenon and provides additional insights into its different components, which can be valuable for generating substantive theories (Ventakesh et al. 2013). Lastly, the mixed-methods design enables the attainment of more robust findings by combining the strengths of qualitative and quantitative approaches to compensate for their respective limitations (Plano and Ivankova 2016).

In this study, I also considered using a longitudinal cohort research design. A longitudinal cohort design can be quantitative, qualitative, or embedded in a mixed-methods approach. Longitudinal studies involve collecting data from individuals or groups over an extended period of time (Zouhai 2023; Donovan 2023; Barrett and Noble 2019), whereas cohort studies recruit and follow participants who share a common characteristic, such as a specific profession, personal or demographic traits (Barrett and Noble 2019). Data can be collected continuously or at regular intervals through tests or simple observations (Donovan 2023). Longitudinal research takes into account the passage of time and focuses on changes or stability in the practices, perceptions, and orientations of individuals, as well as how these relate to events, situations, historical factors, and institutional circumstances (Hollstein 2021). Unlike cross-sectional studies that determine the prevalence, cohort studies have been conducted to examine the incidence, causes, and prognosis (Wang et al. 2020).

In nursing research, longitudinal research designs have been used to study the progression of nurses' education and careers (Barrett and Noble 2019). One

example is a large cohort study that recruited over 6,400 female nurses from six European countries who initially did not intend to leave the nursing profession (Li et al. 2011). After one year of follow-up, 8.24% of the participants intended to leave the nursing profession, citing low salaries, limited promotion opportunities, and lack of esteem as key factors (Li et al. 2011). These findings highlight an imbalance between rewards and the work environment, emphasising the need to improve the work environment and professional rewards, such as pay and incentives to retain nurses, and reduce nursing shortages in Europe (Li et al. 2011).

Couper et al.'s (2021) large longitudinal survey examined the impact of COVID-19 on the well-being of the nursing and midwifery workforce in the UK. The study involved over 7,800 participants and lasted for three months. The findings showed that participants experienced a negative psychological impact resulting from both personal and workplace factors (Couper et al. 2021). These findings provide valuable insights into how healthcare organisations can support the well-being of their staff during the current pandemic and in future pandemic planning (Couper et al. 2021). It is evidenced that longitudinal research allows researchers to compare participants' prospective plans with retrospective evaluations, thus enabling them to draw confident conclusions (Barrett and Noble 2019). The approach also allows for the examination of changes in decision making and how individuals respond to personal, situational, and institutional circumstances. This helps uncover how experiences accumulate over time and how they might influence future perspectives and actions (Hollstein 2021).

However, despite these benefits, this approach presents several challenges. Collecting data over an extended period of time is complex and time consuming.

This requires substantial personnel, resources, and funding (Donovan 2023; Barrett and Noble 2019; Zouhai 2023). As a self-funded Ph.D. student, I could not afford the resources necessary to implement this approach in my study. Moreover, monitoring participants over an extended period can result in participant attrition, which may affect the study's findings and introduce biases that could influence the outcome (Zouhai 2023). It is also possible that participants' behaviour may change due to their awareness of being part of a study cohort (Barrett and Noble 2019).

Thus, after thorough consideration and guidance from my academic supervisors, I chose an explanatory sequential mixed-methods research design as it offered an effective approach to addressing the research aims and objectives.

4.2.2. Explanatory sequential mixed method design

There are three core approaches to data collection that use mixed-methods: convergent, explanatory sequential, and exploratory sequential designs (Creswell and Plano 2018). In the convergent design, both qualitative and quantitative data were collected simultaneously. In an exploratory sequential design, qualitative data collection comes first, aiding the development of a subsequent quantitative data collection tool. In an explanatory sequential design, qualitative data collection follows quantitative data analysis, allowing qualitative findings to explain or expand upon quantitative results (Creswell and Plano 2018). This study used an explanatory sequential design, as illustrated in Figure 4.0.

Phase	Procedure	Product
Quantitative data collection	• Cross-sectional online survey (n= *516*)	• Numeric data
Quantitative data analysis	• Data screening • SPSS software v27 • Data screening (univariate, bivariate and multivariate)	• Descriptive statistics (data description; normality; outliers; missing data) • Bivariate analysis (Spearman's rho correlation coefficient; Chi-square tests)
Interview guide development	• Purposive sampling (all participants invited to the one-to-one interviews) • Development of interview questions	• Interview guide
Qualitative data collection	• Email fellow-up • Social media recruitment • Semi-structured one-to-one interviews (n=*12*)	• One-to-one interviews (n=*12*) • Interview transcripts
Qualitative data analysis	• Transcribing interview scripts • Coding and thematic analysis	• Braun and Clarke's (2022) reflexive thematic analysis (Six-phase analysis) • Codes • Four core themes and six subthemes
Integration of the Quantitative and Qualitative	• Interpretation and explanation of the quantitative and qualitative results	• Discussion • Implications • Recommendations

Source: *Adapted from Creswell and Piano (2018)*

Figure 4.0: Explanatory sequential mixed-methods design flowchar*t*

In this study, equal importance was given to the quantitative and qualitative methods to address the research objectives. Through the quantitative phase, I collected numerical data to identify patterns in work-related stress experienced by nurses and the coping strategies employed while caring for patient with COVID-19. The quantitative phase helped identify relationships between variables such as work-related stress, perceptions of stress and experiences, coping strategies, and demographic characteristics such as gender and years of qualification. The key findings identified in the quantitative phase were further explored through one-to-one interviews during the qualitative phase. In the qualitative phase, deeper insights into the participants' perceptions of their experiences were gained. The participants were given a platform to share their valuable and insightful experiences, which facilitated a richer understanding of the quantitative numerical findings.

Despite the advantages of mixed-methods research design, certain practical difficulties associated with this design are worth noting. The process of data collection and analysis is complicated, requiring multiple stages of data collection and individual analysis. Moreover, ensuring the accuracy and reliability of data at each stage requires a thorough and systematic approach that is time-consuming and resource-intensive (Sharma et al. 2023). Critics of mixed-methods approaches argue that in many instances, the results are insufficient to support conclusions about research questions or objectives (Wilkinson and Staley, 2019). Dawadi et al. (2021) explored the challenges of combining qualitative and quantitative data, addressing important concepts of validity and reliability. The authors stress the importance of skilled researchers in both approaches to ensure the strength of their results. Additionally, they highlighted the potential for time and resource constraints when

conducting both phases, which could result in gaps in the data collection or analysis (Dawadi et al. 2021).

However, the growing importance of this approach cannot be underestimated in several health disciplines (Wasti et al. 2022). An advantage of the explanatory sequential approach is that it allows a single researcher to complete the study and allows for flexibility in designing the second phase based on insights gained from the initial quantitative phase (Creswell and Plano 2018).

4.3. Study inclusion and exclusion criteria

To be included in both components of this study, potential participants had to meet the following criteria:

A. Registrants (Adult and Mental Health nurses) with the Nursing and Midwifery Council (NMC) in the UK;
B. Had expressed interest in taking part in the study through the study online survey link shared on social media platforms;
C. Had worked in hospital settings in Wales or England during the SARS-CoV-2 pandemic for a minimum of two weeks;
D. Had experience caring for severely ill patients with Covid-19 (adult patients aged 17 years and above);
E. Aged 21 years and over and
F. Able to give consent.

4.4. Quantitative component – Cross sectional survey design

The quantitative phase of this study was conducted using a cross-sectional survey design, which is well-established in quantitative studies (Setia 2016). This type of survey provides a quantitative description of trends, attitudes, and opinions within a

population, or tests for relationships between variables within the sample (Creswell 2018). Data are usually collected using questionnaires on more than one case at a single point in time, allowing for the collection of numerical or measurable data in relation to two or more variables, which are subsequently analysed to uncover patterns of association (Bryman 2012). Often, the snapshot provides a picture of what the researcher wants to study (Carlson and Morrison 2009; Connelly 2016). However, the findings can be limited or potentially biased if the variables change over time (Connelly 2016). Despite this limitation, a cross-sectional survey design was selected because it is more efficient and economical than other research designs, such as longitudinal (Polit and Beck 2018; Jupp 2011; Setia 2016; Wang and Cheng 2020). This approach allowed me to connect with study participants who were geographically dispersed and ask them to answer questions in real time. The strategies to address the limitations associated with this design are discussed below.

4.4.1. Sampling and recruitment strategy

The sample size was determined based on the minimum number of people required to obtain reliable results from the statistical procedures to be conducted (Pearson and Mundform 2010). While some researchers argue for a ratio of at least 10 participants to one variable (Everitt 1975) or 20 participants to one variable (Hair et al. 2010), and Comrey and Lee (1992) suggest a sample size of at least 300 participants. They suggested sample size adequacy as follows: 50 – very poor, 100 – poor, 200 – fair, 300 – good, 500 – very good, and 1,000 or more – excellent. And since it is almost never possible to test an entire population, the sample should be as representative as possible. Based on the scale of Comrey and Lee (1992), a sample size of 400 participants was projected for the quantitative component of this study to ensure adequate representation.

The constraints imposed by the SARS-CoV-2 pandemic have considerably influenced the study design and data collection methods. Due to social distancing measures during the pandemic, face-to-face recruitment and data collection were not feasible. As a result, social media platforms were utilised as the primary recruitment tools to ensure participant safety and adherence to pandemic-related restrictions.

Potential participants who met the inclusion criteria were recruited through social media platforms after obtaining ethical approval from the host institution (see Appendix D). The Internet has revolutionised the way we gather and interpret information. This has made it easier to create new knowledge, and has become an invaluable tool for conducting healthcare research (Oppenheimer et al. 2012). The literature indicates that recruiting participants for healthcare research through traditional methods, such as phone calls, direct mail, radio, newspaper adverts, paper flyers, and posters can be challenging, expensive, slow, and time-consuming (Balfe et al. 2012; Fenner et al. 2012; Tate et al. 2015). Moreover, these methods have the potential to be ineffective at recruiting hard-to-reach participants (Tate et al. 2015). As a result of the extensive utilisation of social media platforms for the exchange of information on a daily basis, social media is progressively gaining prominence in health research, rendering telephone and mail-based surveys nearly obsolete (Oppenheimer et al. 2012). Mounting evidence suggests that social media can be an effective recruitment tool and its use should be considered when conducting health research (Arigo et al. 2018). When used properly, web-based surveys can greatly simplify the research process (Oppenheimer et al. 2012).

Although social media presents some challenges in recruiting participants, compared with traditional recruitment methods, the benefits include reduced costs, shorter

recruitment periods, better representation, and improved participant selection in hard-to-reach participants (Topolovec-Vranic and Natarajan 2016). Some common issues with recruiting participants through social media for online surveys include multiple entries by a single individual and overrepresentation of one type of participant. To address these issues, restrictions were applied to limit access to the online survey link to one device per person.

Given the extensive use of social media to recruit hard-to-reach populations in the literature (Phillips and Spratling 2024), the online study survey link embedded in the study recruitment flyer (see Appendix E) was shared on social media platforms, including Facebook, Instagram, WhatsApp, Twitter, and LinkedIn. After commencing data collection, the study flyer and survey link were further disseminated by various organisations, key individuals, and people on their social media platforms. To increase the response rate, a study flyer was created in both the English and Welsh languages.

4.4.2. Survey instrument

To gain a comprehensive understanding of nurses' work-related stressors, their perception of their experiences, and their coping strategies, data were collected using a bespoke, secure online survey, comprising five sections (see Appendix F) in the English language. The online survey comprised four sections: three validated self-report measures, including the measure of Expanded Nursing Stress Scale (ENSS) (French et al. 2000), the Positive and Negative Affect Schedule (Watson et al. 1988), and the Brief-Coping Orientation to Problems Experienced Inventory (Brief COPE) (Carver 1997); and sociodemographic characteristics.

The measure of Expanded Nursing Stress Scale (ENSS) (French et al. 2000) is a 57 item self-report scale which assesses the sources and frequency of work-related stress perceived by nurses. The ENSS effectively explores and assesses work-related stress in three dimensions: the psychological, physical and social environments. Items on the ENSS were rated on a five-point Likert-type scale across nine subscale factors (Death and dying, Conflict with physicians, Inadequate preparation, Problems with peers, Problems with supervisors, Workload, Uncertainty concerning treatment, Patients and their families and Discrimination). The response options ranged from 0 (does not apply) to 5 (always stressful). The total scores range from 1 to 177, with higher scores indicating higher levels of work-related stress. The ENSS has been extensively used in nursing research owing to its reliability and construct validity. A previous evaluation of the ENSS psychometric properties demonstrated an acceptable reliability of Cronbach's coefficient alpha of 0.95 for the total score and subscale coefficient alpha ranging from 0.64 (Discrimination) to 0.84 (Problems with Supervisors) (Alkrisat and Alatrash, 2017). Evidence has shown that this scale is valuable for identifying different sources of stress and for facilitating the planning of effective interventions (French et al. 2000). Utilising this scale in an online survey facilitated a comprehensive understanding and assessment of work-related stress among registered nurses (Adult and Mental Health) who cared for severely ill patients with COVID-19 in hospital settings.

The Positive and Negative Affect Schedule (PANAS) (Watson et al. 1988) contains 20 items on two subscale factors that assess a person's positive and negative emotions using a five-point Likert-type scale. The scale consists of different words that describe a person's emotions (Magyar-Moe 2009), with response options ranging from 1 (very slightly or not at all) to 5 (extremely). The total scores for

Positive Affect (PA) and Negative Affect (NA) ranged from 10 to 50. A high PA score indicates a state of high energy, full concentration, and pleasurable engagement, whereas a low score is indicates sadness and lethargy (Watson et al. 1988). In contrast, a high NA score reflects unpleasurable engagement characterised by a variety of distressing emotions, such as anger, contempt, disgust, guilt, fear, and nervousness, with low NA indicating a state of calmness and serenity (Watson et al. 1988). The participants in this study were asked to choose the words in the scale which described their emotions over the past two weeks. Both clinical and non-clinical studies have found this scale to be a valid and reliable assessment tool (Merz et al. 2013). However, the scale did not fully capture participants' perceptions. Therefore, the participants' perceptions of work-related stress were further explored through semi-structured one-to-one interviews (Phase 2).

The Brief-Coping Orientation to Problems Experienced Inventory (Brief COPE) (Carver 1997) is a 28-item self-report questionnaire that assesses a broad range of coping responses across 14 dimensions. These coping dimensions include self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioural disengagement, venting, positive reframing, planning, humour, acceptance, religion, and self-blame (Galanis et al. 2024). All items are answered on a four-point Likert-type scale, ranging from 1 (I have not been doing this at all) to 4 (I have been doing this a lot). The scores range from 1 to 4, with higher scores indicating higher adaptation to coping strategies (Galanis et al. 2024). Low scores across all items on the BRIEF COPE inventory may indicate that participants had few stressors to manage, struggled with self-reflection, or possessed limited coping skills. The scale covers three coping styles as follows (Carver 1997):

- Problem-Focused Coping: This involves engaging in proactive strategies, such as using information from reliable sources, making plans and positive reframing. A high score signifies coping strategies that focus on altering stressful situations. High scores are indicative of psychological resilience, tenacity, and a pragmatic problem-solving approach.
- Emotion-Focused Coping: This entails the expression of emotions through the use of emotional support, humour, acceptance, self-blame, and religion. A higher score is suggestive of the use of coping strategies to control emotions under pressure. Although high or low scores are not always indicative of psychological well-being or ill health, they can provide insights into participant's coping mechanisms at a more comprehensive level.
- Avoidant Coping: This includes self-distraction, denial, substance abuse, and behavioural disengagement. A high score shows an attempt, either physically or mentally, to detach oneself from a stressful situation. Adaptive coping is usually indicated by a low score.

The online survey also contained sociodemographic and health variables such as gender, age, ethnic background, relationship status, disability status, years of experience as a nurse, type of employer, general well-being status, and COVID-19 testing status were included in the questionnaire. These variables served to enhance the full understanding of participants' experiences. Moreover, providing a detailed description of study participants allows for comparisons between studies and facilitates replication (Hammer 2011).

4.4.3. Piloting

A pilot study was conducted to test the feasibility and usability of the combined measurement instruments. Five registered nurses (Adult field) with experience caring for severely ill patients during the pandemic were recruited for this pilot study. The pilot study was conducted in January 2022 and lasted for three weeks. The purpose of the pilot study was to identify any flaws and potential problems in the data collection method, that could be amended before commencing the main study (Doody and Doody 2015). For instance, participants in the pilot study were asked to comment on the length of the measuring instruments, order of questions, relevance of questions to their experiences, and clarity of the survey instructions. Comments received included, “the survey is lengthy,” “no option to pause and continue later,” “clear instructions but lengthy” and “good consistency”. Based on this feedback, a pause button was added to the survey link to enable the participants to stop and continue later. I also revised the survey instructions so that they were brief, precise and yet clear. The participants’ feedback helped restructure the measures to eliminate ambiguity. Additionally, I prioritised items from the three validated instruments (ENSS, PANAS and BRIEF COPE) over sociodemographic and health questions to increase the survey’s efficacy and better capture key findings. Furthermore, a pilot analysis of the data captured in the pilot study was conducted to ensure that the proposed data statistical analytical techniques (statistical data description, correlation statistics and ordinal logistic regression) were appropriate.

4.4.4. Data collection

Following favourable ethical opinions from the School of Healthcare Sciences Research Ethics Committee, the survey opened on 14th February 2022 and ran until 29th April 2022. Despite regularly sharing the online survey link (Jisc online surveys)

on social media, the response rate was initially low. Consequently, an amended ethics application was submitted and approved (see Appendix G) to expand the study's geographical location to include England. The end date of the online survey was extended to 31st July 2022. A total of 516 participants from Wales and England completed the online survey, exceeding the initial projection of 400 participants by 129%.

4.4.5. Data preparation

The data collected through the online survey were exported from the Jisc online survey platform and then imported into the IBM Statistical Package for Social Sciences (SPSS statistics v27). The dataset was thoroughly examined for errors by checking the frequency of each item (question) for out-of-range values, missing data and double entries. Where data were missing, the exclude cases pairwise option in the IBM SPSS statistics software was applied. The dataset was checked for outliers to minimise errors. All errors were edited and unique identifiers were then assigned to the participants' responses (Table 4.0). Raw data were manipulated and transformed into a format suitable for statistical analysis of the study objectives (Pallant 2016). The manipulation process included reducing the number of categories of variables, recording data entered as text to numerical data, reversing negatively worded items and calculating the scores from the items that made up each scale to give an overall score for the ENSS, PANAS and Brief COPE scales.

Table 4.0: Coding the quantitative variables

Variables	Codes
Age range	1= 21-30 2= 31-40 3= 41+
Gender	1= Male 2= Female 3= Other (Non-Binary, intersex, non-conforming)
Ethnicity / Cultural background	1= Prefer not to Say 2= Non-White (Mixed White and Black Caribbean, Mixed White and Black African, Black other, Black British, Black Caribbean, Asian other, Asian Pakistani, Asian Filipino, Asian Indian, Mixed other) 3= White (British, Welsh, other)
Relationship status	1= Unmarried (Civil partnership, Co-habiting, Divorced, Single) 2= Married
Disability status	1= Yes 2= No
Main employer	1= NHS (Wales, England 2= Non-NHS England (Private, Agency)
Years qualified as a Registered Nurse (Ault/ Mental Health)	1= Under 1 -2 years 2= 3-5 years 3= 6+
Did you return to work to support the COVID-19 response?	1= Yes 2= No (I was already working)
Approximately how many patients with suspected SARS-COV-2 have you cared for?	1= 1-5 2= 6-10 3= 11-15 4= 16+ 5= Can't remember
Approximately how many patients with confirmed SARS-COV-2 have you cared for?	1= 1-5 2= 6-10 3= 11-15 4= 16+ 5= Can't remember
Scale used for each item in the ENSS	1= never stressful 2= occasionally stressful 3= frequently stressful 4= always stressful 5= does not apply
Scale used for each item in the PANAS	1= Very slightly or not at All 2= A Little

	3= Moderately 4= Quite a bit 5= Extremely
Scale used for each item in the Brief COPE	1= I haven't been doing this at all 2= a little bit 3= a medium amount 4= a lot

4.4.6. Data analysis

Following data preparation, three phases of statistical analysis were conducted. The first analytical phase involved a descriptive analysis of the participants' demographic characteristics and three validated scales (ENSS, PANAS, and Brief COPE) used in the online survey. This analysis included the calculation of percentages, means, standard deviations, and range of scores. The second phase involved bivariate analysis to examine the relationships between the dependent variables (level of work-related stress, work-related stressors experienced, nurses' perception of work-related stress, and coping strategies) and the independent variables (participants' demographic characteristics). Additionally, the analysis examined the relationships among the dependent variables. Correlations between two variables were determined using Spearman's rho correlation coefficients, as Spearman's rho is suitable for ordinal or ranked data, particularly when assumptions for Pearson correlation are not met (Pallant 2016). Chi-square (x^2) tests were also performed to determine the distribution of categorical data.

Lastly, ordinal regression analysis was performed to predict the impact of multiple independent variables on the dependent variables. This analysis was chosen because responses to the scale items were recorded on a discrete-ordered scale (Likert-type scale). The items in the measuring scales had at least three response categories in natural ranking order. Although the response categories were

numerically coded (see Table 4.0), these numbers only indicated the order of values and not equal intervals between them (Liddell and Kruschke 2018). For instance, the response categories in the ENSS scale comprised “1= never stressful, 2= occasionally stressful, 3= frequently stressful and 4= always stressful.” This ranking indicated the ordering of stress among participants, and could not assume that the increment in stress from “1” to “2” was the same as from “3” to “4”. Therefore, applying other analytical techniques that assume equal metric intervals for ordinal data could result in misinterpretation of the data (Liddell and Kruschke 2018). The level of statistical significance for both the correlation and predictive analyses was set at $p < 0.05$, $p < 0.001$ and $p < 0.01$, respectively.

4.4.7. Reliability and validity

Reliability refers to the consistency of a measuring scale when used in the same situation on repeated occasions, whereas validity pertains to the accuracy of measuring a concept (Heale and Twycross 2015). Both concepts are essential parts of the psychometric properties of a measure (Hancock et al. 2010), enabling researchers to select appropriate measuring instruments and ensure the quality of study results (Souza et al. 2017). Over the years, researchers have mostly used Cronbach's alpha coefficients to assess the internal consistency of instruments (Keszei et al. 2010; Bonett and Wright 2015). This coefficient measures the degree of covariance among items on a scale (Souza et al. 2017). Despite its wide use, there is no general agreement regarding its interpretation (Souza et al. 2017). While some studies suggest that scores above 0.7 as ideal (Terwee et al. 2007), others contend that values not exceeding 0.70, but close to 0.60, are acceptable (Streiner 2003). The reliability of the three scales (ENSS, PANAS, and Brief COPE) was reassessed in this study to confirm that the variables were accurately measured.

The developers of ENSS, French et al. (2000) used the scale to measure the sources and frequency of workplace stress among 2,280 nurses in Ontario in different work settings. Their study reported a Cronbach's alpha coefficient of 0.96 for the total ENSS, indicating high internal consistency and reliability of the measuring scale (Freanch et al. 2000). Since its inception, the ENSS has been adapted and validated across diverse cultural and clinical contexts, supporting its validity and reliability in assessing work-related stress among nurses (Lam 2013; Mehta and Singh 2014; Kim et al. 2015). For instance, in a recent validation study, the ENSS was adapted into Indonesian language to measure work-related stress among 104 Indonesian nurses in hospital settings (Hasto et al. 2024). Similar to the findings of French et al. (2000), a validation study reported a Cronbach's alpha coefficient of 0.96, indicating satisfactory validity, reliability, and internal consistency in measuring work-related stress among nurses across different cultural contexts (Hasto et al. 2024). In this study, the reliability and validity of the ENSS subscales were assessed using Cronbach's alpha coefficients. A total Cronbach's alpha coefficient of 0.97 was obtained, confirming the scale's satisfactory internal consistency, validity, and reliability for measuring work-related stress among nurses.

Originally developed by Watson et al. (1988), PANAS has been widely adapted and validated across diverse populations. Studies investigating the psychometric properties of PANAS have demonstrated adequate reliability and validity across different settings (Watson et al. 1988; Merz et al. 2013). In nursing research, the PANAS has been used alongside other scales to examine diverse phenomena, such as the subjective well-being of nurses (Gurková et al. 2014), the relationship between personality traits and coping strategies among nurses (Martos et al. 2021), predictors of professional engagement (Martínez et al. 2021) and nurses' levels of

risk perception (Peng et al. 2022). Across these studies, the scale has demonstrated satisfactory internal consistency with a reported minimum Cronbach's alpha coefficients of 0.78 for positive affect and 0.75 for negative affect. These findings support the original reliability reported by Watson et al. (1988), with alpha coefficient of 0.86 for positive affect and 0.85 for negative affect. This study also showed satisfactory internal consistency, with an alpha coefficient of 0.92 for positive affect and 0.91 for negative affect, further supporting PANAS reliability in measuring emotional states within this context.

Building on the original work (Carver et al. 1989), Carver (1997) developed Brief COPE as a quicker alternative to the COPE inventory for measuring coping reactions. In his study on hurricane survivors, all 14 dimensions of coping included in the Brief COPE showed internal reliability, exceeding the alpha coefficients of 0.50 (Carver 1997). In nursing research, the Brief COPE Inventory has been used extensively to identify nurses' coping strategies in diverse clinical settings. For instance, Dimunová et al. (2020) used Brief COPE in a cross-sectional study of 509 nurses to identify nurses' coping strategies in managing workload in clinical settings. Their study reported a Cronbach's alpha coefficient of 0.75, indicating the acceptable reliability and validity of the Brief COPE Inventory. Similarly, Galanis et al. (2024) reported that all Cronbach's alphas for the 14 dimensions of coping included in the Brief Cope Inventory were above 0.60. Consistent with these findings, this study also demonstrated satisfactory internal consistency for the Brief Cope Inventory, with alpha coefficients for all 14 dimensions exceeding 0.60. This further confirms the reliability and validity of the Brief COPE Inventory as an efficient inventory for identifying coping strategies in the nursing context.

Overall, the measurement scales used in this study were thoroughly validated by conducting a pilot study of an online survey and addressing the feedback received from the participants in the pilot study.

4.5. Qualitative component – Semi-structured one-to-one interviews

The objective of the qualitative component of this study was to gain deeper insight into nurses' experiences of caring for severely ill patients with SARS-CoV2 and their coping strategies during the pandemic. To acquire detailed and nuanced data, I used semi-structured interviews, a widely used method for data collection in qualitative research (Barrett and Twycross 2018; Doody and Noonan 2013; Jamshed 2014). The popularity of this method is attributable to its flexibility, as it can generate deeper and richer accounts of participants' lived experiences, which are often perceived as natural when conveyed verbally rather than in writing (Barrett and Twycross 2018).

Participants were asked predetermined open-ended questions based on an interview guide (DiCicco-Bloom and Crabtree 2006) that reflected the study's theoretical framework. The purpose of the interview guide was to facilitate uniformity in data collection and create a sense of order (DiCicco-Bloom and Crabtree 2006). Nevertheless, I applied flexibility, allowing participants to bring their own perspectives into the interviews (Barrett and Twycross, 2018). Traditionally, face-to-face interviews have been conducted (Creswell 2009), however, there is a growing diversity of data collection methods (Bolderston 2012). To overcome geographical barriers to participant recruitment (Barrett and Twycross 2018), all interviews in this study were conducted via videoconferencing, as preferred by the participants, with the exception of one interview, which was conducted face-to-face. Although the content of the interviews was largely consistent across both formats, some

differences in the flow were observed. For instance, the one face-to-face interview conducted allowed for better rapport with the participant and a clearer interpretation of body language and non-verbal cues. In contrast, although the virtual interviews offered convenience and accessibility, they lacked a natural conversational rhythm and were unable to capture non-verbal cues fully.

4.5.1. Sampling and recruitment strategy

As data collection for the study was conducted sequentially, all participants who completed the online survey were given the opportunity to express an interest in participating in one-to-one interviews. A total of 45 participants from the online survey shared on social media platforms expressed their willingness to take part in the semi-structured interviews. An introductory email was sent to 45 potential participants who expressed interest in the study. In the email, I introduced myself as the researcher and interviewer and explained the purpose of the study (see Appendix H). Attached to the email were the Participant Information Sheet (Appendix I), and a Consent Form (Appendix J). Only those who returned signed consent forms were included in the sample of potential interview participants. Participants who met the inclusion criteria were included in this study.

As each recorded interview was transcribed, additional participants were recruited to ensure that the study achieved information power. According to the concept of information power, "*the more information the sample holds, relevant for the actual study, the lower amount of participants is needed"* (Malterud et al. 2016). This suggests that the size of the qualitative study sample should be determined by the relevance and richness of the data provided by the participants. Moving away from traditional notions of sample size adequacy, such as saturation, the concept of

information power emphasises the quality and sufficiency of data in addressing research aims and objectives. Ultimately, a total of 12 participants were included in the one-to-one interview.

4.5.2. Data collection

Data collection for this phase of the study was conducted through semi-structured one-to-one interviews. An interview guide (Appendix K) was developed to align with the study's theoretical framework and integrate key findings from the quantitative data. This approach ensured that the open-ended questions comprehensively addressed the research aims and objectives. Accordingly, the interview guide enabled me as the interviewer, to focus on key areas for discussion while exploring responses systematically and comprehensively, addressing the research aims and objectives (Doody and Noonan 2013; Jamshed 2014).

To ensure the effectiveness of the interview guide, a pilot study was conducted with three registered nurses who cared for severely ill patients during the pandemic. The pilot study aimed to evaluate the clarity, relevance, and comprehensiveness of the open-ended questions. Feedback from these nurses helped to enhance the interview guide by identifying any ambiguities or gaps in the questions and ensuring that they effectively elicited the desired information. Therefore, some changes, such as rewording questions, were made to allow the guide to be more effective in addressing the research aims and objectives, and elaborating on the key findings identified in the quantitative phase. The pilot study also served as a valuable tool for assessing my readiness and ability to conduct interviews (Doody and Doody 2015), and provided an opportunity to practice and gain interview skills (Yin 2016). It also identified practical and methodological issues (Kim 2010) and enhanced the

credibility of the study (Padgett 2008). In addition, the interview guide was discussed with the academic supervisory team to identify any confusing questions and make amendments accordingly (DiCicco-Bloom and Crabtree 2006).

The data collection phase ran from 1st December 2022 to 15th June, 2023. Potential participants who returned a signed consent form were contacted via email, and the dates and times of the interviews were agreed upon. The interviews were conducted via Zoom, Microsoft Teams, or face-to-face, according to participant preference and were audio recorded. The one-to-one interviews lasted between 25 and 60 minutes. All the participants who volunteered to take part in the study signed a consent form and were informed of their rights regarding confidentiality, data protection, and privacy. The participants were reminded that they could withdraw from the interview at any time and were assured that measures would be taken to protect their anonymity (Bolderston 2012). Additionally, participants were briefed about the purpose of the interview, expected duration, and how the results would be disseminated (Creswell 2013). Continuous informed consent was obtained throughout the interview to ensure that the participants were comfortable with the process and willing to proceed. During each interview, participants were regularly asked to reaffirm their ongoing willingness to participate in the study, particularly when discussing sensitive or potentially distressing topics related to their experiences. This approach ensured that consent was not a one-time event, but an ongoing, dynamic process, respecting participants' autonomy and well-being throughout the study.

Casual conversation was initially used to build rapport and gain participants’ trust before proceeding with the actual interview, as recommended by DiCicco-Bloom and Crabtree (2006). Participants were asked general demographic questions regarding

their age range, number of years qualified, field of practice, and main employer. Subsequently, they were asked about the main source of work-related stress during the pandemic, their perceptions, and coping strategies. A final question *"is there anything else that comes to mind which we have not discussed or you wish to say more about?"* was posed. Studies have indicated that asking such questions at the end of an interview can yield insightful responses (Bolderston 2012). While the interview guide was employed flexibly, I used probes to encourage participants to elaborate on their answers (Mcgrath et al. 2018). Probes such as *"Can you tell me more about that?"* and "*How did you feel about that?*" (Doody and Noonan 2013) were employed to prompt participants to provide additional details, thereby eliciting rich, deep, and comprehensive information (Robinson 2023).

As a registered nurse conducting one-to-one interviews with fellow nurses, we shared a common language, understanding, and experience which facilitated in-depth conversations. As an insider, I was able to ask more probing questions and interpret the responses with much better understanding. However, I remained mindful and conscious of not letting my personal and professional biases influence the direction of the interviews and the interpretation of the data. While conducting the interviews, I was mindful that certain topics might echo more deeply with me because of my personal experience. For example, in one of the interviews, a participant shared a deeply moving story of her experience with Long COVID and the lack of support from her employer. The participant's story evoked strong emotions, in which I felt a rush of anger, frustration, sadness, and empathy. I made every effort to maintain emotional boundaries by pausing the interview for both the participant and I to regroup. Every effort was made to remain neutral, balancing empathy and professionalism, to create an environment in which participants felt that their

perspectives were respected and accurately represented. After each interview, I reflected on my feelings and thoughts and how they might influence the research process. As part of regular academic supervisors' meetings, we engaged in debriefing sessions which enabled me to share my experience as a novice researcher, gain insight, and receive emotional support. I am aware that emotions as insider are a natural part of this research process.

Immediately after each interview, I personnaly transcribed the recorded audio using Microsoft Word, version 2410. This approach was designed to ensure that any unclear responses or technical issues, such as poor audio quality, were addressed in the proceeding interviews. Therefore, the quality and clarity of the collected data improved.

4.5.3. Data analysis

Flick (2014) defines qualitative analysis as the

> "*Classification and interpretation of linguistic (or visual) material to make statements about implicit and explicit dimensions and structures of meaning-making in the material and what is represented in it" (p. 5)*

Meaning-making can be either an individual's subjective understanding or a collective social interpretation (Flick 2014). There is no quick solution for analysing qualitative data; instead, the analysis relies on the researcher's choice of either using a set of procedures linked to a specific method or a more reflexive approach to data collection that allows for a 'mix-and-match' approach to both data collection and analysis (Morse 2011). Analytically, approaches have often been combined to gain a better understanding of data (Pope and Mays 2020).

Qualitative data analysis aims to provide a vivid description of a phenomenon, identify similarities or differences among multiple cases, and/or develop a theory based on the analysis of empirical material (Flick 2014). Some research methodologists strongly recommend conducting analyses concurrently with qualitative data collection in order to generate new strategies for data collection (Miles et al. 2014; DiCicco-Bloom and Crabtree 2006). However, in this study, qualitative data analysis was conducted only after all interviews were completed to enable a focus on data collection and to optimise the time available for data collection.

Qualitative data analysis techniques have faced criticism in the past for the lack of structured methods for data collection and analysis. There is no universally accepted approach for conducting qualitative analyses. However, in the realm of nursing research, content analysis and thematic analysis are often used as two analytical techniques in qualitative descriptive studies (Vaismoradi et al. 2013). These two methods are frequently used interchangeably, which can lead to confusion (Sandelowski and Leeman 2012). Nevertheless, the objective of content analysis is to summarise the content of a document (Vaismoradi et al. 2013) and generally concentrates on a more micro level, often providing frequency counts (Wilkinson 2000). Whereas thematic analysis aims to identify, analyse, and report patterns or themes within data (Braun and Clarke 2006), content analysis allows for the qualitative analysis of data as well as its quantification (Gbrich 2007). However, thematic analysis provides a purely qualitative, detailed, and nuanced account of the data, without any quantification (Braun and Clarke 2006). Thematic analysis requires active involvement and interpretation by the researcher to identify and describe both implicit and explicit ideas within data (Guest et al. 2012). Although thematic analysis

can take multiple forms, Finlay (2021) described the process as both systematic and intuitive, requiring both skill and effort.

To distinguish their approach from other versions, Braun and Clarke (2019) adopted the term reflexive thematic analysis, emphasising the following:

> "*The active role of the researcher in coding and theme development, the inevitable subjectivity of these processes, the importance of the researcher reflecting on their assumptions and practices, and how these might shape and delimit their data analysis".* (p 294)

This approach entails critically reflecting on one's values, assumptions, expectations, choices, and actions throughout the research process and considers the impacts and influences of the research (Braun and Clarke 2021). It acknowledges that knowledge is never free of the researcher's influence; assumptions and choices inevitably shape the knowledge produced (Braun et al. 2022).

Unlike other qualitative analysis methods, thematic analysis provides researchers with a high degree of theoretical and epistemological flexibility. The procedures outlined by Braun and Clarke (2006; 2013; 2021) can be modified to suit a variety of theoretical frameworks, ranging from those that require a more scientific approach to descriptive coding, to those that emphasise artful interpretive methods (Finlay 2021). The flexibility of reflexive thematic analysis means that data analysis can be either inductive or deductive, semantic or latent or a combination of both (see Table 4.1) (Braun and Clarke 2006). Nonetheless, the very flexibility that is so appealing can also result in inconsistency and incoherence (Vaismoradi et al. 2013). Polit and Beck (2003) assert that in order to generate high-quality evidence, researchers must make well-informed decisions.

Table 4.1: The variations of reflexive thematic analysis

Orientation to data	More inductive: where the analysis is located within, and coding and theme development are driven by, the data content.	More deductive: where the analysis is shaped by existing theoretical constructs, which provide the "lens" through which to read and code the data and develop themes.
Focus of meaning	Semantic: where the analysis explores meaning at the more surface, explicit, or manifest level.	Latent: where the analysis explores meaning at the more underlying or implicit level.
Qualitative framework	Experiential: the analysis aims to capture and explore people's own perspectives and understanding.	Critical: Where the analysis focuses on interrogating and unpacking the meaning around the topic or issue.
Theoretical framework	Realist, essentialist: where analysis aims to capture truth and reality, as expressed within the dataset.	Relativist, constructionist: where analysis aims to interrogate and unpack the realities that are expressed within the dataset.

Source: copied from Braun and Clarke (2022, p10)

Reflexive thematic analysis allows for analysis primarily driven by inductive reasoning while incorporating some deductive elements. This approach enabled the capture of both semantic and latent meanings. Specifically, the analysis was informed by the study's theoretical framework, the Transactional Model of Stress and Coping (Lazarus and Folkman 1984), as well as by the themes identified in the quantitative phase of the study. This integration ensured that both theoretical concepts and empirical findings were considered when interpreting data. Throughout the analysis, I routinely reflected on my assumptions and expectations which shaped the development of the themes. The six-phase process of reflexive thematic analysis recommended by Braun and Clarke (2022) was used as follows:

4.5.3.1. Phase 1: Familiarising with the dataset

The first phase involved familiarising myself with the dataset through immersion. Immersion entails gaining a deeper understanding of the contents of the dataset by reading and re-reading the entire dataset (Braun and Clark 2019). Although time-consuming, immersion enabled me to identify pertinent information aligned with the research aims and objectives (Byrne 2021).

I listened to each recorded interview and personally transcribed the recorded interviews using Microsoft Word (2023). Familiarisation with the data was achieved by reading and re-reading the transcripts multiple times, critically engaging with the data, and asking questions about its content. During this process, I noted my initial observations and interesting trends in the dataset, as illuminated in Table 4.2.

Table 4.2: Sample researcher's initial note

"Participants emphasised heavy workload, shortage of staff and inadequate respiratory related training as the main sources of work-related stress during the pandemic. Note: inadequate training was linked to uncertainty and time of onset".
"There appears to be divergent perspectives: some sees the pandemic experience as both good and bad as they acquired key skillsets at the same time bad experience due to little institutional support (well-being), impact on their career"
"I noticed that though majority of the participants are dissatisfied due to pay issues (the need for pay rise) and have expressed the desire to leave the nursing profession, none has definite plans or desire to leave the profession entirely but rather have changed working settings such as from working in one ward to the other".

4.5.3.2. Phase 2: Data coding

The second phase involved coding the data. Miles et al. (2013) defined coding as the process of assigning symbolic meanings to information gathered in a study through the use of labels. This process is heuristic (Miles et al. 2013), requiring the researcher to engage deeply with the data. The process involves closely reading each data segment and tagging all segments of the text relevant to the research objectives with the appropriate codes or labels (Braun and Clark 2022). It is recommended that the researcher works systematically through the entire dataset, assigning equal consideration to each data item, and identifying aspects of data items that may be informative in developing themes (Byrne 2021).

I systematically coded the dataset adopting Saldana's (2013) First cycle and Second cycle coding approaches. The initial codes were descriptive, and used words or short phrases from the participants' own language in the dataset, as illustrated in Table 4.3. I then incorporated the provisional codes identified from the quantitative phase of this study.

Table 4.3: Sample preliminary coding

Data	Codes
Participant 2: "*And there was very little training that was given to us because there was little time for us to respond to the cases that were coming in. And yes, the workload was pretty heavy. We went on our mandatory breaks, as is expected of us, but still it still took a toll on me in particular. I felt that it did take a toll on me in caring for the patients".*	Little training Heavy workload Emotional/Physical toll Impact on care delivery
Participant 7: *"I think COVID has had a long-term impact on myself. And I think since last year I have actually given up working in AMU. And I've chosen to just work on the bank. And I tend to avoid AMU, because it definitely brings back a lot of overwhelming emotions for myself and because of what essentially happened during the COVID period,*	Long term impact Impact on career Overwhelming emotions

I found it very difficult to work in that stressful environment".	
Participant 4*: "It was good and bad experience cause there were essential skills I picked out because some like nursing with the patients using the CPAP and those patients who needed ventilation. And also there were good skills I obtained, So, which means it was a good thing, but at the same time, there were some bad experiences as well. Yes, because sometimes you needed more people on the unit to help with the rolling of patients and setting up the equipment".*	Good and bad experience Diverged perspectives Gained essential skills Shortage of staff
Participant 10: *"I have looked into retraining though, and it is a thought that I've had quite a lot since COVID and even to the point that I have looked at going into something like Tesco's or Sainsbury's and you know, the pay isn't, don't get me wrong, it's not the same as a nurse, but it's only just slightly less than nurse and it's a lot less stress. But I do wonder sometimes, why am i putting myself through all of this stress, unnecessary stress for a wage which I can get in in a supermarket".*	Intentions to leave the nursing profession Nursing is stressful Issues with wages

This type of coding is referred to as In Vivo coding (Saldana 2013) or semantic coding to capture participants explicitly expressed meaning (Braun and Clark 2022). After discussing the initial codes or labels with the academic supervisory team, I continuously engaged in second-cycle coding, also known as latent coding, to generate a deeper and more implicit level of meaning from the data. Subsequently, the initial codes were grouped into smaller number of categories relevant to the research aims and objectives, as illustrated in Figure 4.1.

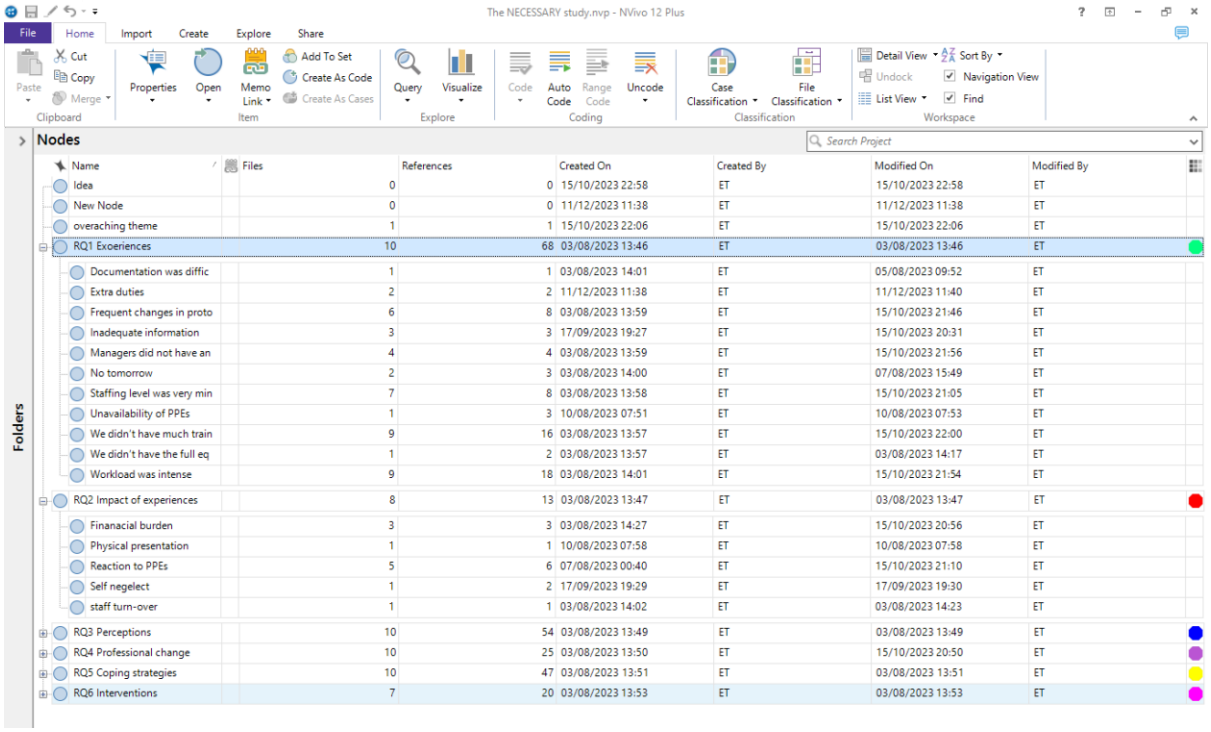


Figure 4.1: Illustration of smaller number of categories done using NVivo

4.5.3.3. Phase 3: Generating initial themes

The next stage involved the generation of initial themes from the codes using NVIVO. I engaged with these codes to identify areas where there were similarities or shared meanings. A number of similar codes were clustered into initial themes and subthemes in relation to the research aims and objectives. These themes were then checked to ensure that they had central organising concepts that were pertinent to the research objectives and to determine whether the codes fit within them. Any individual code that was not evident in any other data item or lacked sufficient relevance was excluded. At this stage, some themes were widely extensive or too thin and required further revision. A thematic map of the initial themes is shown in Figure 4.2.

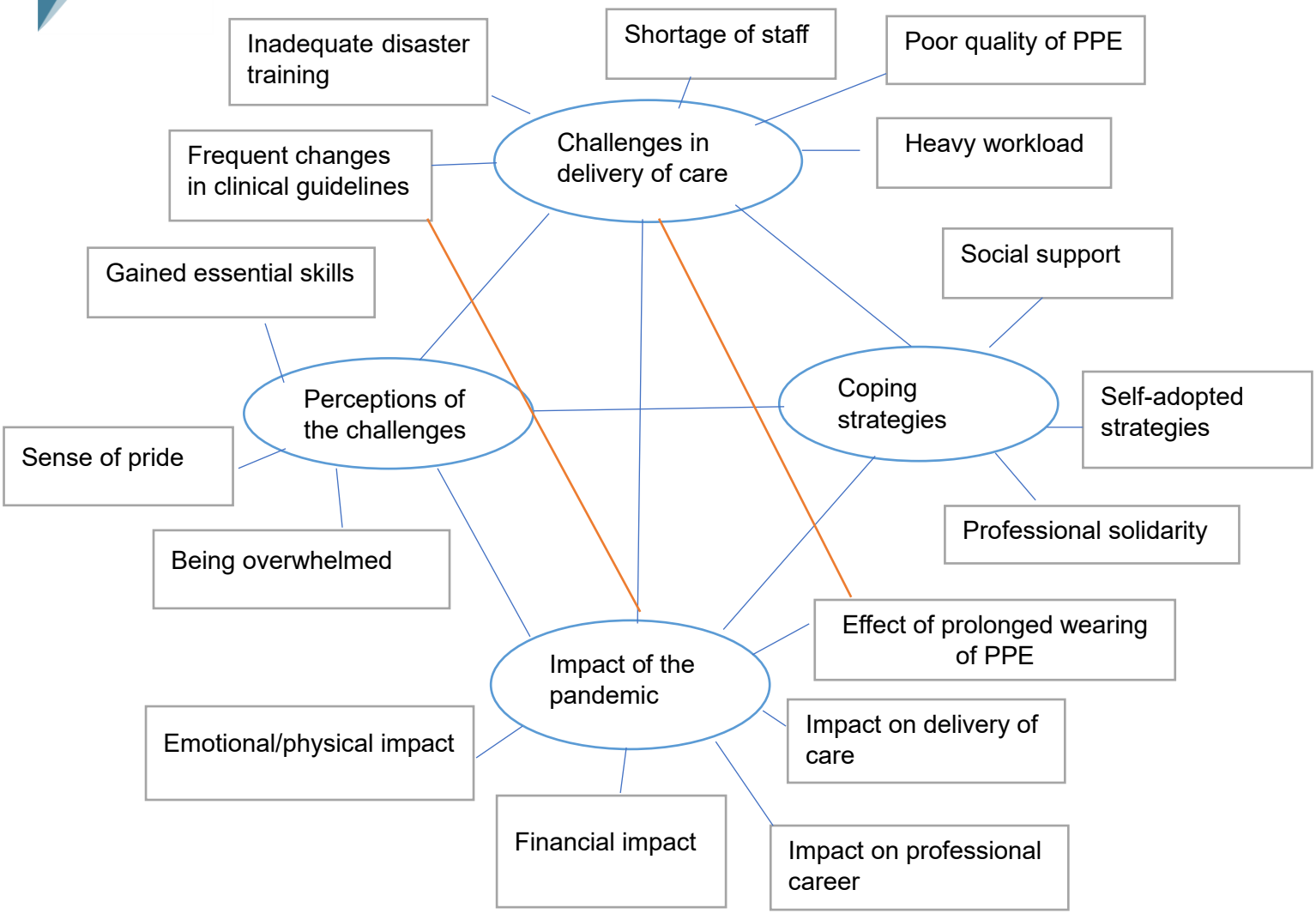


Figure 4.2: Initial thematic map indicating four interconnected themes

4.5.3.4. Phase 4: Developing and reviewing themes

At this stage, the preliminary themes and subthemes were reviewed by re-engaging with the entire dataset to ascertain whether they were true representations of the dataset. Preliminary themes and subthemes that did not address the research objectives were excluded. A continuous validity check of the quality and scope of the initial themes was conducted, re-engaging the dataset for better pattern development between themes and subthemes. Continuous validity checks enabled thorough probing of the patterns and relationships within the dataset, allowing for theme

refinement and identification of subthemes. This step was repeated until the identified themes and subthemes were well defined.

4.4.3.5. Phase 5: Refining, defining and naming themes

After a continuous iterative process of revisiting and revising the themes and connected subthemes, four core interconnected themes were identified. This involved analytically refining the themes and connected subthemes, defining their focus and boundaries to avoid repetition and ensuring that they were distinct from each other. Informative and concise names were then assigned to the developed themes/subthemes, avoiding one-word theme names (Braun and Clarke 2022).

4.5.3.6. Phase 6: Writing up

The final phase was writing up the report/findings. As opposed to much quantitative research, where the write-up of reports/findings occurs after analysing the data, the write-up of qualitative findings is interwoven with the analytical process (Braun and Clarke 2012; 2022). At this stage, I refined the analytical work to establish the order in which themes were reported, ensuring a logical and meaningful flow of the analysis. To demonstrate the prevalence of themes, compelling data extracts were selected.

Following the data analysis, I gained a holistic perception of both the experiences of nurses during the pandemic and my own personal journey as a registered nurse. Although analysing the study data for both phases was overwhelming, it was an enlightening process. Conducting a reflexive thematic analysis required me to continuously reflect on how my background as a registered nurse influenced the research design, data collection, and interpretation. In coding the data, my experience naturally influenced the process, as I easily recognised patterns.

Although this was an asset in understanding the context of the data, it required that I constantly self-reflect to minimise biases and cherry-picking of data. Also, I engaged in regular discussions with my academic supervisors which helped shaped and ensured a more comprehensive analysis process. These reflections reinforce the importance of acknowledging both the strengths and challenges of conducting research as an insider. Ultimately, the data analysis deepened my understanding of not only the shared experiences of nurses during the pandemic, but also how my personal and professional journey has shaped my approach to research, providing me with a more nuanced perspective on the complexities of the nursing profession during a global health crisis.

4.5.4. Rigour and trustworthiness

Assessing the research quality is crucial for the practical application of these findings (Noble and Smith 2015). However, assessing rigour in qualitative research can pose challenges, as a standardised and universally accepted set of quality standards remains elusive (Guetterman et al. 2022). There are ongoing debates regarding the appropriateness of employing quantitative-derived terms such as validity and reliability to evaluate qualitative research (Sandelowski 1993; Long et al. 2000). While some scholars reject the term reliability in favour of alternative terms such as trustworthiness (Sandelowski 1993) or dependability (Guba and Lincoln 1985), it is widely accepted that these terms share the same fundamental meaning (Long et al. 2000). Although qualitative research differs epistemologically from quantitative research, the adoption of parallel terminology reflects a broader effort to ensure its methodological credibility. Using alternative labels for identical concepts can cause confusion (Long et al. 2000). However, caution must be exercised to avoid imposing rigid criteria that may not align with the interpretive nature of qualitative research.

Trustworthiness includes various important parameters such as credibility, reliability, confirmability, and transferability, which can be used as criteria for assessing qualitative studies (Bingham 2023). Credibility represents trust in the truth of the results, whereas dependability represents the repeatability of the underlying research methodology over time (Bingham 2023). Confirmability relates to the degree to which results are driven by participants and not by researcher bias, whereas transferability relates to the generalisability of results to other contexts (Morse 2015). Thus, reliability describes consistency within the employed analytical methods, whereas internal validity refers to the integrity and application of the methods undertaken and the precision with which the findings accurately reflect the data (Long et al. 2000).

In this phase of the study, reliability was enhanced by audio-recording one-to-one interviews (Creswell 2013). As suggested by Creswell (2013), the following strategies for achieving trustworthiness were used:

- **Triangulation:** Multiple sources of evidence were used to gain a comprehensive understanding of the identified themes. Two phases of data collection methods were employed in this study, and the data from each method corroborated the findings of the other.
- **Debriefing:** Regular debriefing sessions with the academic supervisory team were conducted to discuss the identified themes and to serve as an external check of the research process (Creswell 2013). Holloway and Wheeler (1996, p. 165) also highlighted the importance of academic supervisors in ensuring the rigour of research studies conducted by students.

- **Rich, thick description:** I provided a detailed and thick description of the findings, connecting the details using strong action verbs and direct quotes.

4.6. Data integration/triangulation

Integration is a dynamic and interactive process in mixed method research (Skamagki et al. 2024), where the quantitative and qualitative components of a study "*come into conversation with each other*" (Plano 2019, p. 108). This process has the potential to significantly enhance the value of mixed-methods research (Bryman 2006; Creswell and Plano 2011). However, if data integration is not approached rigorously, the resulting findings may reflect only one dataset, thereby raising concerns about the purpose and rigour of the research (Skamagki et al. 2024). Therefore, it is vital for researchers to follow specific approaches for integrating qualitative and quantitative research (Creswell and Clark 2011; Fetters et al. 2013). The integration of data in mixed-methods research can be implemented at the design, methods, and interpretation and reporting levels (Fetters et al. 2013). This study employed a three-point process of integration guided by the work of Fetters et al. (2013).

First, through a multistage data collection process, quantitative data were collected and analysed, subsequently informing the collection of qualitative data (Ivankova et al. 2006).

Second, integration occurred at the method level by establishing a link between data collection and analysis (Creswell et al. 2011). Linking can occur either by connecting (one database links to the other through sampling), building (one database informs the data collection approach of the other) or merging (the two databases are brought

together for analysis) (Fetters et al. 2013). In this study, a connecting strategy was employed (Fetters et al. 2013), in which all participants from the quantitative component were invited to participate in subsequent qualitative interviews. The final qualitative sample mainly consisted of participants from the quantitative strand. Then, through a building approach (Fetters et al. 2013), key findings from the quantitative strand informed the development of a qualitative interview guide. The purpose of the qualitative interviews was to provide further insight into the key findings of the quantitative strand. Thus, an explanatory sequential design was utilised to explain and interpret the numerical data obtained from the online survey (Creswell et al. 2003).

The final integration of data occurred at the interpretation and reporting levels using a contiguous narrative approach to integrate, analyse, and report the quantitative and qualitative findings separately (Fetters et al. 2013). Links between quantitative and qualitative data were identified using a joint display table. The purpose of this display is to demonstrate the connection between the two databases and visually explain how qualitative findings contribute to a better understanding of quantitative results (Creswell and Clark 2018). A narrative interpretation of the findings is presented in the discussion chapter, incorporating the study's theoretical framework to understand the aims and objectives. Merging the two datasets was feasible because both yielded similar conclusions. According to Fetters et al. (2013), when two data sources validate the results of each other, the findings have greater credibility.

Although data integration aided a thorough exploration and comprehension of the aims and objectives of this study (Skamagki et al. 2024), several challenges that are

typical of an explanatory sequential design were encountered (Creswell and Clark 2018). Recruiting participants through the online survey for the subsequent one-to-one interviews was challenging due to the extended time required to complete the online survey, conduct quantitative analysis, and subsequently initiate one-to-one interviews. While participants who volunteered for the subsequent one-to-one interviews through the online survey were contacted immediately after completing the quantitative analysis, some potential participants did not respond to the email invitation. To mitigate this challenge, potential participants were recruited from several social media platforms to increase the interview response rate.

Another challenge encountered was the use of manual methods to identify themes in the data. Although NVivo was used to organise and code the qualitative data, the software programme did not take over the cognitive and extensive process of data analysis. Rather, it serves as a tool to enhance the robustness, efficiency, and transparency of the analysis process (Bonello and Meehan 2019). Identification of themes were primarily conducted manually, involving reading, re-reading and checking the transcribed text against a series of themes and subthemes (Bazeley 2009). One common challenge in this process was determining which direct quotes to exclude or include in writing up the findings, thereby making this process exhaustive and time-consuming (Bazeley 2009). This challenge was addressed by engaging in regular discussions with academic supervisors to help shape the identified themes and subthemes, and by supporting these themes with relevant quotes that represent the participants' voices.

4.7. Ethical considerations

Ethical approval for the study was obtained from the School of Healthcare Science Research Ethics Committee (HCARE SREC), Cardiff University on 27th January, 2022. Due to an initial low response rate in the online survey, an amended ethics application was submitted to the HCARE SREC (see Section 4.2.4). The amended ethical approval was granted on 13th April, 2022 by the HCARE SREC, allowing for the continuation of data collection. To ensure the protection of participants' rights and safety, I completed Good Clinical Practice (GCP) training and worked closely with my academic supervisory team for ongoing guidance and support throughout the study. The study was conducted with integrity, rigour, and in accordance with the Cardiff University Research Governance Framework (2019), and the ethical principles outlined by the Health Research Authority (HRA). As a registered Nurse, I also adhered to the standards set forth in the NMC Code, ensuring that the research upheld the professional values of respect, confidentiality, and safeguarding participants' rights and welfare throughout the process.

Given the sensitive nature of the research topic, participants were deemed particularly vulnerable and at a risk of experiencing emotional distress. Thus, throughout both phases of data collection, participants were made aware of their right to withdraw from the study at any time, without the need to provide a reason. Participants in the online survey were presented with the opportunity to pause or stop their progress by selecting the stop/pause button and were given the flexibility to return at a later time to continue the survey. Individuals who chose not to complete the online survey (*n=100*) were excluded from the final analysis.

During the one-to-one semi-structured interviews, verbal consent to continue, (also known as process consent) was obtained periodically, and participants were

continually reminded of their right to pause or withdraw from the interview at any point in time. The participants were informed of support services, such as the Caring for All Nursing and Healthcare Practitioners' Initiative (CANOPI), or telephone helplines such as the Samaritans, if they experienced distress following the interview. CANOPI, previously known as Help for Healthcare Professionals (HHP) Wales, provides free mental health and well-being support to NHS and social care staff in Wales.

Although the interviews were conducted online through video conferencing, every attempt was made to create a welcomed and encouraging atmosphere. I employed intermittent nodding and responding gestures that enabled participants to express their emotions without fear of judgement. In a few instances, participants who encountered distress during the interview were given time to recover, reassured and reminded them to stop the interview at any time. I also provided the participants with information on available support services. Throughout the interviews, I maintained a composed and reassuring manner, making every effort to ensure that the participants felt at ease and respected at all times. Participants were encouraged to seek additional assistance from professional services. Participants who recovered were then given the option to continue if they wished or withdrew. It is noteworthy that none of the participants chose to withdraw from the interviews. This study was conducted at the time when nurses reported that they felt devalued and were engaged in industrial actions with their employers. Therefore, it is reasonable to assume that taking part in this study may have had a positive impact on participants, through the opportunity to tell their stories and express their feelings and concerns.

At the end of each interview, there was an opportunity for debriefing to discuss the participant's experience of the interview, enquire about any concerns or worries

regarding the interview or what was shared, or address any questions that may have arisen about the study or how the information shared will be used. Following each interview, I would take some time to reflect on my own experience, emotions, or events, as well as any relevant contextual information and external factors that may have affected the interview or the flow of the interview. These reflections were subsequently discussed during academic supervisory meetings, where academic supervisors provided invaluable assistance in processing and making sense of my own memories and emotions.

4.7.1. Informed consent and voluntary participation

The process of obtaining informed consent holds significant importance in maintaining ethical research standards and safeguarding the rights and well-being of participants (Hardicre 2014). According to Parahoo (2006), informed consent involves:

> "*The process of agreeing to take part in a study based on access to all relevant and easily digestible information about what participation means, in particular, in terms of harms and benefits*." (p.469)

In both phases of the study, participants provided informed consent. The introductory section of the online survey included comprehensive information about the study, the role of the researcher, the names of academic supervisors and statements assuring confidentiality. Participants in the online survey were presented with the option to either consent to participate in the study by selecting "Yes" or "No" to decline. Those who declined to participate were prevented from accessing the online questionnaire. Furthermore, participants who consented to take part in the online survey were then asked to provide their initials and the date in the box provided before proceeding with the questionnaire.

In the qualitative phase of the study, written informed consent was sought and obtained. Individuals who expressed an interest in participating in the one-to-one interviews, either through the online survey link or social media, were contacted through email. An introductory email was sent to the participants which included a participant information sheet and informed consent form for them to review and sign. Only those who returned signed informed consent forms were included in the study. Throughout the one-to-one interviews, ongoing process consent was obtained as well (RCN 2011; Health and Social Care Research 2020b). Participants were on a regular basis asked to reaffirm their willingness to continue the interview, ensuring that participation was entirely voluntary. Also, participants were periodically reassured of their right to withdraw at any time without consequences.

Participation in both components of the study was voluntary. Subsequently, detailed study information was provided to enable potential participants to voluntarily decide whether or not to take part in the study (Manti and Licari 2018). Measures were taken to ensure that the information disseminated was communicated in plain language and participants were not subjected to any form of coercion to take part in the study (RCN 2011).

4.7.2. Confidentiality and Anonymity

All personal information about the participants, both in quantitative and qualitative data, was anonymised and protected throughout the analysis, transcription, and thesis write-up processes. In accordance with the recommendation of Wiles (2006), confidentiality was maintained by separating the identifiable personal information of the participants from the data and securely storing it on a password-protected drive. Each respondent in the online questionnaire was assigned a code, while participants

in the one-to-one interviews were assigned pseudonyms such as “participant” and a number.

The anonymised data were stored in compliance with the Data Protection Act, 2018 and the data protection guidelines of Cardiff University and will continue for a period of 5 years after the completion of the study.

4.8. Chapter summary

This chapter outlined the overall design of the research study, including its philosophical underpinnings and research design. A detailed discussion of the research procedures was provided, covering piloting the data collection instrument, participant recruitment, data collection, data analysis, rigour and ethics, while also addressing the challenges I faced as a researcher. The next chapter presents the analysis and findings of the quantitative data collected via an online survey.

Chapter 5: Quantitative Results

5.0. Introduction

This chapter presents an analysis of the data collected through a cross-sectional online survey. At this stage of the study, registered nurses (adult/mental health fields) who cared for patients who were seriously ill with COVID -19 in hospitals during the SARS-CoV-2 pandemic in Wales and England were surveyed regarding the work-related stress they encountered and how they coped with the stress. The IBM SPSS statistics software, version 27, and Microsoft Excel were used to analyse the quantitative data.

The findings are presented in the following three sections:

a) Data description

b) Correlation statistics

c) Predictive statistics (Ordinal Logistics regression)

5.1. Data description

A descriptive analysis of the participants' demographic characteristics and the three pre-validated scales (ENSS, PANAS, and Brief COPE) used in the online survey was conducted. There are variations in the n and percentage (*%*) numbers in the tables or figures presented in this section due to missing values in the dataset, as some participants did not answer every question in the online survey.

5.1.1. Descriptive data for Participants' demographic characteristics

A total of 516 registered nurses completed an online survey between 14th February to 31st July 2022. Most participants were aged 31 to 40 years (*n = 376, 73%*) and were predominantly female (*n = 468, 91%*). Of the 516 participants who completed the online survey, the majority (*n = 466, 90%*) were of a White ethnic background,

with 9% (*n = 44*) from Black, Asian and Minority ethnic backgrounds. Almost 70% (*n = 350, 68%*) of participants were married. Of the participants, 6% (*n = 30*) reported some form of disability. The detailed demographic data of the participants are outlined in Table 5.0.

Table 5.0: Distribution of the participants' demographic characteristics (age, gender, ethnicity, relationship and disability statues) (*n = 516*)

Item	n	%
Age range (*n = 498*)		
21-30	54	11
31-40	376	73
41+	68	13
Gender (*n = 515*)		
Male	28	5
Female	468	91
Other (Non-binary, intersex, non-conforming)	19	4
Ethnicity / Cultural background (*n = 516*)		
Prefer not to Say	6	1
Non-White (Mixed White and Black Caribbean, Mixed White and Black African, Black other, Black British, Black Caribbean, Asian other, Asian Pakistani, Asian Filipino, Asian Indian, Mixed other)	44	9
White (British, Welsh, other)	466	90
Relationship status (*n = 515*)		
Unmarried (Civil partnership, Co-habiting Divorced, Single)	163	32
Married	350	68
Disability status (*n = 468*)		
Yes	30	6
No	438	85

5.1.1.1. Participants' employment background and intentions to stay in the profession

The participants responded to questions about their employment, the number of years qualified as a registered nurse, whether they returned to work to support the COVID-19 pandemic, how many suspected and confirmed cases of people with COVID-19 they had cared for and their intentions to stay in the nursing profession. Figure 5.0 and Table 5.1 show the responses to these questions. A considerable proportion of participants reported that the NHS was their main employer. These were either NHS England (*n = 196, 38%*) or NHS Wales (*n = 121, 23%*). Almost 40% (*n = 187, 36%*) of the participants' main employer was "Other" which they specified as "Agency". 41% of the participants reported having 6 years plus of experience as registered nurses. In response to the question "did you return to work to support the COVID-19 response", only five participants reported returning to work to support the COVID-19 pandemic. The findings showed that most participants were already working (*n = 470, 91%*) prior to the SARS-CoV-2 pandemic. The majority of participants reported caring for patients with either suspected (*n = 394*) or confirmed (*n = 498*) cases of SARS-CoV-2.

Table 5.1: Participant's main employer, years qualified as registered nurse, and response to COVID-19
(n = 516)

Item	n	%
Main employer (*n = 508*)		
NHS (Wales, England)	317	61
Non-NHS England (Private, Agency)	191	37
Years qualified as a Registered Nurse (Ault / Mental Health)		
Under 1 -2 years	115	22
3-5 years	162	31
6+	211	40
Did you return to work to support the COVID-19 response?		
Yes	5	1
No, I was already working	470	91
Approximately how many patients with suspected SARS-COV-2 have you cared for?		
1-5		
6-10	73	14
11-15	62	12
16+	125	24
Can't remember	134	26
	116	22
Approximately how many patients with confirmed SARS-COV-2 have you cared for?		
1-5		
6-10	48	9
11-15	55	11
16+	114	22
Can't remember	171	33
	110	21

Figure 5.0 reveals that whereas 30% (*n = 146*) of the participants definitively intended to stay in the nursing profession, 48% (*n = 240*) indicated uncertainty while 19% (*n = 93*) of the participants intended to leave the profession.

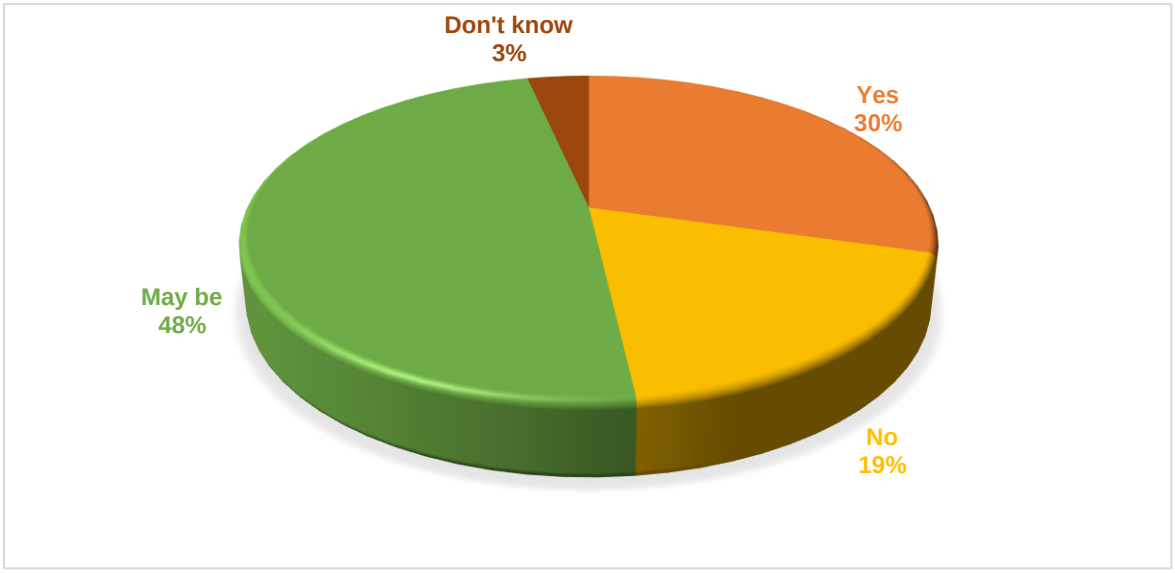


Figure 5.0: Participants' intentions to stay in the profession (n = 516)

5.1.1.2. Participants' health, COVID-19 response and support system

Participants were asked to rate their own health prior to the SARS-CoV-2 pandemic and at the time of completing the questionnaire. They were also asked questions about their SARS-CoV-2 status and access to support in the community. Table 5.2 shows the decline in participants' self-reported health, with ratings dropping from 73% (*n = 376*) before the pandemic to 66% (*n = 339*) after. Additionally, the proportion of participants reporting "very poor" health increased from 14% (*n = 52*) before the pandemic to 24% (*n = 123*) during the pandemic. 86% (*n = 446*) of participants reported having tested positive for SARS-CoV-2. Just under 5% (*n = 22, 4%*) of those who responded, reported having Long-COVID. Participants agreed that they had access to support from family members, friends, General Practitioners (GP), and other healthcare professionals and facilities.

Table 5.2: Participants' responses to questions related to their health, COVID-19 and access to support
(n=516)

Item	*n*	%
How would you rate your overall health before SARS-CoV-2?		
Very good	13	3
Good	376	73
Very poor	52	10
Poor	70	14
How would you rate your health now?		
Very good	9	2
Good	339	66
Very poor	123	24
Poor	40	8
Have you tested positive for SARS-CoV-2?		
Yes	446	86
No	27	5
Do you consider yourself to have Long-Covid?		
Yes	22	4
No	481	9
If Yes, how long have you been unwell with Long-Covid?		
Less than 3 months	2	0.4
3-6 months	3	0.6
Over 6 months	3	0.6
Have you accessed support from any of the following?		
Family / Friends	351	68
GP	111	22
Other health facilities/professionals	35	7
Other	20	4

5.1.2. Descriptive Data for the Expanded Nursing Stress Scale (ENSS)

To fully comprehend the levels of work-related stress experienced by participants in caring for patients who were severely ill with COVID-19 during the pandemic, participants were asked questions using the pre-validated ENSS (French et al. 2000). The participants were asked to rate their level of work-related stress on a five-point Likert scale from “always stressful” allocated 5 to “never stressful” allocated 1 and included, “does not apply” allocated 0. In analysing the data collected, the ENSS was compressed to a four-point Likert scale as none of the participants responded with “does not apply”. Figure 5.1 below illustrates the distribution of participants’ responses across the ENSS subscales, measured in frequency (*n*) and percentage (%). The majority of participants reported “always stressful” or “frequently stressful” experiences in relation to the subscales of workload, death and dying, conflict with physicians, inadequate preparation, problems with supervisors, patients and their families, and uncertainty concerning treatment. Conversely, a larger percentage of participants reported “never” or “occasionally” stressful experiences in relation to the problems with peers (53%) and discrimination (34%) subscales. This highlights that these two subscales have the lowest reported work-related stress levels compared to the other ENSS subscales.

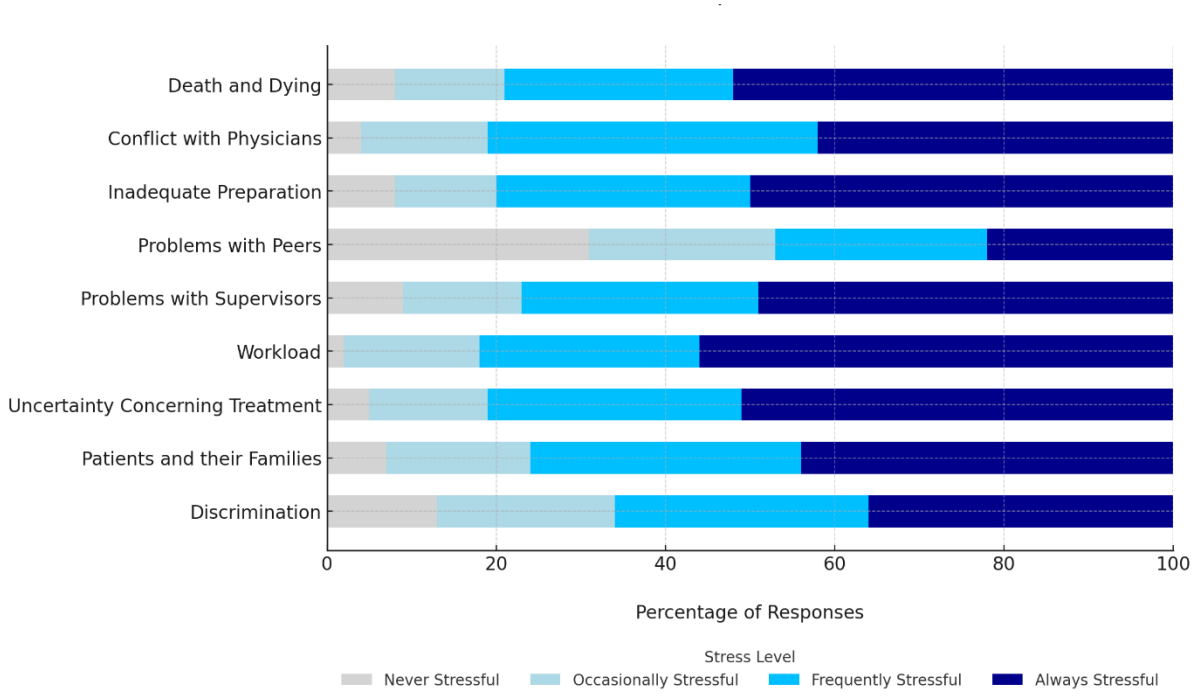


Figure 5.1: Distribution of participants' responses to ENSS subscales (n=516)

As shown in Table 5.3, the item with the lowest mean score was 'difficulty in working with nurses of the opposite sex' (*M = 1.14, SD = 0.45*), indicating that the majority of participants (*87%, n = 449*) reported minimal stress associated with this factor. In contrast, the highest mean score was for 'not enough staff to adequately cover the unit' (*M = 3.64, SD = 0.77*), reflecting that nearly 80% of the participants (*n = 410, 80%*) experienced high levels of work-related stress due to staff shortages. Additional items indicating varying levels of work-related stress are detailed in the table below.

Table 5.3: Means ± standard deviation of each subscale of the ENSS highlighting the highest-scoring and lowest-scoring (n=516)

Subscale Factor	Number of Items	Mean (M) ± SD (Range)	Highest-scoring Item (M ± SD)	Lowest-scoring Item (M ± SD)
Death and Dying	7	3.27 ± 0.85 (2.93–3.51)	Death of a patient with close relationship (3.51 ± 0.66)	Physician(s) not present when patient dies (2.93 ± 0.67)
Conflict with Physicians	5	3.04 ± 0.72 (2.61–3.38)	Conflict with a physician (3.38 ± 0.66)	Having to organise doctor's work (2.61 ± 0.76)
Inadequate Preparation	4	3.23 ± 0.96 (3.11–3.30)	Feeling inadequately prepared to help with emotions (3.30 ± 0.90)	Feeling inadequately trained for duties (3.11 ± 1.07)
Problems with Peers	6	2.76 ± 0.69 (1.14–3.44)	Lack of opportunity to talk about problems (3.44 ± 0.82)	Difficulty working with opposite-sex nurses (1.14 ± 0.45)
Problems with Supervisors	7	3.28 ± 0.78 (2.56–3.61)	Lack of support from health administrators (3.61 ± 0.76)	Criticism from nursing administration (2.56 ± 0.81)
Workload	9	3.40 ± 0.79 (2.49–3.64)	Not enough staff to cover unit (3.64 ± 0.77)	Demands of patient classification system (2.49 ± 0.75)
Uncertainty Concerning Treatment	8	3.29 ± 0.83 (2.23–3.51)	Inadequate physician info on patient condition (3.51 ± 0.87)	Disagreement on patient treatment (2.23 ± 0.85)
Patients and Their Families	8	3.19 ± 0.81 (2.29–3.50)	Patients making unreasonable demands (3.50 ± 0.73)	Being blamed for anything that goes wrong (2.29 ± 0.85)
Discrimination	3	2.77 ± 0.87 (2.23–3.24)	Being sexually harassed (3.24 ± 0.81)	Experiencing racial discrimination (2.23 ± 1.02)

Figure 5.1 below presents the mean scores for each of the nine ENSS subscales. The overall mean score across all subscales was 3.00 (*Median = 3.08, SD = 0.34*), suggesting a moderate level of work-related stress among the participants. The subscales 'Problems with peers' (*Mean = 2.59, SD = 0.40*) and 'Discrimination'

(*Mean = 2.76, SD = 0.57*) had the lowest mean scores, indicating lower levels of stress associated with these factors. Conversely, 'Workload' had the highest mean score (*Mean = 3.36, SD = 0.45*), reflecting elevated levels of stress due to workload demands. The other subscales also showed high mean scores ranging from 3.04 (*SD = 0.41*) to 3.25 (*SD = 0.47*), indicating that participants experienced significant stress across multiple areas. These findings suggested that a substantial proportion of participants faced heightened levels of work-related stress while caring for patients severely ill with COVID-19 during the SARS-CoV-2 pandemic.

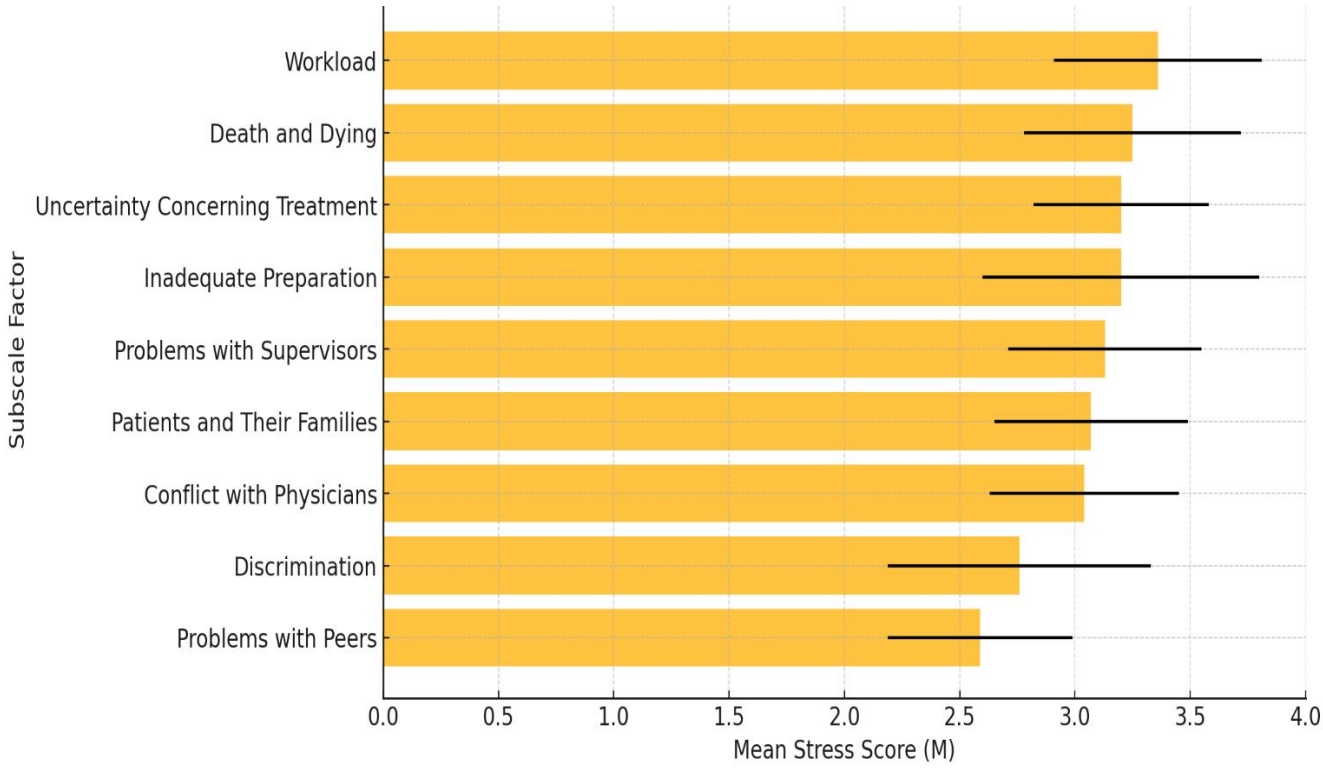


Figure 5.2: Means ± standard deviation of the subscales of the ENSS (n=516

5.1.3. Descriptive data for the Positive Affect and Negative Affect Schedule (PANAS)

To explore nurses' perceptions of work-related stress while caring for patients who were severely ill with COVID-19, the PANAS (Watson et al. 1988) was used in the online survey. Participants were asked to select words from the scale that best described their emotions and feelings over the past two weeks. As shown in Table 5.4, the participants reported a mix of positive and negative emotions related to their experiences. Notably, 2.5% (*n = 13*) of the participants reported feeling extremely proud of providing nursing care to patients with COVID-19, while the majority (*57%, n = 295*) felt quite a bit proud. A smaller percentage reported feeling moderately inspired (*37%, n = 191*) and a little bit enthusiastic (*37%, n = 190*).

In contrast, the negative affect subscale revealed that a substantial portion of participants (*51%–77%*) experienced many of the negative emotions listed, suggesting that, alongside feelings of pride, participants faced considerable emotional strain in their roles during the pandemic.

Table 5.4: Participants' responses to the questions in the PANAS (n=516)

Subscale Factors	Subscale items	Participant's responses				
		Very Slightly or Not at All ***n (%)***	**A Little** ***n (%)***	**Moderately** ***n (%)***	**Quite a Bit** ***n (%)***	**Extremely** ***n (%)***
Positive Affect	Interested	39 (8%)	47 (9%)	195 (38%)	208 (40%)	-
	Excited	49 (10%)	111 (22%)	103 (20%)	239 (46%)	-
	Strong	52 (10%)	72 (14%)	136 (26%)	225 (44%)	-
	Enthusiastic	47 (9%)	**190 (37%)**	110 (21%)	135 (26%)	-
	Proud	38 (7%)	60 (12%)	96 (19%)	**295 (57%)**	13 (3%)
	Alert	52 (10%)	42 (8%)	111 (22%)	**298 (58%)**	-
	Inspired	50 (10%)	116 (23%)	**191 (37%)**	150 (29%)	-
	Determined	43 (8%)	39 (8%)	178 (35%)	243 (47%)	-
	Attentive	46 (9%)	57 (11%)	105 (20%)	**294 (57%)**	-
	Active	56 (11%)	157 (30%)	71 (14%)	210 (41%)	-
Negative Affect	**Distressed**	47 (9%)	39 (8%)	129 (25%)	**261 (51%)**	26 (5%)
	Upset	11 (2%)	37 (7%)	96 (19%)	**355 (69%)**	14 (3%)
	Guilty	9 (3%)	31 (6%)	102 (20%)	**367 (71%)**	-
	Scared	14 (3%)	28 (5%)	134 (26%)	**334 (65%)**	-
	Hostile	3 (0.6%)	31 (6%)	144 (28%)	**335 (65%)**	-
	Irritable	11 (2%)	53 (10%)	132 (26%)	**301 (58%)**	11 (2%)
	Ashamed	10 (2%)	30 (6%)	80 (16%)	**388 (75%)**	-
	Nervous	23 (5%)	64 (12%)	132 (26%)	**290 (56%)**	-
	Jittery	9 (2%)	47 (9%)	137 (27%)	**318 (62%)**	-
	Afraid	16 (3%)	13 (3%)	81 (16%)	**397 (77%)**	-

Within the positive affect subscale, items such as 'Enthusiastic' (*Mean = 2.69, SD = 0.99*), 'Inspired' (*Mean = 2.87, SD = 0.95*), and 'Active' (*Mean = 2.88, SD = 1.09*) had relatively lower mean scores, indicating that participants experienced these positive emotions to a moderate extent. In contrast, items across the negative affect subscale consistently showed higher mean scores, ranging from 3.35 to 3.69, suggesting that negative emotions were more prominently felt by the participants (Table 5.5).

Table 5.5: Means ± standard deviation of questions in each subscale of the PANAS (n=516)

Subscale Factors	Number of items	Subscale items	Mean (*M*)	SD
Positive Affect	10	Interested	3.17	0.90
		Excited	3.06	1.04
		Strong	3.10	1.02
		Enthusiastic	2.69	0.99
		Proud	3.37	0.99
		Alert	3.30	1.00
		Inspired	2.87	0.95
		Determined	3.23	0.92
		Attentive	3.29	0.99
		Active	2.88	1.09
Negative Affect	10	Distressed	3.36	1.03
		Upset	3.63	0.75
		Guilty	3.62	0.68
		Scared	3.55	0.72
		Hostile	3.58	0.63
		Irritable	3.49	0.80
		Ashamed	3.67	0.68
		Nervous	3.35	0.87
		Jittery	3.50	0.74
		Afraid	3.69	0.67

The total mean score for the positive affect subscale was 3.25 (*SD = 0.59, Median = 3.4*), whereas the negative affect subscale yielded a higher mean of 3.57 (*SD = 0.51, Median = 3.8*). These findings suggested that nurses reported higher levels of negative emotions than positive emotions while caring for patients who were severely ill with COVID-19. This difference highlights the stronger presence of negative affect among participants, possibly reflecting the challenging conditions

faced while caring for patients who were severely ill with COVID-19. To further explore these differences, additional analyses were conducted using the Chi-Square test, with results presented under bivariate and ordinal logistic regression.

5.1.4. Descriptive data for the Coping Orientation to Problems Experienced inventory (Brief COPE)

The third objective of this study was to examine how nurses cope with work-related stress while caring for patients who were severely ill with COVID-19, measured using Brief COPE (Carver, 1997). Participants rated their engagement with different coping strategies on a four-point Likert scale, from "I haven't been doing this at all", allocated a score of 1 to "I have been doing this a lot", allocated a score of 4. As shown in Table 5.6, most participants reported frequently engaging in positive reframing, ("I've been trying to see it in a different light, to make it seem more positive", n=230, 45%) and seeking emotional support ("I've been getting emotional support from others", n=300, 58%). In contrast, fewer participants reported using humour to cope ("*I've been making jokes about it", n = 473, 92%*), self-criticism *("I've been criticising myself", n = 446, 86%*), or self-blame *("I've been blaming myself for things that happened", n = 368, 71%*). Additionally, most participants avoided coping through substance use, with 73% (*n = 377*) not using alcohol or drugs to cope and 86% (*n = 442*) not using substances to feel better.

As shown in Table 5.7, across the three coping subscales, Problem-focused coping (*Mean = 2.82, SD = 0.33, Median = 2.87*) emerged as the most common approach, compared to Emotion-focused coping (*Mean = 2.17, SD = 0.26, Median = 2.16*) and Avoidant coping (*Mean = 2.30, SD = 0.33, Median = 2.37*). Further analyses examining these outcomes are presented and discussed in the subsequent sections.

Table 5.6: Participants' responses to the questions in the Brief COPE scale (n=516)

Subscale Factors	Subscale items	Participant's responses			
		I haven't been doing this at all ***n (%)***	**I've been doing this a little bit** ***n (%)***	**I've been doing this a medium amount** ***n (%)***	**I've been doing this a lot** ***n (%)***
Problem-Focused Coping	I've been concentrating my efforts on doing something about the situation I'm in.	77 (15%)	211 (41%)	187 (36%)	24 (5%)
	I've been taking action to try to make the situation better.	33 (6%)	55 (11%)	285 (55%)	132 (26%)
	I've been getting help and advice from other people.	51 (10%)	46 (9%)	302 (58%)	113 (22%)
	I've been trying to see it in a different light, to make it seem more positive.	29 (6%)	42 (8%)	210 (41%)	230 (45%)
	I've been trying to come up with a strategy about what to do.	73 (14%)	56 (11%)	319 (62%)	58 (11%)
	I've been looking for something good in what is happening.	68 (13%)	60 (12%)	325 (63%)	54 (10%)
	I've been trying to get advice or help from other people about what to do.	75 (15%)	64 (12%)	316 (61%)	52 (10%)
	I've been thinking hard about what steps to take.	69 (13%)	33 (6%)	324 (63%)	65 (13%)
Emotion-Focused Coping	I've been getting emotional support from others.	15 (3%)	47 (9%)	146 (28%)	300 (58%)
	I've been saying things to let my unpleasant feelings escape.	59 (11%)	56 (11%)	339 (66%)	38 (7%)
	I've been criticising myself.	446 (86%)	32 (6%)	29 (6%)	-
	I've been getting comfort and understanding from someone.	56 (11%)	43 (8%)	307 (59%)	89 (17%)
	I've been making jokes about it.	385 (75%)	40 (8%)	76 (15%)	-
	I've been accepting the reality of the fact that it has happened.	71 (14%)	47 (9%)	315 (61%)	72 (14%)

	I've been expressing my negative feelings.	55 (11%)	44 (9%)	323 (65%)	83 (16%)
	I've been trying to find comfort in my religion or spiritual beliefs.	389 (75%)	12 (2%)	94 (18%)	11 (2%)
	I've been learning to live with it.	43 (8%)	35 (7%)	230 (45%)	199 (39%)
	I’ve been blaming myself for things that happened	368 (71%)	35 (7%)	109 (21%)	-
	I've been praying or meditating	375 (73%)	43 (8%)	86 (17%)	-
	I've been making fun of the situation.	473 (92%)	19 (4%)	19 (5%)	-
Avoidant Coping	I've been turning to work or other activities to take my mind off things.	40 (8%)	175 (34%)	224 (43%)	57 (11%)
	I've been saying to myself "this isn't real".	38 (7%)	77 (15%)	269 (52%)	128 (25%)
	I've been using alcohol or other drugs to make myself feel better	442 (86%)	48 (9%)	21 (4%)	-
	I've been giving up trying to deal with it.	156 (30%)	75 (15%)	236 (46%)	45 (9%)
	I've been refusing to believe that it has happened.	172 (33%)	51 (10%)	215 (42%)	72 (14%)
	I've been using alcohol or other drugs to help me get through it.	377 (73%)	37 (7%)	94 (18%)	-
	I’ve been giving up the attempt to cope.	96 (19%)	69 (13%)	343 (66%)	-
	I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping	48 (9%)	50 (10%)	309 (60%)	93 (18%)

Table 5.7: Means ± standard deviation of questions in each subscale of the Brief COPE scale (n=516)

Subscale Factors	Number of items	Subscale item	Mean (*M*)	SD
Problem-Focused Coping	8	I've been concentrating my efforts on doing something about the situation I'm in.	2.32	0.78
		I've been taking action to try to make the situation better.	3.02	0.79
		I've been getting help and advice from other people.	2.93	0.84
		I've been trying to see it in a different light, to make it seem more positive.	3.25	0.83
		I've been trying to come up with a strategy about what to do.	2.72	0.85
		I've been looking for something good in what is happening.	2.72	0.82
		I've been trying to get advice or help from other people about what to do.	2.68	0.84
		I've been thinking hard about what steps to take.	2.78	0.84
Emotion-Focused Coping	12	I've been getting emotional support from others.	3.44	0.78
		I've been saying things to let my unpleasant feelings escape.	2.72	0.77
		I've been criticising myself.	1.18	0.51
		I've been getting comfort and understanding from someone.	2.87	0.83
		I've been making jokes about it.	1.38	0.73
		I've been accepting the reality of the fact that it has happened.	2.77	0.86
		I've been expressing my negative feelings.	2.86	0.81
		I've been trying to find comfort in my religion or spiritual beliefs.	1.46	0.86

		I've been learning to live with it.	3.15	0.88
		I've been blaming myself for things that happened	1.49	0.82
		I've been praying or meditating	1.43	0.77
		I've been making fun of the situation.	1.11	0.42
Avoidant Coping	8	I've been turning to work or other activities to take my mind off things.	2.60	0.80
		I've been saying to myself "this isn't real".	2.95	0.83
		I've been using alcohol or other drugs to make myself feel better	1.18	0.48
		I've been giving up trying to deal with it.	2.33	1.00
		I've been refusing to believe that it has happened.	2.37	1.09
		I've been using alcohol or other drugs to help me get through it.	1.44	0.79
		I've been giving up the attempt to cope.	2.49	0.79
		I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping	2.89	0.81

5.2. Bivariate Analysis

Correlation analyses were performed to assess the relationships between the following:

- The level of work-related stress (ENSS subscale scores) and participants' perceptions of work-related stress experienced in caring for patients severely ill with COVID-19 (PANAS subscale scores);
- The level of work-related stress (ENSS subscale scores) and coping strategies (Brief COPE subscale scores);
- The participants' perceptions of work-related stress experienced in caring for patients severely ill with COVID-19 (PANAS subscale scores) and their coping strategies (Brief COPE subscale scores);
- The participants' demographic characteristics and the level of work-related stress as measured by the ENSS subscale scores;
- The participants' demographic characteristics and their perceptions of work-related stress experienced in caring for patients severely ill with COVID-19 as measured by the PANAS subscale scores;
- The participants' demographic characteristics and their coping strategies as measured by the Brief COPE subscale scores.

The relationships between the variables were investigated using Spearman's rho correlation coefficients. Chi-square (x^2) tests were performed to determine the distribution of data. The significance levels were set at $p < .05$, $p < .001$ and $p < .01$.

5.2.1. Correlations between ENSS subscales and PANAS subscales

Spearman's rho correlation coefficient was performed to examine the relationship between participants' work-related stress experienced as measured by the ENSS

subscales and their perceptions of the work-related stress experienced in caring for patients severely ill with COVID-19 as measured by the PANAS subscales. All the variables examined showed a statistically significant relationship with a positive correlation between the variables as presented in Table 5.8.

Table 5.8: Correlations between ENSS subscales and PANAS subscales

	PANAS subscales	
ENSS Subscales	Positive Affect	Negative Affect
Death and Dying	**.39****	**.52****
Conflict with Physicians	.13**	.34**
Inadequate Preparation	**.36****	.45**
Problem with Supervisors	.24**	.47**
Workload	.21**	.49**
Uncertainty with Treatments	.22**	.45**
Patients and their families	.29**	.46**

Note. **. Correlation is significant at the 0.01 level

Across the dataset, a medium to high positive correlation was reported between work-related stress, as measured by the ENSS subscales, and negative emotional perceptions associated with caring for patients who were severely ill with COVID-19, as measured by the Negative Affect subscale of the PANAS. These findings indicated that higher levels of work-related stress were associated with stronger expressions of negative emotions and feelings among the participants. The strongest positive correlation was found between stress associated with “death and dying” (ENSS subscale) and negative affect (PANAS subscale), with $r = .52$, $n = 416$, $p < .001$, suggesting that as work-related stress levels in this area increased, so did feelings of distress, guilt, fear, hostility, nervousness, and irritability.

Interestingly, moderate positive correlations were also noted between certain work-related stressors and the Positive Affect subscale scores. For example, “death and dying” correlated with positive affect at $r = .39$, $p < .01$, and “inadequate preparation” also correlated with positive affect at $r = .36$, $p < .01$. These findings suggested that while high levels of work-related stress often led to negative emotions, some participants also reported positive feelings, possibly mirroring resilience and a sense of professional commitment in response to the challenges brought on by the pandemic.

5.2.2. Correlations between ENSS subscales and Brief COPE subscales

Spearman’s rho correlation coefficient was performed to examine the relationship between participants’ level of work-related stress as measured by ENSS subscales and coping strategies as measured by Brief COPE subscales. A statistically significant relationship was observed between the subscale factors with effect sizes ranging from small to medium (Cohen, 1988) as presented in Table 5.9.

Table 5.9: Correlations between ENSS subscales and Brief COPE subscales

	Brief COPE subscales		
ENSS Subscales	Problem-Focused	Emotion-Focused	Avoidant
Death and Dying	**.31****	**.31****	.27**
Conflict with Physicians	.21**	.09	.15**
Inadequate Preparation	.20**	.19**	.21**
Problem with Supervisors	.20**	.24**	**.32****
Workload	.28**	.30**	**.34****
Uncertainty with Treatments	.26**	.23**	.19**
Patients and their families	**.30****	.28**	.28**

Note. **. Correlation is significant at the 0.01 level

A positive correlation was observed between work-related stress as measured by the "death and dying" subscale ($r = .31, p < .01$), "patients and their families" subscale ($r = .30, p < .01$) and "problem-focused coping" subscale; work-related stress as measured by "death and dying" subscale and "emotion-focused coping" subscale ($r = .31, p < .01$); and work-related stress as measured by "problems with supervisors" subscale ($r = .32, p < .01$), "workload" subscale ($r = .34, p < .01$) and "avoidant coping" subscale.

A Chi-square test of independence was performed to further assess the strength of the relationship between these variables. Table 5.10 displays the findings from the Chi-square test of independence. The findings suggested that participants experienced higher levels of work-related stress in the areas of performing procedures that patients experienced as painful, lack of support from immediate supervisors, unpredictable staffing and scheduling, too many non-nursing tasks required, and not enough staff to adequately cover the unit. Increased scores on these variables were associated with greater use of problem-focused coping strategies along with moderate use of certain elements of emotional-focused and avoidant coping strategies. This suggested that participants largely focused on practical approaches to changing stressful situations and often regulated their emotional responses while using adaptive coping strategies.

Table 5.10: Chi-square test of independence showing the strength of relationship between ENSS subscales and Brief COPE subscales

	ENSS subscales					
Brief COPE subscales	**Death and Dying subscale (Performing procedures that patients experience as painful)**					
	Chi-Square	**df**	**Sample size**	**Value**	**P value**	**Cramer's V**
Problem-Focused						
I've been concentrating my efforts on doing something about the situation I'm in.	X^2	9	482	196.982	<.001	.369
I've been trying to come up with a strategy about what to do.	X^2	9	488	142.971	<.001	.313
I've been looking for something good in what is happening.	X^2	9	489	163.120	<.001	.333
I've been trying to get advice or help from other people about what to do.	X^2	9	489	136.617	<.001	.305
Emotion-Focused						
I've been getting comfort and understanding from someone.	X^2	9	477	130.688	<.001	.302
Avoidant Coping						
I've been turning to work or other activities to take my mind off things.	X^2	9	478	200.585	<.001	.374
I've been giving up trying to deal with it.	X^2	9	490	106.735	<.001	.330
	Conflict with Supervisors subscale (Lack of support of my immediate supervisors)					
Avoidant Coping						
I've been turning to work or other activities to take my mind off things.	X^2	9	480	132.126	<.001	.303
I've been saying to myself "this isn't real".	X^2	9	496	121.031	<.001	.285

I've been giving up the attempt to cope.	X^2	6	492	85.761	<.001	.300
I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	X^2	9	484	142.049	<.001	.313
			Workload subscale (Unpredictable staffing and scheduling)			
Avoidant Coping						
I've been turning to work or other activities to take my mind off things.	X^2	6	471	98.969	<.001	.321
I've been giving up the attempt to cope.	X^2	4	491	72.160	<.001	.271
I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	X^2	6	483	82.006	<.001	.291
			Workload subscale (Too many non-nursing tasks required)			
Avoidant Coping						
I've been turning to work or other activities to take my mind off things.	X^2	9	493	131.456	<.001	.300
I've been giving up the attempt to cope.	X^2	6	505	84.226	<.001	.290
			Workload subscale (Not enough staff to adequately cover the unit)			
Avoidant Coping						
I've been giving up the attempt to cope.	X^2	6	506	76.189	<.001	.274

5.2.3. Correlations between PANAS subscales and Brief COPE subscales

Spearman's rho correlation coefficient was performed to examine the relationship between participants' perceptions of the work-related stress experienced in caring for patients who were severely ill with COVID-19 as measured by PANAS subscales and coping strategies as measured by the Brief COPE subscales. The subscale factors showed statistical significance at $p < .01$, level with effect sizes ranging from small (*.20*) to large (*.55*), as shown in Table 5.11.

Table 5.11: Correlations between PANAS subscales and Brief COPE subscales

	Brief COPE subscales		
PANAS Subscales	Problem-Focused	Emotion-Focused	Avoidant
Positive Affect	.37**	.22**	.20**
Negative Affect	**.55****	.37**	**.41****

Note. **. Correlation is significant at the 0.01 level

There was a strong positive correlation between participants' perception, as measured by the Negative Affect subscale, and coping strategies as measured by Problem-focused ($r = .55, p < .01$) and Avoidant coping ($r = .41, p < .01$). Therefore, an increase in negative emotions and feelings was associated with increased reliance on problem-focused, avoidant coping strategies and moderate reliance on emotion-focused coping. The use of problem-focused strategies indicated psychological strength and a practical approach to problem-solving, both of which point to positive outcomes. Whereas the use of avoidant coping strategies suggested physical or cognitive efforts to detach from the stressor or the use of adaptive coping strategies. Emotion-focused strategies used here, could suggest an effort to regulate emotional responses.

5.2.4. Correlations between participants' demographic characteristics and ENSS subscales

The correlation between participants' demographic characteristics (age range, gender, relationship status, main employer and number of years qualified) and the level of work-related stress experienced by the participants as measured by the ENSS subscales was examined using Spearman's rho correlation coefficient. A Chi-square test of independence indicated a significant association between the main employer (NHS or Non-NHS) and the level of work-related stress experienced as measured by the ENSS subscale of "death and dying", x^2 *(1, n = 452) = 17.770, p = <.001, phi = .25*. These findings suggested that regardless of the participants' main employer, participants experienced some level of work-related stress as measured by the ENSS subscale of "death and dying". There was no significant difference between the proportion of NHS nurses and non-NHS nurses and the level of work-related stress experienced as measured by the ENSS subscales, x^2 *(1, n = 304) = 8.19, p = .49.*

5.2.5. Correlations between participants' demographic characteristics and PANAS subscales

Spearman's rho correlation coefficient was performed to examine the correlation between participants' demographic characteristics (age range, gender, relationship status, main employer, and number of years qualified) and their perceptions as measured by the PANAS subscales. This analysis aimed to determine whether participants' demographic characteristics influenced their perceptions of the work-related stress experienced in caring for patients who were severely ill with COVID-19. As illustrated in Table 5.12, the findings indicated a small effect size across the dataset (Cohen 1988). There was a statistically significant relationship between

gender and the negative affect subscale ($r = .11$, $p < .05$); and between relationship status (married or unmarried) and the positive affect subscale ($r = -.10$, $p < .05$).

Table 5.12: Correlations between participants' demographic characteristics and PANAS subscales

	PANAS subscales	
Demographics	Positive Affect	Negative Affect
Age Range	.00	-.01
Gender	.04	**.11***
Relationship Status	**-.10***	-.07
Main Employer	-.01	.08
Number of Years Qualified	.08	-.02

Note. *. Correlation is significant at the 0.05 level

5.2.6. Correlations between participants' demographic characteristics and Brief COPE subscales

A Spearman's rho correlation coefficient was performed to examine the correlations between participants' demographic characteristics (age range, gender, relationship status, main employer and the number of years qualified) and their coping strategies as measured by the Brief COPE subscales (problem-focused, emotion-focused, and avoidant coping). The findings indicated a small effect size of correlations between these demographic characteristics and coping strategies as shown in Table 5.13.

Table 5.13: Correlations of participants' demographic characteristics With Brief COPE subscales

	Brief COPE subscales		
Demographics	Problem-Focused	Emotion-Focused	Avoidant coping
Age range	.05	.01	-.03
Gender	.09	.06	**.12****
Relationship status	.07	-.09	-.03
Main employer	-.01	**.22****	-.03
Number of years qualified	.04	**.12***	**-.10***

Note. **. Correlation is significant at the 0.01 level *. Correlation is significant at the 0.05 level

There was a significant relationship between gender and avoidant coping ($r = .12, p < .01$); main employer and emotion-focused coping strategies ($r = .22, p < .01$); number of years qualified and emotion-focused coping ($r = .12, p < .05$); and the number of years qualified and avoidant coping ($r = -.10, p < .05$). A Chi-square test of independence was performed, and statistical significance was found between the main employer (NHS and non-NHS) and emotion-focused coping strategy, $x^2 (1, n = 428) = 20.840, p = <.001, phi = .28$. This suggested that the majority of the participants, both NHS nurses and non-NHS nurses engaged in emotion-focused coping strategies. There was a positive association between gender and avoidant coping, $x^2 (1, n = 459) = 7.162, p = .01, phi = .41$. Predominantly, female participants ($n = 423$) compared to male ($n = 21$) counterparts engaged in avoidant coping strategies. A statistically significant value was also found between the number of years qualified and emotion-focused coping, $x^2 (1, n = 408) = 5.909, p = .02, phi = .24$. Participants who were qualified between three years and five years ($n = 316$) were

found to engage in emotion-focused coping compared to those who were newly qualified.

5.2.7. Bivariate analysis Summary

The analysis showed that nurses caring for patients severely ill with COVID-19 during the pandemic experienced notably high levels of work-related stress as measured by the ENSS subscales. Significantly high levels of work-related stress were reported in the areas related to “death and dying”, “lack of support from their immediate supervisors”, “unpredictable staffing and scheduling”, “too many non-nursing tasks required” and “not enough staff to adequately cover the unit”. Thus, these findings fully support the research objective on the overall level of work-related stress and stressors experienced by nurses caring for severely ill patients with COVID-19 during the pandemic.

Across the dataset, high levels of stress were associated with a greater level of negative perceptions among participants. Participants expressed negative emotions and feelings of distress, afraid, scared, upset, irritability, hostility, shame, jittery, guilt and nervousness when caring for severely ill patients with COVID-19 during the pandemic. Therefore, the research objective on nurses’ perceptions of work-related stress encountered in caring for severely ill patients with COVID-19 as measured by the PANAS is thoroughly supported by these findings.

The bivariate correlations showed that participants’ use of problem-focused, avoidant coping and emotional-focused coping strategies were related to the level of work-related stress experienced. Although all coping strategies were used, participants engaged in problem-focused coping strategies more frequently than the other coping strategies. This indicated that, in the mist of adversity, participants identified practical

strategies to manage the challenges they faced. This finding supports the research objective of examining how nurses cope with work-related stress experienced while caring for severely ill patients with COVID during the pandemic.

5.3. Ordinal Logistic Regression

To predict the influence of independent variables (multiple) on the dependent variables simultaneously, an ordinal logistic regression was conducted. Just like the bivariate analysis, the significance level was set at $p < .05$, $p < .001$ and $p < .01$.

5.3.1. Relationship between total ENSS score, participants' demographic characteristics, PANAS subscales scores and Brief Coping subscales scores

Ordinal logistic regression was performed to assess the relationship between the following:

- Levels of work-related stress as measured by the total ENSS score,
- Participants' demographic characteristics (age range, gender, relationship status, type of employer and the number of years qualified),
- Their perceptions of the work-related stress experienced in caring for patients who were severely ill with COVID-19 as measured by the PANAS subscales, and
- The coping strategies adopted as measured by the Brief Coping subscales.

The model which included all predictors was statistically significant at $p < .01$, indicating that the model was a good fit for the data. As shown in Table 5.14 , the model predicted that higher levels of work-related stress were associated with a 1.72 times greater likelihood of participants reporting negative perceptions rather than positive perceptions. Consequently, participants engaged less frequently in emotion-focused and avoidant coping strategies compared to problem-focused coping

strategies. This indicated that participants preferred strategies that provided practical solutions to manage the challenges posed by the pandemic, over short-term strategies. Although emotion-focused and avoidant strategies may have offered relief, they were considered to be less effective in sustaining long-term resilience.

The only demographic characteristic significantly related to the level of work-related stress was gender (female). Although there was a slight difference in the ratio of male to female participants' levels of work-related stress, the findings indicated that female participants were over 11 times more likely to experience higher levels of work-related stress in caring for severely ill patients with COVID-19. However, this finding should be interpreted with caution, as there were more female participants (*n = 468, 90.7%)* in the study, potentially limiting the ability to draw conclusions about gender differences. The remaining predictive findings are illustrated in Table 5.14 and a summary of the findings is displayed in Figure 5.3.

Table 5.14: Summary of Ordinal Logistic Regression Analysis Predicting the Level of Work-related Stress as measured by the total ENSS score

Subscale Factors	B	SE	df	OR	95% CI	Wald	P
Positive	.25	.06	1	1.27	[.13, .36]	16.67	.00*
Negative	.55	.40	1	**1.72**	[-.24, 1.33]	1.88	.17
Problem	.51	.58	1	1.67	[-.62, 1.64]	.79	.38
Emotion	.09	.49	1	1.09	[-.88, 1.06]	.03	.86
Avoidant	.27	.69	1	1.31	[-1.08, 1.61]	.15	.70
Age range (21-30)	.58	.78	1	1.79	[-.96, 2.12]	.56	.46
Age range (31-39)	-.08	.50	1	.92	[-1.05, .89]	.26	.87
Age range (40+)	0[a]						
Gender (male)	2.33	1.31	1	10.32	[-.24, 4.91]	3.17	.08
Gender (female)	2.44	.85	1	11.42	[.77, 4.10]	8.24	.00*
Gender (other)	0[a]						
Relationship status (married)	.44	.37	1	1.56	[-.27, 1.16]	1.47	.23
Relationship status (unmarried)	0[a]						
Main employer (NHS)	.07	.33	1	1.07	[-.57, .71]	.05	.71
Main employer (Non-NHS)	0[a]						
Number of years qualified (under 1-2)	.13	.38	1	1.13	[-.63, .88]	.11	.75
Number of years Qualified (3+)	0[a]						

Note. CI = confidence interval for odds ratio (OR). * $p < 0.05$. [a] = category of reference for each variable.

5.3.2. Predictive analysis summary

Further analyses revealed areas where nurses experienced significant levels of work-related stress as well as the predominant coping strategies. High levels of stress were associated with negative perceptions, which subsequently led to

frequent reliance on problem-focused coping strategies to manage these stressors. The levels of work-related stress identified in the key areas are illustrated using a traffic light system in Figure 5.3 . In this classification, red indicates high levels of work-related stress, yellow denotes medium levels of work-related stress, and green represents low levels of work-related stress. The findings and the traffic system point to possible areas where nurses could need support to manage work-related stressors.

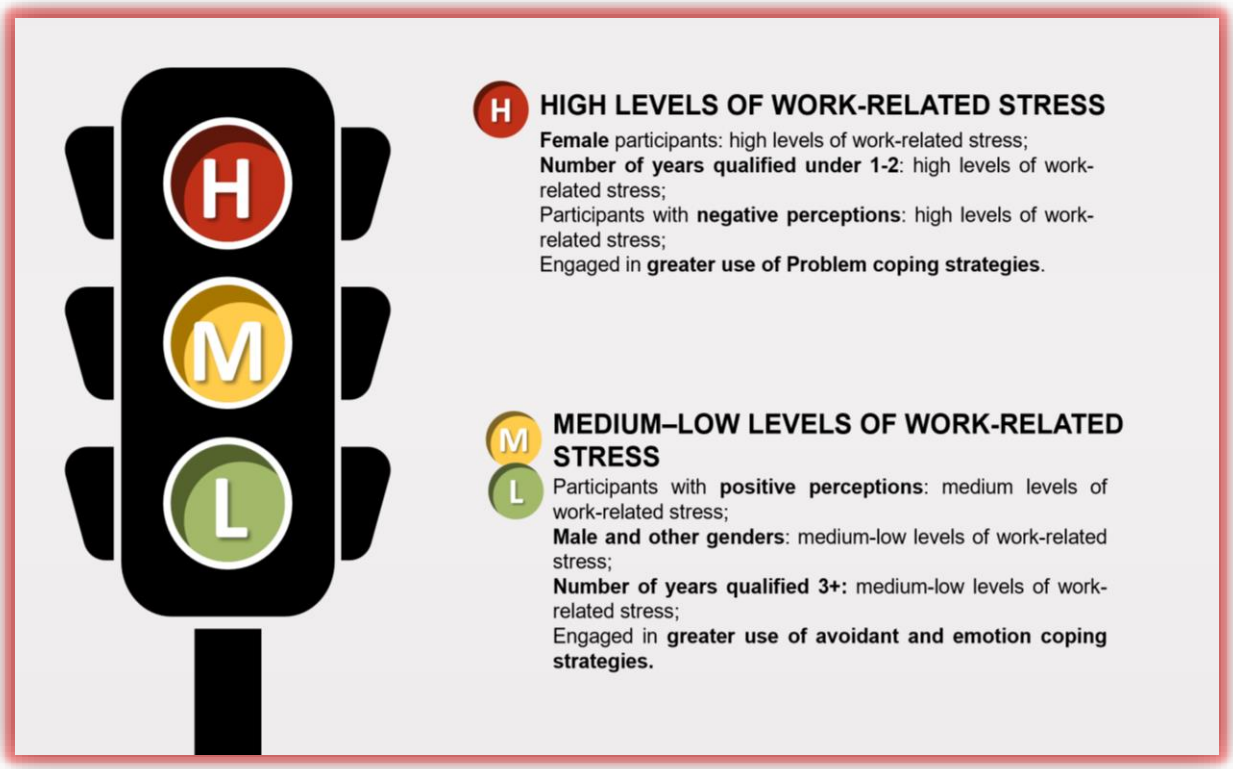


Figure 5.3: Illustration of work-related stressors

5.4. Chapter summary

This chapter presented the analysis of quantitative data collected through an online survey. This chapter examined the levels and effects of work-related stress among nurses during the SARS-CoV-2 pandemic, and the most prevalent coping strategies

used by participants. Three levels of analysis were conducted namely: descriptive, correlational and predictive.

Work-related stress measured using the ENSS revealed high levels of stress in areas such as workload, facing death and dying, inadequate preparation, lack of support from immediate supervisors and unpredictable staffing levels. Participants' perceptions of the challenges they experienced were measured using PANAS. It was revealed that high levels of stress correlated with negative emotions, suggesting that participants experienced increased negative perceptions of work-related stress. The Brief COPE scale analysis revealed that participants primarily used problem-focused coping strategies which involved practical strategies more than avoidant coping to mitigate the impact of the challenges they encountered.

The predictive analysis indicated that high levels of work-related stress were strongly associated with increased negative perceptions, and frequent use of problem-focused coping strategies. Additionally, the findings predicted that female participants were 11 times more likely to experience high levels of stress. However, this finding should be interpreted with caution as there were more female participants in this study sample. Furthermore, the levels of work-related stress were illustrated using a traffic light system, where **red** represents high level of stress, **yellow** represents medium level and **green** represents low level.

Chapter 6: Qualitative Findings

6.0. Introduction

In this chapter, I explored how registered nurses (in the adult and mental health fields) experienced and navigated the work-related challenges they encountered during the pandemic. The participants' accounts in the one-to-one interviews revealed that they displayed resilience in the face of the crisis, showcasing adaptive strategies and emotional strength. First, I presented the demographic characteristics of the participants, offering a description of participants' characteristics relevant to this study. Four themes were identified through reflexive thematic analysis, which examined the different aspects of the participants' experiences and responses. Each theme drew on the unique perspectives of the participants, supported by direct quotes that captured their voices.

6.1. Participants' descriptors

Twelve one-to-one interviews were conducted with the participants. The length of the interviews ranged from 25 to 60 minutes. The participants included six females, five males, and one individual who identified as other (non-binary, intersex, non-conforming). Of the participants, three were over the age of 40 years, four were between 31 and 40 years, and the remaining five were aged between 21-30 years. The years of professional experience were evenly distributed among the participants: five had been qualified for more than six years, five for between three and five years, and two had less than three years of experience. All participants were from an adult nursing background, with the exception of one who specialised in mental health nursing. Eight participants worked for either NHS Wales or NHS England, one worked in the private sector, and three were agency staff members. To maintain

anonymity, any possible identifiable data were removed. A summary of participants' demographic characteristics is outlined in Table 5.0.

Table 6.0: A summary of participants' demographic characteristics (n=12)

Pseudonyms	Gender	Age range	Number of years qualified	Field of practice	Main Employer
Participant 1	Female	41+	3-5	RN Adult	NHS
Participant 2	Male	41+	6+	RN Adult	NHS
Participant 3	Male	21-30	<3	RN Mental Heath	Private
Participant 4	Male	31-40	6+	RN Adult	Agency
Participant 5	Female	41+	6+	RN Adult	NHS
Participant 6	Female	21-30	3-5	RN Adult	NHS
Participant 7	Female	21-30	3-5	RN Adult	NHS
Participant 8	Female	31-40	3-5	RN Adult	NHS
Participant 9	Male	31-40	6+	RN Adult	NHS
Participant 10	Other	21-30	<3	RN Adult	NHS
Participant 11	Male	31-40	6+	RN Adult	Agency
Participant 12	Female	21-30	3-5	RN Adult	Agency

*Note: other (*Non-Binary, intersex, non-conforming)
RN: Registered Nurse

6.2. Themes

Four interconnected core themes and six sub-themes were identified from the interview data through reflexive thematic analysis (Figure 6.0).

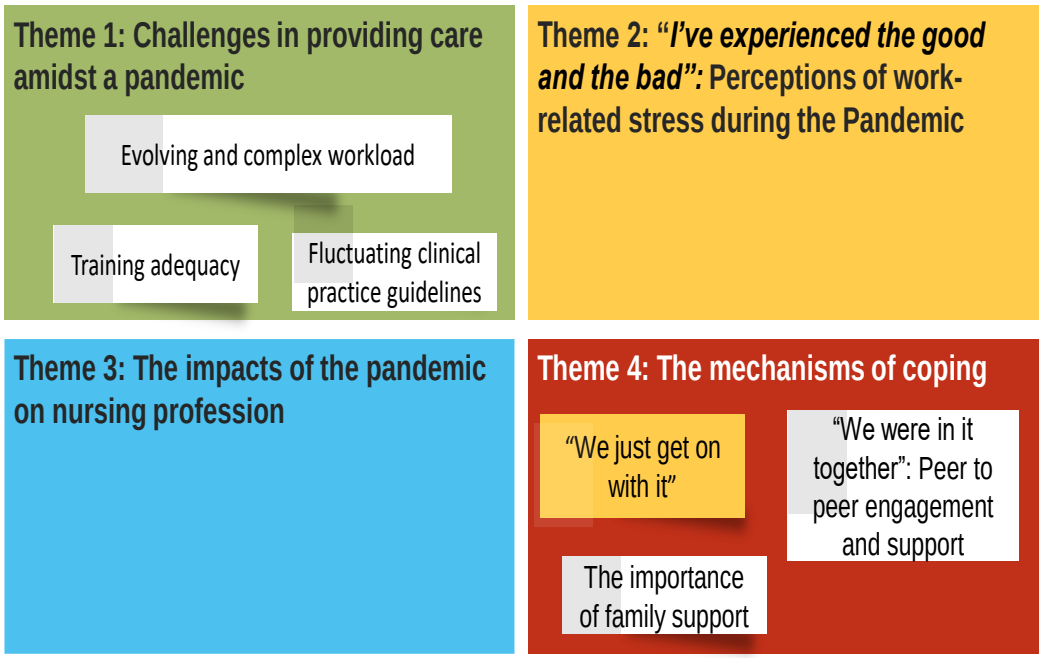


Figure 6.0: Illustration of themes and subthemes

The first and third themes related to the challenges participants encountered in caring for severely ill patients with COVID-19 during the SARS-CoV-2 pandemic, focusing on the evolving and complex workload, inadequate disaster training, inconsistency in clinical guidelines, and the resultant impacts on the nursing profession. The second theme revealed participants' perception of work-related stress, specifically, whether they perceived it as a hindrance stressor or a challenging stressor. The final theme "the mechanisms of coping", explores participants' coping strategies used in overcoming the work-related stress they encountered.

6.3. Challenges in providing care amidst a pandemic

This theme captured the challenges participants experienced when caring for severely ill patients with COVID-19 during the SARS-CoV-2 pandemic, highlighting

the evolving and complex nature of the workload, as well as feelings of being unprepared and unsupported in the face of fluctuating clinical practice guidelines. As expressed by one participant: "*we were just thrown in the deep end"* (Participant 7).

6.3.1. Evolving and complex workload

Workload patterns evolved in many hospital settings during the SARS-CoV-2 pandemic, with participants experiencing a significant increase in the complexity and intensity of their workload. The workload was described by participants as "heavy" due to the severity of the patient's conditions.

> *"The workload was high in a way that all the patients, they needed 1 to 1 care [close monitoring]… which you'll be kept on your toes really" (Participant 4)*
>
> *"When we had COVID, it was a different sort of workload because although we had less patients, the patients we had were generally much sicker…..the workload changed considerably…. it was heavy because the patients were very, very unwell". (Participant 5)*

As the majority of patients were severely ill with COVID-19, they required stringent barrier nursing and continuous close monitoring. This nature of care is not new in nursing. However, caring for patients during the pandemic was extremely challenging due to the limited understanding of the prognostic implications of the COVID-19 virus, the fear of patients' deteriorating rapidly, and the potential volume of deaths.

> *"I found that initially because we were unaware of what COVID was and how to sort of go about it,….. it was extremely difficult….to look after COVID patients on the wards…. I had quite a few patients who did deteriorate very quickly…… and unfortunately many of them did pass away…… It was incredibly hard. I mean, death is inevitable, especially in the nursing sector and it's something that all of, every nurse is going to face in some point in their nursing career. And that*

because it [death] was just constant, it [workload] was extremely, extremely hard". (Participants 7)

The heavy workload was further exacerbated by a heightened staff shortage in the hospitals. The high prevalence of COVID-19 infections among staff led to frequent absences, which significantly affected the staffing levels. Consequently, there were often insufficient staff to provide adequate care to severely ill patients, therefore making work an unpleasant experience, particularly for those working in Accident and Emergency Departments (ED) or Intensive Care Unit (ICU):

"We have colleagues as well contracting the disease and then they needed to be off sick for at least ten days. So there was less staff and more workload" (Participant 4)

"The staffing level was very minimal and because the staff started becoming sick, we started becoming short staffed. There wasn't enough staff on the ward to cover, look after the patients." (Participant 1)

"…..but somewhere along the line, colleagues would have to drop out [of work] because some would test positive. So the workload would have to be split on to those of us available.… a lot of unpleasant experience". (Participant 2)

Conversely, some participants who worked in high-acuity units such as ICU and ED reported increased staffing levels during the pandemic. Seemingly, staffing levels were determined based on the acuity of the patients in the units:

"……So we got extra nurses on each shift then". (Participant 9*)*

A participant further endorsed this view:

"…..within the emergency department…….they're [emergency department] pretty good at staffing in terms of agency [staff]….. they used a lot of agencies [nurses]". (Participant 11)

The use of PPE generated an increased workload. Throughout the pandemic, staff were required to wear PPE, such as aprons, gloves, visors, and surgical masks, in clinical areas, as well as between each patient's contact. The constant donning and doffing of PPE took considerable amount of physical effort, and made caring for patients excessively time-consuming. Furthermore, wearing PPE was uncomfortable.

> *"It took a long time to look after one patient with putting on the PPE, the apron, mask, glove and visor to go in to see the patient…. It was time-consuming just looking after each individual patient".*
> *(Participant 1)*

> *"The biggest challenge for me was the PPE….it made working quite uncomfortable because you'd be sweating and you'd still have to keep the PPE on and taking it off, washing your hands, putting it back on between each time you went around the rooms".*
> *(Participant 3)*

While recognising the need for PPE, the prolonged use of PPE resulted in physical discomfort. The underlying health conditions of some participants worsened:

> *"…most of the PPEs we reacted to. Some of us, like react to latex, especially the gloves come in latex and we were not consulted before they [the hospital Trusts] would gets those kind of gloves for us. We use them, had skin reactions". (Participants 2)*

> *"Wearing a face mask all shift it would like give me a sore throat. So really I was asymptomatic. It was the face masks, the surgical masks just irritate my throat and my asthma really". (Participant 9)*

> *"It was sort of summer then and like within the environment where we were looking after the patients, there was no ventilation, there was no windows in there and like it was too hot, like you'll walk out dripping of sweat and everything". (Participant 11)*

Many participants reported that wearing PPE hindered their ability to provide quality care effectively, and introduced communication barriers for certain patients. Communication with patients with hearing impairments or with patients from diverse backgrounds who may already struggle to understand due to language barriers was particularly challenging:

> *"It was barrier for some patients, especially the elderly, because they couldn't really hear you because of the face mask. With a lot of people in Wales from different countries, it was a barrier because they struggled to understand us anyway, let alone wearing all the PPE". (Participant 9)*

> *"While you were with the patients, first of all, you had to cover your face. We had patients who had hearing difficulties and like we could never communicate properly, like if they were hard of hearing. They couldn't lip read or I couldn't take the mask off to talk to them". (Participant 11)*

Participants also recounted the need to take engage with extra measures such as additional or duplicate documentation and using technology to communicate with patients' family members as they were restricted from visiting. These extra measures, while intended to mitigate cross-contamination in clinical areas and the spread of the virus, resulted in an increased workload for nurses, as the following participants articulated:

> *"The documentation was difficult to get hold of because they were being passed from one end of the room to other because, you had to keep it separate from where the patient was staying because of the COVID…..you had to fill in blank pieces of information on it first and then put it down, destroy it, and then put it down on the case notes… So that made the work double". (Participant 1)*

"….later on they introduced like iPad where you could video call patient relatives if patients wanted to talk to their family members…… it makes things a bit easier for patients to be able to at least see relatives….. but again that was difficult….. there was no formal training for the iPads. You'd find a lot of staff members would be like, I don't know how to get the patient relative to call on this iPad and only a few would know how to actually use the calling system for like the Microsoft Team system that we were using to call relatives at home". (Participant 8)

Although the introduction of iPad technology was intended to enhance virtual visits and facilitate communication between patients and their relatives, several participants reported facing challenges in using the technology. This was mainly due to inadequate training, which hindered their ability to fully utilise the communication system. While the participants acknowledged the importance of extra measures that extended beyond direct patient care, they perceived it as an "*added stress*" (Participant 9).

6.3.2. Training adequacy

A major concern among the participants was their level of preparedness in response to the SARS-CoV-2 pandemic. Participants articulated that their disaster training mainly focused briefly on the use of PPE, and that this was insufficient. Participants expressed a strong desire for regular, comprehensive disaster training and management to better equip them to function effectively in crises such as this:

"Just a one day training that was given on PPE. I see that as hugely inadequate"… Constant training for the nurse in dealing with pandemics and emergency situations….. Such things would keep us on our toes that would prepare us for situations that can pop up…… (Participant 2)

*"The only training we had really was donning and doffing [*of PPE*]. And just training with respiratory nurses and infection control….that's all we had really". (*Participant 9*)*

In clinical settings, the approach to learning was informal, with participants relying on conversations with other healthcare professionals:

"There wasn't any formal training, it was actually from the conversation that we built with the doctors and from other departments that we learned certain things." (Participant 11)

Some participants implied that "*inadequate training"* (Participant 2) had a negative effect on their well-being, and placed them in "*positions which were dangerous*" (Participant 10). This suggests that inadequate preparation left participants feeling vulnerable and exposed to dangerous working environments, highlighting the possible implications for the quality of care provided:

"It [working] was incredibly difficult, I think from actually caring for the patient to even looking after myself". (Participant 7)

"We didn't know, how safe we were as staff". (Participant 5)

An interesting aspect of this finding is that some participants acknowledged the provision of training by their employers, while critiquing its inadequacy. This balance of perspective indicates an awareness of the efforts made by employers to provide training to their staff, even in the face of criticism.

"…..there was very little training that was given to us…. But they [employer] still did give some training, so you can't discredit them [employer] on that score. They [employer] did what they could at that point". (Participant 2)

This perspective suggests a fair and balanced evaluation, rather than a complete condemnation given the sudden nature of the pandemic:

"I don't think any amount of experience would have helped anyone going through COVID-19 [the pandemic]… COVID-19 was just something that you really, I don't think any of the nurses were able to sort of, have enough training or be prepared for because we just didn't know it was happening. So no one knew what to do". (Participant 7)

6.3.3. Fluctuating clinical practice guidelines

A recurring issue in the interview data related to fluctuating clinical practice guidelines. Given the novelty of the SARS-CoV-2 pandemic, the government, stakeholders, policy makers and hospital management, lacked the necessary knowledge and experience to effectively respond. The absence of timely, relevant clinical practice guidelines from hospital management proved detrimental, fostering sentiments of frustration and an atmosphere of insecurity in the workplace. This diminished nurses' confidence in the management's ability to provide support during crucial emergencies such as this.

"…..it [fluctuating clinical practice guidelines] did make the place seem unsafe, but it also made you feel that management didn't actually know what they were doing and that, that's stressful but it's also irritating". (Participant 5)

"…..management not having up-to-date information [clinical practice guidelines] was sometimes unhelpful…….you always felt like sometimes you're behind with information". (Participant 8)

"I saw a lot of politics going on within the management because….. They started putting blame on COVID and started making changes which we know very clearly that it has nothing to do with COVID and then even with the Protective measures. They kept changing things every week, could clearly see that it was just because of the budget

issue and nothing to do with the change in regulations or anything. So I kind of lost that trust in the management". (Participant 12)

Participants expressed concern about the frequent changes in clinical practice guidelines in the workplace. Clinical practice guidelines rapidly changed on an hourly basis, making finding the right clinical practice guidelines and caring for patients increasingly difficult. Commenting on this, the participants expressed:

"It was quite a turbulent time because things move, things progressed very quickly, so you'd go in at the beginning of shift and you'd have a set of procedures to follow, and before the end of the shift, certainly in the early days, those procedures were changing not even daily. They were changing hourly, so it was actually quite a difficult time". (Participant 5)

"…..the rules and everything [clinical practice guidelines] were being changed on an hourly……. and it was being changed hourly. So that was really worrying. It was, you know, one minute we were told to wear a thin surgical masks, then we were told to wear the FFP10, and then we were told that we didn't have to wear them, then the surgical masks were fine with a visor, it was confusing and confusing". (Participant 10)

"The protocol [clinical practice guidelines] kept changing and like there was no sort of I would say there was no sort of reassurance….the protocol, it kept changing every few days". (Participant 11)

6.4. "I've experienced the good and the bad": Perceptions of work-related stress during the pandemic

The second theme captured the participants' perceptions of work-related stress experienced in caring for patients who were severely ill with COVID-19. Divergent perspectives were identified regarding whether the perceived work-related stress

experienced during the pandemic constituted a hindrance stressor (yielding negative outcomes) or challenge stressor (leading to positive outcomes). As one participant expressed:

> *"I've experienced the good and the bad". (Participant 5)*

The use of the term "good" in this context suggested positive outcomes, such as increased personal resilience in the face of challenges, while the term "bad" implied negative outcomes that may have potential detrimental effects on the well-being of participants, such as emotions of "being overwhelmed", "scared", and "depressed".

The majority of participants reported experiencing negative emotions during the SARS-CoV-2 pandemic. Predominantly, sentiments of feeling overwhelmed, grief, and depression were reported among the participants:

> *"The overall emotion was just emotions of just being overwhelmed. I was really sad, quite depressed as well"…(Participant 7)*

The fear of contracting coronavirus and potentially spreading it to their families and loved ones was pervasive. Participants expressed a deep sense of worry that they were putting themselves, their families, and their loved ones at risk. This fear led to feelings of unease and reluctance towards work, acknowledging the inherent risks associated with their profession and the potential consequences for themselves and their families.

> *"You risk in catching this disease that is killing everyone, and then you come back home and you bring that to your family. And majority of us feel we were doing it [going to work] because we didn't really have an option". (Participant 3)*

> *"To be honest, it was scary because everybody in the unit was scared…. because I had small kids, I did distance myself from*

working on those wards [infection wards]. And after we realised that the more of the minority group were contracting the illness [COVID-19] and they were dying from it. So I started distancing myself from working there [COVID-19 wards]". (Participant 4)

"I felt really worried going into it [work] because I had a family of my own and looking after my parents and my siblings…. So I felt really, really worried for myself and for my family". (Participant 7)

In spite of the fear and apprehension towards work, participants were compelled to continue working as they perceived a sense of professional obligation and also felt they had no choice. Unlike other professions that could work remotely to reduce exposure to the virus, participants voiced concerns that their role as nurses required direct engagement with patients with COVID-19, thus placing them at high risk.

"…… the fear was that realisation of what it meant to be a nurse. So it was kind of like other people who maybe work office jobs could kind of go home and hide away and keep themselves safe from this unknown disease. But you [nurse] didn't have a choice to just stay at home. You [nurse] had to still go out there and still face the unknown basically, and that's what was really frightening". (Participant 8)

This highlighted the challenges in the nursing profession, shedding light on the lack of autonomy that contributed to the heightened fear experienced by nurses who cared for patients with COVID-19 during the pandemic.

Despite the negative emotions experienced, the SARS-CoV-2 pandemic presented a positive aspect in that it created a unique opportunity for personal and professional development. Some participants reported acquiring valuable skills and feeling a sense of honour, as they supported patients who were without their families during this critical time.

“In some way you'd feel honoured that you're there with them [patients] to support them [patients]….” (Participant 8)

“There were essential skills I picked out because some like nursing with the patients using the CPAP and those patients who needed ventilation and also there were good skills I obtained. So, which means it was a good thing…” (Participant 4)

“Rather than stressful, I felt good actually because like I thought I was trying to help people……. It was like you feel like you're doing something great”. (Participant 11)

Some participants felt that they derived valuable elements from their experiences, conveying a sense of fulfilment in their role as nurses. Describing the differences they made in patients’ lives, their contribution to the care and treatment of patients during this crucial period reflected a deeper sense of pride and dedication to the nursing profession. The statement “I felt good” highlights the inherent reward within nursing, where the positive impact on patients’ lives can exceed the work-related stress and challenges inherent in the profession.

6.5. The impacts of the pandemic on nursing profession

The pandemic has had an impact on all aspects of nurses' lives, including psychological well-being, social (concern for the impact on their families) and professional. A common perception among participants was that the nursing profession was “not caring for its own” (Participant 10).

Participants recounted the risks and sacrifices tied to their roles, emphasising the financial and emotional burdens brought about by the pandemic. Concerns were raised about the pay structure, with participants feeling that it did not reflect the perceived risks and sacrifices inherent in their professional roles.

> *“So I think it [the pandemic] did have a direct impact because first hand, we saw how dangerous the job can be or how much sacrifice the job can take, and then when you see your pay check and you're now trying to still make ends meet and you're not feeling valued even just financially. It does break you down”. (Participant 8)*

Consequently, there was dissatisfaction and pervasive perception of being undervalued among the participants.

> *“I felt like we were very undervalued…... It's meant to be a caring profession that doesn't care for its own stuff”. (Participant 10)*

The discrepancies in pay structure and the consequent job dissatisfaction prompted some participants to reassess their career pathways. Some participants explained that they had considered alternative career pathways both in nursing and non-nursing such as retraining to be a nurse anaesthetist or leaving the profession and healthcare altogether.

> *“I want to go into, train to be a nurse anaesthetist”. (Participant 4)*

> *“I have looked into retraining though, and it is a thought that I've had quite a lot since COVID [pandemic] and even to the point that I have looked at going into something like Tesco's or Sainsbury's and you know, the pay isn't, don't get me wrong, it's not the same as a nurse, but it's only just slightly less than nurse and it's a lot less stress. But I do wonder sometimes, why I’m putting myself through all of this stress, unnecessary stress for a wage which I can get in a supermarket”. (Participant 10)*

A lack of flexibility and support further compelled some participants to transition between different work settings or adjust their work schedules.

> *“I really want to nurse……but I don't want to work 12 hour shifts. And you know, unfortunately there's a resistance to being flexible. I may*

well go down the route of working full time for the nurse bank because that does give you more flexibility". (Participant 5)

Despite the challenges encountered, some participants working during the SARS-CoV-2 pandemic experienced learning curves. Not only did participants acquire new skills, but they also developed a heightened awareness of their essential role in the management of patient care and infection control. This led to an increased sense of awareness, professional responsibility, and adaptability.

"I've definitely changed my infection control measures. I'm very self aware now and not just for me, but for other patients". (Participant 9)

"A lot of realisations that I actually came across just because of COVID…. I've taken a lot of life changing decisions that I've taken during this period". (Participant 11)

In addition, acknowledging the collaborative work and invaluable roles played by various healthcare team members substantially contributed to the overall proficiency of the nursing staff in delivering optimal patient care. This collaborative approach highlighted the importance of teamwork in challenging times. A participant expressed:

"I've come to realise the fact that everybody counts and every little role everyone plays in the hospital is important and it all adds up to we the nurse being able to give the maximum best of care to the patient, especially in times like COVID. I learned to appreciate everybody that I worked with and especially my colleague nurses as well. You can't underestimate or underrate the role of the nurse in situations like these". (Participant 2)

The improved collaborative teamwork throughout the SARS-CoV-2 pandemic may have boosted nurses' capacity to manage stress.

“Professionally because of the amount of stress everyone had to go through, I think I became more able to handle stress than I was before”. (Participant 1)

6.6. The mechanisms of coping during the pandemic

Participants identified several resources, skills, and strategies to help them ~~in~~ cope with the challenges encountered while caring for severely ill patients during the SARS-CoV-2 pandemic. They indicated a preference for problem-focused coping strategies over emotion-focused coping strategies as presented in the following sections. Participants’ coping responses to the challenges posed by the pandemic demonstrate their resilience in acute situations. While there are some interpretations of what constitutes optimal coping, problem-focused coping appears to be more effective than emotion-based coping in acute situations.

“You come in, you just know it's going to happen and you deal with it. You move on. You wake up the next day, you do the same thing again. I think at some point in my life it is going to come back and haunt me. But at the moment, it's just been pushed to the back of my head”. (Participant 10)

6.6.1. “We just get on with it”

The participants demonstrated resilience and adaptability in the face of adversity, prioritising professional responsibilities over personal emotions.

“I tried to take my emotions away from the workplace, so it doesn't cloud my judgement because we have to stay professional…. And I fully felt if I let emotions, if I look at it [effect of the pandemic] in an emotional way, I won't be able to perform as good as I would be, I don't let my emotions take over”. (Participant 3)

They emphasised the importance of self-care and managing their emotions effectively to sustain and foster resilience. The notion of *"taking time off to rest"* suggests an awareness of personal well-being and the significance of emotional control in providing patient care.

> *"I just take some time off, maybe just go to the staff room or quiet room, just to reset myself again and come back to the ward, because I need to be strong for my patients….(Participant 6)*

Amidst the challenging circumstances, participants articulated the need to stay strong, composed, professional, and focused on delivering optimal patient care.

> *"We just have to get on with it and you prioritise the ones [patients] which needed more care". (Participant 4)*

> *"It's like the swan effect…..I was constantly going around making sure everything was okay……. I feel that it was expected from me, I just carried on, and carried on ." (Participant 9)*

Participants also described relying on their fundamental infection control measures to cope with the pandemic. Measures such as washing hands, changing PPEs, and following infection control measures as they would in the clinical settings, were essential in promoting patient safety and minimising the spread of the virus.

> *"….just keeping our hand washed and changing our PPE and following the protocol [infection control] accordingly, as we would normally do in looking after patient using aseptic technique". (Participant 1)*

> *"….using your basic infection control understanding to help manage it as best as we could". (Participant 8)*

6.6.2. "*We were all in it together*": Peer to peer engagement and support

Another form of coping was through multidisciplinary team engagement and support, such as psychological, practical, and social support. A sense of unity among healthcare workers was an essential source of support and strength for the participants during the pandemic. Participants explained that they felt a stronger bond as a result of sharing their experiences and working closely together:

> *"…..It [support] created a bit of a good bond in terms of the teams, because I believe whatever did affect me as a nurse, the other team members also were affected in the same way. We all developed similar bonds. We did talk and share experiences….. it's created, made us get to know each other more professionally and also on a personal level with other team members as well". (Participant 2)*

This served as a source of encouragement and motivated them to "*keep going*" (Participant 12), fostering a supportive working environment within the team:

> *"Supporting each other as colleagues, like from colleague to colleague and being able to talk to each other when you're feeling frightened or feeling unsure and uncertain about things". (Participant 8)*

Despite the challenging circumstances, participants were inspired to go "*above and beyond"* (Participant 2) their regular duties in order to provide optimal care for patients. A culture of teamwork prevailed, in which colleagues willingly assisted each other in completing tasks. This highlights the importance of collaborative work, particularly in critical situations.

> *"Teamwork with the other staff on the board, the NAs [Nursing Assistants] and the other registered nurses, we all work together as a team to be able to finish our work on time and do the right thing for the patients as well" . (Participants 6)*

6.6.3. The importance of family support

Given the pandemic's restrictive measures to stay at home, many participants relied on their immediate family members to support with the challenging circumstances in their workplace. The participants recounted developing strong family bonds and support at home, and were able to express their concerns. The participants found relief in sharing their fears, anxiety, and emotions with their families. This approach helped the participants regulate their emotions associated with work-related stress.

> *"I did have amazing family support at home as well. So I was able to somewhat offload my concerns ……I was able to just express how I was feeling and they were there for me, how I needed them to be". (Participant 7)*

> *"Just talked to my partner. I think that was my biggest relief…… the thing that helped me cope was coming back home and speaking to my partner that helped me a lot". (Participant 12)*

Family support was evident in different forms including emotional comfort, social support, and practical support. Some participants recounted engaging in activities with their families that they would not typically partake in, such as exploring new hobbies. As stated by the participant:

> *"I got some gym equipment and then me and the family, me and the kids would exercise at home try to keep fit, do some exercise activities". (Participant 2)*

Engaging in family support led to reduced stress, improved mood, and enhanced physical and mental well-being. This highlights the indispensable role families play in difficult times.

> "

Participants who distanced themselves from their families to protect them from contracting the virus maintained regular communication through the use of digital technology, including video calls. This use of technology bridged the physical gap, which helped participants stay motivated and continue going.

> *"I lived alone, so spending a lot of time on face time with my daughter". (Participant 9)*

6.7. Chapter summary

The SARS-CoV-2 pandemic has brought about a multitude of challenges and a variety of experiences for nurses caring for patients on the frontline. Nurses reported an increased workload due to a shortage of staff, inadequate training, and the adverse effects of wearing PPE. The working environment was challenging, with frequent changes in protocols and poor dissemination of information.

The participants experienced heightened work-related stress due to excessive workload. They acknowledged that their workload increased due to unfamiliar duties and responsibilities resulting from staff shortages. Given that staff shortages preceded the acute phase of the pandemic, the increased number of people needed to staff the high-dependency areas meant that other areas that might have also needed more staff were under-resourced. Another element that contributed to the excessive workload was the use of PPE, which required physical effort and was time consuming. Inadequate training in response to the pandemic has added to nurses' lack of preparedness. Furthermore, the ambiguity and frequent changes in protocols made the workplace seem unsafe and increasingly challenging to care for patients.

The participants' experiences of caring for severely ill patients during the pandemic were of mixed emotions. Although they reported a range of negative emotions and

experiences, some recognised opportunities for personal and professional development.

Although the participants recounted struggling to manage their emotional distress, they expressed a profound sense of the duty of care that motivated them. The participants had a great sense of responsibility toward their patients and relied on professional solidarity and family support as coping mechanisms.

Chapter 7: Integration of Findings

7.0. Introduction

This chapter presents the integration of the key findings from the quantitative phase (Chapter 5) and qualitative phase (Chapter 6) of this study. By linking these findings, this chapter provides a comprehensive understanding of the research aims and objectives, offering deeper insights into the relationships between work-related stress, participants' perceptions of their experiences, and their coping strategies. This integration strengthens the conclusions of this study and enhances the applicability of the findings in practice and policy.

7.0.1 Overview of the study

Work-related stress is a significant challenge for the nursing workforce (Shambhavi 2023). In both the pre and post-pandemic eras, this stress remains pervasive within the nursing profession, driven by enduring structural, organisational, and workplace-based challenges, such as excessive and complex workloads, suboptimal staffing levels, adverse working conditions, poor quality leadership, and unhelpful management practices (Watts et al. 2023). Prolonged exposure to work-related stress has detrimental implications for nurses' psychological and physical health, which can lead to immune dysfunction, moral distress, and increased staff turnover (Noor et al. 2023; Watts et al. 2023). The unprecedented demands of the SARS-CoV2 pandemic exposed nurses and other healthcare professionals to extraordinary situations, raising considerable concerns about their health and well-being (Lee and Lee 2020; Rohita et al. 2023; Couper et al. 2021). A systematic review conducted by Watts et al. (2023) further revealed that the moral distress experienced by nurses and other healthcare professionals during the SARS-CoV-2 pandemic poses a significant risk of moral injury and an increased incidence of PTSD. These findings

highlight the need for a deeper understanding of nurses' experiences of work-related stress during and beyond the pandemic.

Literature on work-related stress and coping among UK registered nurses (and other healthcare professionals) during the SARS-CoV-2 pandemic (Couper et al. 2021; Maben et al. 2022; Dykes et al. 2022; Gray et al. 2022; Brooks et al. 2020; Liberati et al. 2021; Greenberg et al. 2021) is extensive. However, most of these studies focused broadly on the entire UK nursing and midwifery workforce and other healthcare professionals across various clinical settings, including acute, primary, community care, and care homes (Couper et al. 2021; Maben et al. 2022; Dykes et al. 2022; Gray et al. 2022; Brooks et al. 2020; Liberati et al. 2021; Greenberg et al. 2021). There is a dearth of research specifically addressing registered nurses' (Adult/Mental Health fields) experiences of working in hospital inpatient settings during the pandemic in Wales and England. Therefore, this study aimed to address this gap by examining and exploring the work-related stress experienced by registered nurses (Adult/Mental Health fields) who provided care for severely ill patients with COVID-19 in hospital inpatient settings in Wales and England during the SARS-CoV-2 pandemic.

As detailed in Chapters 5 and 6, several sources and impacts of work-related stress and coping strategies were identified in the data. These integrated findings (Table 7.0) constitute an original contribution to the knowledge on this topic by adding in-depth, context-specific information to the existing body of evidence.

Table 7.0: Matrix detailing data integration to address study aim and objectives

Study aim and objectives	Quantitative	Qualitative	Integrated findings
To understand the work-related stress experienced by registered nurses (adult/mental health fields) who cared for severely ill patients with COVID-19 in all hospital settings during the SARS-CoV-2 pandemic in Wales and England. The objectives were to: 1. Understand the work-related stress experienced by nurses caring for severely ill patients with COVID-19; 2. Determine nurses' perception of the work-related stress experienced in caring for severely ill patients with COVID-19 (Challenge/Positive or Hindrance/Negative) and to 3. Examine how nurses cope with work-related stress experienced in caring for severely ill patients with COVID-19.	Nurses caring for severely ill patients with COVID-19 during the pandemic experienced high levels of work-related stress as measured by the ENSS subscales.	High levels of work-related stress were attributed to increased workload, shortage of staff, inadequate training, adverse effects of wearing PPE, frequent changes in protocols, and poor dissemination of information. These factors collectively made the workplace seem unsafe and increasingly challenging in caring for patients.	1. **Work-related stressors:** Environmental factors -Increased workload, inadequate preparation, frequent changes in protocol and poor dissemination of information Personal characteristics – gender and years qualified.
	Nurses expressed a more negative perception of work-related stress experienced in caring for severely ill patients with COVID-19, as measured by the PANAS.	Although the majority of participants reported a range of negative perceptions (emotions) of fear, overwhelming, grief and depression, some recognised the opportunity for personal and professional development. Thus, divergent perspectives were identified regarding whether the perceived work-related stress experienced during the pandemic constituted a hindrance stressor (yielding negative outcomes) or challenge stressor (leading to positive outcomes).	2. **Perceptions of work-related stress**: Negative perceptions yielded outcomes such as fear, grief, overwhelming and depression. Positive perceptions of feeling honoured, and recognising an opportunity for personal and professional development
	Nurses engaged in problem-focused coping strategies more than in avoidant coping strategies.	Various resources, skills and strategies were identified to help participants cope with the challenges encountered while caring for severely ill patients during the SARS-CoV-2 pandemic. They had a great sense of responsibility toward their patients and largely relied on professional solidarity and family support as coping mechanisms.	**3. Coping strategies:** Social expectations and support are crucial coping strategies that empower nurses to manage the heightened work-related stress and demands associated with caring for severely ill COVID-19 patients.

7.1. Interpretation of integrated findings

This study adopted an explanatory sequential mixed-methods approach consisting of a quantitative phase followed by a qualitative phase. The quantitative phase utilised an online survey questionnaire that included three validated measures: the ENSS, PANAS, and Brief COPE, alongside demographic questions. The survey was completed by 516 registered nurses (adult/mental health fields) from Wales and England who worked in hospital inpatient settings and cared for patients with COVID-19. The subsequent qualitative phase involved one-to-one semi-structured interviews (*n=12*) with the same population criteria as the quantitative component. The quantitative data were descriptively analysed with inferences drawn, while data from the later phase were thematically analysed using Braun and Clark's (2006; 2019) reflexive thematic analysis.

The findings shed light on the challenges participants faced and the coping mechanisms adopted while providing care for patients during the SARS-CoV-2 pandemic. Many of the challenges and coping strategies identified in this study align with existing literature. However, this study offers new insights into the diverse (both positive and negative) perceptions of work-related stress and coping strategies among nurses during the pandemic. These perspectives have largely been overlooked in previous studies. The next chapter explores these findings in more detail.

Chapter 8: Discussion

8.0. Introduction

This chapter discusses and interprets the key findings in relation to the study objectives, the theoretical framework, and relevant literature. It outlines the study's original contributions to the existing knowledge and provides evidence-based recommendations for practice and future research. Finally, this chapter addresses the strengths and limitations of the study and details the strategy for disseminating the findings.

8.1. Work-related stressors

Participants who cared for severely ill patients with COVID-19 in hospital inpatient settings during the pandemic in Wales and England reported experiencing high levels of work-related stress as a result of personal and environmental factors. These findings are consistent with the Transactional Model of Stress and Coping (Lazarus and Folkman 1984), which views stress as a dynamic interaction between individuals and their surroundings. In this context, the pandemic has introduced extreme personal and environmental factors (stressors) that affect nurses' professional and personal lives. This profoundly influenced their perceptions, responses, and the delivery of care. The interaction between the participants' perceptions and environmental challenges highlights the transactional nature of stress. The level of stress was determined by how participants perceived and appraised demands as either manageable challenges or overwhelming threats. The high levels of stress experienced by participants indicated that external demands overwhelmed their available resources, further compounded by the systemic inadequacies revealed during the pandemic. The imbalance between the challenges and available resources to deal with these challenges indicates a disruption in the

transactional process, in which extrinsic demands exceed individual and professional resilience.

8.1.1. Environmental factors as determinant of work-related stressors

In this study, elements within the clinical environment, including increased workload as a result of staff shortages, inadequate preparation, frequent changes in protocols, and poor dissemination of information, were identified as key contributors to the overall stress participants experienced during the pandemic. These findings are consistent with those of previous studies (Poon et al. 2022). These factors played a significant role in shaping the participants' perceptions of work-related stress, profoundly impacting their experiences. As evidenced across the dataset, environmental factors in the workplace were a major concern for participants. These concerns were primarily related to the failure of the workplace to meet participants' essential needs regarding safety and preparation in caring for severely ill patients with COVID-19. For instance, concerns have been raised about the quality of PPE and its adverse effects on wearer's well-being. Although the beneficial use of PPE has been extensively supported by previous viral outbreaks (Fischer et al. 2014; Moore et al. 2005), prolonged usage can result in physical discomfort, unmet personal needs and worsening of underlying conditions. Wearing PPE also significantly affects the delivery of care by introducing communication barriers for some patients. The UK's Health and Safety Executive (HSE) legally requires employers to provide suitable PPE to employees at risk (HES 1992). Although PPE is primarily used to ensure the safety of healthcare workers and infection transmission control, surely its availability also significantly influences employees' willingness to attend work during a pandemic (Janson et al. 2022).

A healthy working environment for nurses is characterised by a safe, empowering, and satisfying atmosphere (Wei et al. 2018) that enables them to work at their full potential in delivering high-quality patient care (Johansen et al. 2021). Despite extensive recommendations for healthy working environments for nurses (Mabona et al. 2022), the participants' working environments showed limited resources, such as staff shortages, inadequate PPE, limited information, and increased job demands. Consistent with previous research, inadequate resources had a persistent detrimental effect on the mental and physical well-being of nurses (Galon et al. 2022; Putekova et al. 2023; Couper et al. 2021). The SARS-CoV-2 pandemic has exacerbated longstanding, systemic deficiencies inherent in healthcare work environments, further intensifying workplace stressors, particularly among nurses (Ulrich et al. 2022; Boudreau and Rhéaume 2024). Nurses who are exposed to enduring unfavourable working conditions often report poorer health outcomes (Bujacz et al. 2021). In this study, an assessment of health ratings before and during the SARS-CoV-2 pandemic revealed a decline in participants' self-reported health. Furthermore, unfavourable working conditions and work-related stress are acknowledged as risk factors for the development or progression of several physiological conditions, including cardiovascular and musculoskeletal disorders, as well as adverse mental health effects (Garzaro et al. 2022; Norful et al. 2023). In our sample, the pandemic impacted participants' anxiety, depression and work-related stress, with some living with Long-COVID. Therefore, this study recommends further research to explore strategies for improving nurses' working environments and well-being post-pandemic.

The absence of adequate major health threat training significantly impacted the participants' scope of practice, making it challenging for them to work to their fullest

potential. In this study, participants reported receiving minimal or no training in caring for patients with COVID-19, resulting in feelings of unpreparedness during the pandemic. While participants felt that they had basic competence in infection control measures, they expressed the need for regular education in major health threat response management to better prepare themselves for the pandemic. The nature of the pandemic posed unique challenges in that participants' basic knowledge of infection control could not have been sufficient, highlighting a disparity between their perceived and actual readiness. Consistent evidence has shown that while many nurses believe that they are prepared for disaster situations, their actual competencies and readiness often fall short of expectations (Suwaryo et al. 2022). This gap in knowledge and training can be attributed to factors such as, inadequate disaster-specific training (Labrague and Hammad, 2024; Younos et al. 2021), previous disaster experience (Barack and Alfred, 2013), and organisational support (Minehmorad et al. 2024). Farokhzadian et al.'s (2024) asserted that there is an ongoing crises in nurses' educational needs. According to their research on nurses' challenges in disaster response, disaster risk management training is often not reflected in the educational needs of nurses, with the training provided being superficial and not given sufficient priority (Farokhzadian et al. 2024). A scoping review demonstrated that a lack of proper disaster preparation and education for nurses is a global issue (Al Harthi et al. 2020). Studies have revealed that some nursing professionals are reluctant to engage in disaster response due to inadequate practical experience or formal training in this field (Al Thobaity et al. 2017). The gap in nurses' training and educational needs is further supported by the findings of Watanabe et al. (2024), who advocated the integration of disaster training into basic nursing education, a recommendation supported by the findings of this study.

Furthermore, evidence has shown that nurses without previous disaster experience struggle to gain practical knowledge or experience (Barack and Alfred, 2013). Therefore, establishing a global platform to share experiences and evidence-based practices in disaster nursing will enable nurses with little experience to develop practical knowledge and skills (Watanabe et al. 2024). Improved preparedness among nurses can potentially mitigate the impact of public health disasters (Suwaryo et al. 2022).

Despite recognising the inadequacy of their disaster training, the participants in this study demonstrated strong professional commitment to patients. Participants conceded that the unprecedented nature of the pandemic made it impossible for nurses to be fully prepared. This sentiment was echoed by Farokhzadian et al. (2024), who also emphasised that most of the challenges in disasters cannot be experienced in advance, making it difficult to provide comprehensive preparatory training. However, research has highlighted that inadequate skills, knowledge, and preparedness among nurses during a disaster can intensify adverse outcomes, expose them to adverse physical outcomes, such as infection and psychological distress, and cause service disruption (Chua et al. 2021). The findings of this PhD study support the findings of previous research on nurses' preparedness in disaster response (Baack and Alfred 2013; Farokhzadian et al. 2024; Davidson and Szanton, 2020; Nemati et al. 2020; Quigley et al. 2020), highlighting the inadequate disaster education in nursing.

These challenges were further compounded by fluctuating clinical practice guidelines, which contributed to a sense of insecurity in the workplace. These guidelines were intended to enhance patient care by providing evidence-based

recommendations (Wang et al. 2021b). However, their inconsistency became a source of confusion (Valiee and Salehnejad 2020), leading to diminished confidence in management. At the onset of the SARS-CoV-2 pandemic, several organisations, including individual NHS Trusts, NICE, the Health and Safety Executive, Public Health Wales/England, and the Department of Health and Social Care, issued frequent updates to clinical practice guidelines. Hasty and ongoing updates have created a complex and ever-changing informational landscape for healthcare professionals. As a result, frequent discrepancies between the guidelines and their practical implementation led to considerable confusion and heightened anxiety among participants. These factors further altered the already depleted working conditions of nurses in hospitals (Farokhzadian et al. 2024). However, it is important to note that the novel and unpredictable nature of the SARS-CoV-2 pandemic, especially in its initial stages, presented pronounced challenges for adequate preparation and a consistent global response effort (Maccaro et al. 2023). Studies have indicated that, while many nations were able to swiftly build capacities to combat COVID-19, most remained unprepared to handle pandemic challenges (Bell and Nuzzo, 2021), a finding reflected in this study.

The increasing incidence of natural and environmental disasters, as well as public health emergencies such as the SARS-CoV-2 pandemic, underlines the necessity of equipping the nursing workforce with the necessary knowledge, skills, and abilities required for effective response (Flaubert et al. 2021). Therefore, it is essential that nurses possess competencies, such as knowledge of disaster management, strong leadership abilities, and the capacity to adjust to rapidly changing situations. In response to this issue, the ICN and WHO have developed a disaster nursing framework that outlines three distinct phases of disaster management for nursing

competency (Al-Maaitah et al. 2019). They emphasised the importance of nurses acquiring sufficient knowledge, skills, and capabilities to identify potential risks, implement response strategies, and prepare for various disaster scenarios before unfolding. Second, they stipulated the need for nurses to deliver competent physical, psychological and comprehensive care to individuals, families and communities, with particular attention paid to vulnerable groups such as children and the elderly. Finally, they drew attention to nurses' role in post-disaster recovery and rebuilding. In summary, they posited that nurses must possess adequate knowledge and skills to provide care for affected communities, individuals, and families, not only in the immediate aftermath but also over an extended period (Al-Maaitah et al. 2019). Studies have demonstrated that integrating this framework into nursing training curricula, simulation training, and continuous professional development training can enhance nurses' confidence in disaster management (Loke and Fung, 2014; Chen et al. 2017). Through the establishment of these shared sets of competencies, there is global consensus on the preparedness of the nursing workforce to effectively cope with disasters (Fletcher et al. 2022). These skills are crucial for protecting nurses, meeting the needs of patients, and improving nurses' performance in delivering care during public health disasters (Baack and Alfred, 2013; Han et al. 2023).

This study adds to the growing body of evidence pointing to a link between poor working conditions and staff turnover (Pin-pin et al. 2013; Havaei et al. 2023). In the healthcare sector, turnover intention pertains to the process by which nurses leave or transfer within their organisation (Hayes et al. 2012). The pandemic has exacerbated unfavourable working conditions, resulting in an increase in nurses' turnover intentions. Consistent with a recent survey in the UK by the RCN (2024), 30% of participants in this study expressed their intention to leave the profession due to

immense pressure and stress from staff shortages, increased workload, and frequent changes in clinical guidelines and information. A recent RCN survey (2024) indicated that 10.4% of nurses left the NHS between 2022 and 2023. This resulted in an estimated 42,300 nursing vacancies in Wales and England (NHS vacancy statistics 2023). To address the nursing workforce challenges, some retired nurses returned to nursing during the pandemic (Noorland et al. 2021). In another effort, academic placement-paid roles were introduced to integrate final year nursing students into the workforce. The UK NMC approved the Emergency Education Standard, enabling all final year nursing students to be deployed in clinical practice roles (NHS Staff Council 2021). Similar strategies for tackling nursing workforce crises have been implemented around the globe (Gómez-Ibáñez et al. 2020; Casafont et al. 2021; Plamondon et al. 2022). It appears that providing nursing students with the opportunity to undertake paid roles during the pandemic significantly bolstered the NHS workforce at the height of the public health crisis (Green and Blunden 2022).

However, these short-term strategies were not sufficient to alleviate the pressure on the nursing staff during the pandemic. The participants in this study faced a worsening staff shortage, which led to increased workload. A substantial body of research has demonstrated that a secure and healthy working environment characterised by variables such as an appropriate staffing ratio of nurses to patients, professional autonomy, ample resources, and correspondence between nurses' increased workload and their skillset are closely connected to enhanced patient outcomes, heightened job satisfaction, and diminished work-related stress (Aiken et al. 2012; Copanitsanou et al. 2017).

Long-term solutions to this nursing shortage have relied heavily on the recruitment of international nurses and temporary (agency) staff. Since its establishment, NHS has employed overseas healthcare professionals, including qualified nurses (Smith et al. 2022). This approach remains crucial for addressing persistent vacancies in the nursing workforce (Beech et al. 2019), as the process of training nurses domestically can take at least three years or even longer and is considered expensive (Phiri et al. 2022). The total upfront costs of recruiting an international nurse range from approximately £10,000 to £12,000, which is significantly cheaper than the £26,000 spent on training a UK-based nurse for an undergraduate training post (Palmer et al. 2021). The UK's withdrawal from the European Union and European Economic Area (EU/EEA), known as BREXIT, has significantly impacted NHS international recruitment strategies. Historically, EU/EEA has been a major source of nurses for the NHS (Olsen 2022). However, following the BREXIT, there has been a notable shift towards recruiting nurses from developing countries such as India, the Philippines, and Nigeria (NMC 2023; Al-Yateem et al. 2022). Due to this extensive recruitment effort abroad, foreign nurses now constitute nearly half (49.9%) of the new registrants with the UK NMC (NMC 2023).

While international nurses are a valuable resource, their extensive recruitment raises ethical concerns (McKeown et al. 2021). The ethical dilemma revolves around the responsibility of developed countries to avoid compromising developing nations' healthcare systems by draining their trained healthcare workforce (Walton-Roberts 2022). Although migration can facilitate the exchange of nursing knowledge and professional development, the receiving country often benefits more than the sending country. The sending country often suffers from a diminished workforce and reduced access to high-quality care, as the most skilled nurses often emigrate

(Delucas 2014). Additionally, there is concern about how internationally trained nurses might impact the quality of healthcare services in host countries (Al-Yateem et al. 2022). International nurses who have various migration options present a challenge, as their length of stay post-recruitment remains uncertain (Pressley et al. 2023). Evidence indicates that international recruitment is not an exhaustive solution to the rising demand for healthcare professionals (Harrison, 2023). Even though it addresses immediate staffing shortages, it is not a viable long-term, large-scale solution (Phiri et al. 2022). It is preferable to avoid excessive reliance on international recruitment, instead fostering it for the purpose of promoting cultural interchange (Phiri et al. 2022).

An alternative to addressing the shortage of nursing staff has been the use of temporary nurses, particularly agency staff. The unfavourable working conditions in the NHS have led some permanent nurses to leave and pursue temporary roles, resulting in unfilled nursing vacancies (Dixon-Woods et al. 2024). In this study, some participants expressed a desire to work on a temporary basis due to the lack of flexibility in their current positions. During the pandemic, reliance on agency staff increased in response to the workforce challenges. However, growing evidence suggests that, while this strategy helps fill staffing gaps, it can be expensive and negatively affect patient care, the experiences of permanent staff, and continuity of care (Penny 2023). Despite efforts to attract healthcare professionals, negative work environments and policies continue to create challenges for workers (McKeown et al. 2021). Consequently, there is growing argument that retention strategies should take into consideration both personal and environmental factors (Hayes et al. 2012; Poon et al. 2022).

In addition, Chief Nurses in devolved UK nations have been advocating for improved working conditions for nurses to promote retention, well-being and job satisfaction . This involves flexible working patterns, improved work-life balance, and mental health support services (Rocchio et al. 2022). Studies have shown that effective leadership and team dynamics play crucial roles in supporting nurses and improving job satisfaction, both of which are vital for retention (Davey et al. 2022). Another key aspect of addressing nursing shortages is enhancing the educational pipeline for future nurses. Chief Nurses are calling for increased investment in nursing education, such as the extension of pre-registration nursing courses, and the empowerment of advanced practice nursing (Nígenda et al. 2021). There is also advocacy for bursaries among nursing students to increase the number of locally trained nurses. Withdrawal of bursaries for nursing students in the UK has significantly impacted recruitment, leading to a decline in the number of new entrants to the profession (Clifton et al. 2018).

Furthermore, Chief Nurses are also researching new care models and new strategies to reduce the impact of nursing shortages. This includes the use of advanced practice nurses and other healthcare practitioners to perform tasks currently performed by registered nurses, which will help reduce the strain on the nursing workforce (Nígenda et al. 2021). The introduction of technology to healthcare delivery, including virtual health services, has also been considered as a way to maximise nursing resources and enhance patient care (Rocchio et al. 2022). These approaches play an important role in long-term health and sustainability of the nursing workforce.

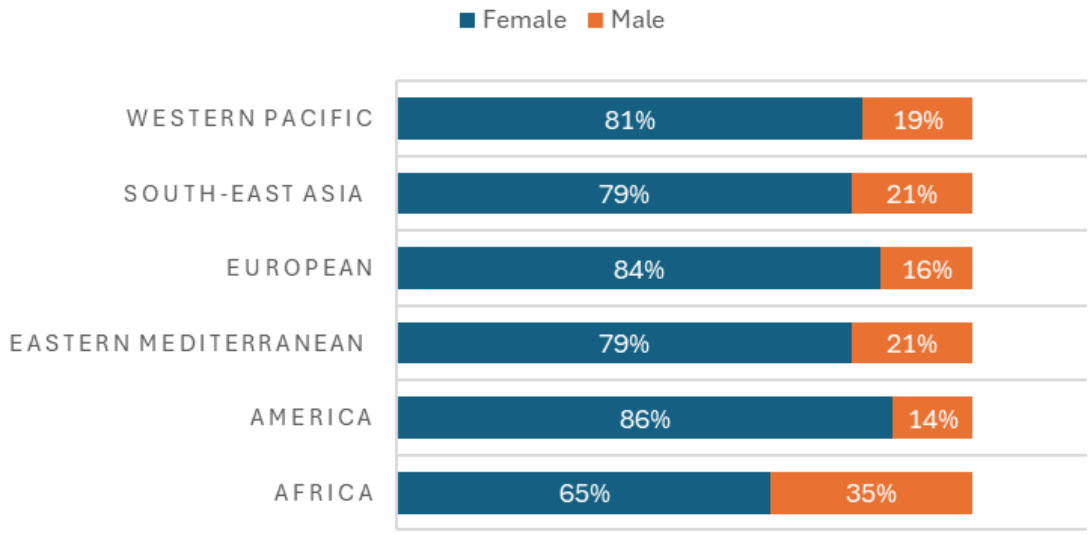
8.1.2. Personal characteristics as determinants of work-related stressors

Gender and number of years qualified significantly influenced the stress levels of participants who cared for patients with COVID-19 during the pandemic. Notably, female participants were found to experience heightened levels of stress when caring for severely ill patients with COVID-19 during the pandemic. This finding aligns with those of previous studies (Pappiya et al. 2023; Tsegaw et al. 2022; Zhang et al. 2020). Further evidence reinforcing the link between female gender and increased vulnerability to stress during infectious pandemics was reported in a rapid systematic review conducted by Sirois and Owens (2021). This review revealed that being female was a significant risk factor for stress in six different infectious diseases, including MERS, SARS, H1N1, H7N9, and SARS-CoV-2. Research further indicates that female nurses experience higher levels of stress compared to other genders in nursing staff when treating patients with COVID-19 (Lai et al. 2020). Additionally, female nurses who cared for COVID-19 patients reported worse mental health outcomes and higher levels of emotional exhaustion (Chen et al. 2021; Luceño-Moreno et al. 2020). Heightened stress among female nurses has been attributed to the dual roles they often navigate, balancing their professional duties with their personal and family responsibilities (Rabee et al. 2024). The conflict between these roles significantly contributes to their stress levels, reinforcing the finding that female nurses are particularly vulnerable to stress during infectious outbreaks (Sirois and Owens 2021).

In contrast, a study of mental health nurses found that male nurses experienced higher stress levels during the pandemic compared to their female counterparts (Zhang et al. 2022). This difference was attributed to the predominantly female nature of the nursing profession, in which female nurses may have benefited from

stronger peer support networks and a greater sense of workplace belonging, potentially mitigating stress (Zhang et al. 2022). Additionally, male nurses may face unique stressors, such as stigma around emotional expression, expectations of resilience, and role-related pressures, all of which could contribute to heightened stress levels. Understanding these gender-based differences is crucial when assessing the impact of work-related stress on nurses' well-being and developing targeted support systems. However, it is important to note that this finding contrasts with the current study, which was unable to draw statistical comparisons due to the relatively small number of male participants. Therefore, any firm conclusion should be interpreted with caution.

The number of male participants in this study was comparably small (n=28/515 quantitative components), reflecting the broader trend observed in the register of the NMC for Wales and England. Recent NMC data indicate that approximately 9.7% of male nurses and midwives are registered in Wales, whereas in England the figure is 11.3% (NMC registration 2023). As reported by the WHO, the nursing workforce has a substantial gender imbalance, with women making up a higher proportion of the workforce compared to men (Boniol et al. 2019). Globally, this highlights nursing as one of the most gendered professions in healthcare as illustrated in Figure 7.0 (Gauci et al. 2023).



Source: Data from National Health Workforce Accounts 2019

Figure 8.0: Global distribution of nurses by gender

The notion of nursing as a predominantly female-oriented profession has been supported by previous research (Takase et al. 2006; Bartfay et al. 2010). This perspective is embedded in the historical influence of Florence Nightingale's vision of modern nursing (Clayton-Hathway et al. 2020). Central to this notion is the belief that women have a natural inclination to care work, an extension of the traditional nurturing duties already performed by wives and mothers (Gauci et al. 2023). However, feminist researchers have challenged this idea, arguing that caring is not intrinsically gender-specific, but rather gender-neutral (Gauci et al. 2023) and socially constructed. Recent initiatives in the UK have aimed to break the stereotype of nursing, thereby encouraging more men to choose nursing as their career. These efforts have seen the number of male applicants to nursing programmes increased by more than 50% compared to previous years (Clayton-Hathway et al. 2020).

This study highlights the heightened work-related stress experienced by early career nurses during the pandemic. Transitioning from students to qualified nurses is inherently challenging due to gaps between theory and practice, high workloads, and work-life imbalances (Chen et al. 2021). The SARS-CoV-2 pandemic has exacerbated these challenges, exposing early career nurses to greater uncertainty and complexities in patient care. Without clinical experience, these nurses were especially vulnerable to the unprecedented and evolving nature of the pandemic. They struggled to adapt to increased workloads, frequent changes in clinical practice guidelines, and complex patient needs, all of which significantly increased their stress levels. These findings resonate with the existing literature, which highlights the difficulties faced by early career nurses transitioning to their roles during the pandemic (Crismon et al. 2021; Joseph et al. 2022). Early-career nurses often describe the overwhelming nature of this transition as "transition shock," feeling unprepared for the uncertainty and responsibilities they encounter (Crismon et al. 2021). This period is frequently characterised by emotional exhaustion, stress, and burnout (Joseph et al. 2022; Smythe and Carter, 2022). Participants in this study echoed these sentiments, emphasising the emotional and psychological toll of the pandemic on their professional and personal lives.

Acknowledging the inherent challenges in the transition from student to registered professional, healthcare institutions such as the NHS have introduced preceptorship programmes, recognising this period as crucial for developing nursing practice (Baldwin et al. 2020). Although not mandatory, UK NMC has encouraged all healthcare institutions to implement preceptorship as a structured framework to boost newly registered nurses' confidence and facilitate the application of theoretical knowledge to practical skills (NMC, 2020). Extensive research has demonstrated the

positive impact of preceptorship on newly qualified nurses' professional development, confidence, and readiness (Irwin et al. 2018; Forneris and Peden-McAlpine, 2009; Sandau et al. 2011). Despite the numerous benefits of nursing preceptorship, the accessibility of these transition programmes was severely impacted during the SARS-CoV-2 pandemic, with many programmes being moved online or cancelled altogether (Mitchell, 2022). The absence of nursing education and transition programmes left these nurses feeling unprepared to navigate the demands of their new roles and responsibilities during the pandemic (Casey et al. 2021). Previous research has indicated that without adequate measures to reduce stress levels, early-career nurses are more likely to leave the profession within two years of qualification (Taylor et al. 2019). In light of these challenges, there have been calls for preceptorship and other transition programmes to be made mandatory in all UK healthcare systems, highlighting their roles in reducing stress and supporting the professional development of early career nurses (Mitchell, 2022). Such initiatives not only have the potential to alleviate stress among nurses but also promote the overall resilience of the nursing workforce.

8.1.3. Perceptions of work-related stress

According to the Transactional Model of Stress and Coping (Lazarus and Folkman 1984), some individuals may perceive stressors as opportunities for growth and mastery, whereas others may view them as sources of harm or loss. The findings from this study align with this model, revealing divergent perspectives among nurses regarding whether work-related stress experienced during the pandemic was perceived as a hindrance stressor (resulting in negative outcomes) or a challenge stressor (leading to positive outcomes).

Participants in this study primarily reported emotional responses to work-related stressors, including fear, depression, grief, anger, and feelings of being overwhelmed. These emotions were linked to job dissatisfaction and a persistent sense of being undervalued, which was further exacerbated by concerns about low pay. Although the focus of this study was not on pay, participants in the one-to-one interviews expressed significant concerns about the alignment of nurses' pay with the perceived risks and sacrifices of their professional role. Pay is a fundamental aspect of the employer-employee relationship. When employees perceive the payment system as fair, it can have beneficial effects on recruitment and retention (Buchan et al. 2021). Conversely, when the pay system is perceived as unfair, it can lead to demotivation and a sense that efforts and competencies are not appreciated (Buchan et al. 2021). Evidence indicates that UK nurses' pay has consistently lagged behind that of other healthcare professionals (Cannings 2022), with average earnings failing to keep pace with inflation (Sanfey 2024). According to an analysis conducted by West et al. (2020), a substantial proportion of NHS nurses were dissatisfied with their pay. Furthermore, 61% of respondents to an RCN UK-wide survey (with a total of 7,720 respondents) considered their pay grade inadequate (West et al. 2020). This contributed to the sentiment of being undervalued.

The participants of this study reported feeling undervalued. The perception of personal and professional values is fundamental to the well-being of nurses and their ability to deliver high-quality care (Sanfey 2024). The participants of this study highlighted the significance of adequate remuneration, emphasising that job satisfaction and perceived worth are closely tied to financial compensation. Concerns over pay evoked strong emotional reactions among participants, with many feeling disheartened amidst extreme circumstances. Without doubt, nurses'

pay grading systems have played a significant role in motivating them to engage in industrial action (Sanfey 2024). Post-pandemic, there has been an increase in nurses taking industrial action in various parts of the world, including the UK, the US, Europe, Australia and Africa. At first glance, it appears that the primary reasons behind industrial action are disputes over pay, staff shortages, and working conditions that impact patient safety (Kalocsányiová et al. 2023). Although resorting to industrial action is always a last resort for nurses, the International Council of Nurses (ICN 2022) emphasised that the current circumstances necessitate such actions. The ICN asserted that the global industrial action undertaken by nurses is a necessary response to the failure of governments to address fundamental issues, such as the lack of recognition and value accorded to nurses, historical gender disparities, and inadequate remuneration and working conditions (ICN 2022).

The implications of industrial actions by nurses are a matter of ongoing discussion among researchers. While some researchers consider industrial action in healthcare to be morally indispensable, Essex and Weldon (2022) argued that it is not only healthcare workers who have an obligation to their patients, but also governments and employers have a responsibility to ensure the functioning of the healthcare system and to furnish healthcare workers with the resources necessary to perform their duties. The dedication exhibited by nurses during the pandemic and throughout their professional lives should be acknowledged by creating work environments that uphold, esteem, and appreciate their work (West et al. 2020).

While the majority of previous research has concentrated on the negative experiences of nurses during health crises (as discussed in the mixed-methods systematic review in Chapter 3), some participants of this study reported gaining

invaluable skills during these critical periods. Notably, the participants viewed work-related stressors as a unique opportunity for personal and professional advancement. Some participants gained advanced knowledge of infection control measures, and respiratory care, such as the use of non-invasive equipment. In light of the pandemic causing pneumonia, it has become essential for nurses to possess key respiratory skills (Roberts et al. 2021). These skills encompass the ability to conduct respiratory assessments, administer oxygen therapy, and perform airway management to provide effective care for patients with respiratory illnesses (Wallace and Angus 2021). Regardless of the area of clinical practice, researchers agree that all nurses should possess fundamental respiratory management skills (Leonardsen et al. 2020; Šajnić et al. 2022). Maintaining airway patency and preventing respiratory insufficiency are core elements of safe and effective nursing practice (NMC 2024). However, consistent with the literature (Roberts et al. 2021), this study uncovered that participants from certain clinical backgrounds, such as outpatient departments, and care of the elderly wards perceived themselves as having inadequate respiratory skills for caring for patients with COVID-19. Consequently, several participants acquired useful respiratory skills, such as administering non-invasive ventilation through informal learning experiences. According to the participants, developing proficient skills in respiratory nursing was widely acknowledged as a significant achievement.

Evidence has demonstrated that nurses operate within a constantly evolving healthcare environment where continuous learning is critical for professional growth, job satisfaction, and enhancing patient care (Skår 2010). The nursing code and revalidation process in the UK reinforce the need for nursing professionals to be dedicated to lifelong learners at all stages of their careers (Gerrish 2000).

Nevertheless, the pandemic has affected formal teaching and learning opportunities (Kumar et al. 2021), leading to increased reliance on informal learning in the workplace. Unlike formal learning, informal learning provides increased flexibility for learners, takes place in a broader range of settings, and is widely regarded as a valuable supplement to learning from experience (Eraut 2010). Joynes et al. (2017) found that informal learning opportunities tend to emerge under time pressures. In this study, participants reported relying on informal learning both in their workplace and at their own time to improve their understanding of the COVID-19 virus's prognosis and enhance their clinical skills. This recognition of the value of informal learning for personal and professional development aligns with the findings of Marsick (2006), who suggested that approximately 80% of skills are acquired through informal day-to-day interactions in the workplace. While there was potential for nurses to encounter outdated practices and irrelevant information, participants in the present study also benefited from informal learning, some of which was helpful. The recognition of prospects for personal and professional advancement suggests a favourable outcome despite these challenges.

Similar to the findings of Wang et al. (2023) in China, the participants in this study perceived professional benefits and development during the SARS-CoV-2 pandemic. Some participants viewed the pandemic as an opportunity for career development and believed their professional competencies had expanded. The findings of this study suggest a connection between personal and professional development and self-reflection. Although no statistical comparison was conducted, it appears that by reflecting on their experiences in caring for patients with COVID-19, participants claimed they were able to enhance their infection control awareness and fulfil their responsibilities more effectively as the pandemic progressed. The continuous

learning process through reflection may have facilitated greater understanding of the challenges faced by healthcare professionals during the pandemic.

This study has shown that, despite difficulties, nurses reported finding significance and purpose in their roles, emphasising their dedication and resilience (Wang et al. 2023). The participants expressed a deep sense of pride in their role, supported patients who were separated from their families, and underscored the profound impact of their caregiving responsibilities. This study highlights the importance of recognising nurses' experiences during the pandemic and their potential for personal and professional growth. Therefore, it is proposed that additional studies should be conducted with greater emphasis on nurses' personal and professional development experiences during this challenging time. Such investigations would enhance the comprehension of nurses' personal and professional development and may aid in retaining the nursing workforce during periods of adversity.

8.1.4. Coping strategies

The theoretical framework underpinning this study emphasises the substantial role that personal and environmental factors play in shaping individuals' coping mechanisms. However, the framework also acknowledges that the availability of resources and presence of constraints in specific contexts impact the effectiveness of these coping mechanisms. To be considered resourceful, it is necessary to possess a range of resources and/or the ability to locate and utilise them effectively in response to demand. These resources, whether readily accessible or requiring the development of skills to acquire them, are vital assets on which individuals rely. In this study, different coping mechanisms were identified as beneficial in mitigating the difficulties experienced by participants in caring for patients with COVID-19.

Primarily, these strategies were dependent on the resources and support accessible to participants. The majority of the participants reported their reliance on their professional roles as nurses and social support from their colleagues, relatives, and friends.

With the emergence of the pandemic, societal expectations have influenced how nurses managed their responsibilities and stressors. Faced with extraordinary difficulties, nurses were held to a demanding standard for unwavering their commitment, and resilience (Bennett et al. 2020; Uysal and Demirdağ 2022). They felt compelled to uphold these elevated expectations while simultaneously grappling with their own anxieties about contracting the virus and worrying about the well-being of their loved ones (Evgin and Şener Taplak 2023). While these expectations may not always result in stress, they can extensively shape an individual's thoughts, emotions, behaviours and coping strategies (Lazarus and Folkman 1984). As evidenced in previous research, when nurses perceived stressors to be normal due to social expectations, they tended to use emotion-focused coping strategies more than other coping strategies (Chui et al. 2021). Our study findings suggest that, increased societal expectations impacted the coping and stress management strategies of the participants. The participants predominantly turned to both problem-focused and emotion-focused coping strategies, thereby balancing addressing the stressors practically and managing their emotions. This finding is consistent with Puto et al. (2021), who observed that adaptive flexibility in coping strategies was common among nurses who provided care for patients with COVID-19, compared to their counterparts who worked with non-infected patients. Evidence points to the fact that adaptive coping which involves the use of both problem-focused and emotion-

focused coping strategies has a significant positive impact on the well-being of nurses (Dimunová et al. 2021).

During the pandemic, the concept of the "nurse as hero" emerged, which captured the shared experience of countless frontline nurses who endangered their personal safety to attend to individuals infected with the virus (Mohammed et al. 2021). This concept of a hero was publicised through a variety of means, including the use of physical gestures such as applause for healthcare professionals, media coverage that showcases their hard work, and general public expressions of gratitude. Available data demonstrate that, although the hero narrative is often associated with optimistic outcomes, it tends to overlook the emotional challenges and inner turmoil that frontline nurses experience (Mohammed et al. 2021). Instead, the hero narrative has contributed to the normalisation of risk for nurses, and has been utilised to justify the necessity for a prompt and dedicated response in situations of uncertainty, political polarisation, and under-prepared healthcare systems (Mohammed et al. 2021). Conolly et al. (2022) examined this through the Maslow's (1943) seminal work around hierarchy of needs, which posits that basic physiological needs such as shelter, food, water, clothing and security must be met before achieving self-actualisation. They critically questioned the practicality of nurses demonstrating resilience during the SARS-CoV-2 pandemic when their basic needs were often unmet (Conolly et al. 2022). Based on their study findings, Conolly et al. (2022) argued that healthcare organisations and policymakers exploited the concept of resilience during the pandemic to normalise emotional labour and organisational feeling rules. Nurses internalised the imposed concept of resilience, reframing their emotions and sacrifices as an expected societal norm which prevented them from speaking out or seeking change (Conolly et al. 2022). These sentiments were

echoed in our study findings. Although participants responded to social demands or expectations in dealing with difficulties, they reported that this resulted in moral distress and burnout, as nurses were expected to sustain high levels of performance against the backdrop of inadequate support and resources (Watts et al. 2023). It is vital to acknowledge and address the emotional, psychological, and physical obstacles confronted by nurses, while also providing the necessary resources to facilitate more effective coping mechanisms (Maben and Bridges 2020; Maben et al. 2022).

Eliciting social support from colleagues, friends, and family has proven to be effective for frontline nurses during the pandemic. A recent scoping review showed that social support plays a crucial role as a coping mechanism for frontline nurses during the pandemic (Iddrisu et al. 2023). In line with other studies, strong social support networks, particularly from colleagues, other healthcare professionals, friends, and family, have been reported to mitigate workload stress and enhance resilience among nurses (Ali et al. 2022). Support from family members and friends is linked to increased resilience in nurses, providing emotional sustenance, alleviating stress and anxiety, and serving as a protective factor against emotional exhaustion and psychosocial symptoms (Zhang et al. 2020). However, heavy reliance on personal support networks as a primary coping mechanism raises concerns about the sustainability and equity of such support systems. This also highlights the possibility that employers neglect their duties to safeguard their employees and ensure their well-being (Feeney and Collins, 2015). It is important to consider that not all nurses have access to strong personal support networks, and the burden on personal relationships can sometimes exacerbate stress rather than alleviate it.

While the participants in this study indicated that they engaged in social support as a means of reducing their stress and emotional exhaustion, it is possible that this perspective overlooks the systemic issues present within healthcare environments that contribute to work-related stress. It is problematic to rely solely on social support to compensate for inadequate working conditions and systemic failures, as it places an unfair burden on social relationships to fill the gaps that should be addressed by institutional policies and structural reforms. Hence, the establishment of healthy social support networks and post-registration trainings/education within healthcare environments is important. However, it must be supplemented by extensive institutional changes that address the underlying factors contributing to work-related stress in nurses (de Cordova et al. 2024). This integrated strategy is essential for guaranteeing a healthy work environment and fostering nursing professionals' well-being and resilience. For example, a recent study found that when nurses felt appreciated and supported, they were able to meet their obligations to their profession and to patients (de Cordova et al. 2024).

8.2. Study strength and limitations

One of the key strengths of this study is its mixed-methods approach, which was effective in gaining a comprehensive understanding of participants' experiences. The integration of quantitative data with qualitative narratives provided a rich perspective, as the qualitative insights gave depth and context for the quantitative findings. This integration of data sources increased the robustness and reliability of the findings of the study. The consistency observed between the quantitative and qualitative data reinforced the findings of the study, enhancing the credibility of the study's outcomes.

Furthermore, the application of thematic analysis to qualitative data facilitated the identification of rich themes, offering detailed insights into the factors that hindered

as well as encouraged registered nurses to provide care to patients with COVID-19 during the pandemic. This approach allowed for a nuanced exploration of the personal and situational factors that affect nurses' experiences and coping strategies.

Additionally, the study's focus on frontline nurses in real-time during the pandemic is a notable strength, as it captures lived experiences as they unfolded, rather than relying on retrospective accounts. This timeliness enhances the authenticity and relevance of the findings. Moreover, the use of online recruitment and data collection methods enabled participation from a geographically diverse sample, helping broaden representation and capture a range of experiences.

8.2.1. Limitations

The study sample consisted of registered nurses in the Adult and Mental Health fields who provided care to patients with COVID-19 during the pandemic in hospital inpatient settings. Nurses who were on leave, not actively engaged in patient care at the time, who worked in the community, paediatric nurses or those who retired early were excluded to maintain a focused and homogeneous sample. While this decision ensured that the findings reflected work-related stress specific to acute hospital inpatient adult care settings which differed from other care settings, it may have a substantial influence on the transferability of the results. In particular, the challenges and experiences encountered by registered nurses in hospital inpatient settings may not be entirely reflective of those experienced by nurses in other care settings, where resources, patient characteristics, and institutional regulations could differ substantially. The excluded nurses may have possessed valuable insights or unique experiences that could have offered a more comprehensive understanding of the impact of the pandemic on the nursing profession.

In addition, despite the implementation of recruitment strategies aimed at increasing the participation of Black, Asian, and ethnic minority registered nurses, the sample does not sufficiently reflect the diversity of the nursing workforce. The proportion of registered nurses from Black, Asian and ethnic minorities in our study (8.8%) did not reflect the increasing ethnic diversity of the UK's nursing and midwifery workforce (27.7%). The findings of this study are predominantly representative of the experiences and viewpoints of white registered nurses. The lack of diversity within the sample presents a notable limitation, as it may lead to biased findings and reduce the ability of the study to capture the full variety of experiences of the target population. The importance of inclusivity in research cannot be overstated, as it enhances the validity of the findings and contributes to the development of effective and equitable interventions and policies for diverse communities. Consequently, future studies should prioritise the inclusion of a more representative sample of registered nurses from diverse healthcare settings and ethnic backgrounds to improve the generalisability of the results.

As a substantial proportion of participants were recruited through social media platforms, this raises the possibility that the sample may not accurately reflect the opinions of registered nurses who do not have access to these platforms. The use of social media as a recruitment method introduces the potential for bias, as it may favour registered nurses who are more proficient in technology, while possibly excluding those who are less inclined to engage with social media. Therefore, it is possible that the findings of this study may not comprehensively represent the diverse viewpoints and experiences of the entire nursing workforce. In addition, the qualitative data collection for this study commenced at the time when nurses were involved in industrial action demanding a pay rise. This may mean that they were

more focused on industrial action, which led to reduced willingness to participate and engage in the study. Minimising delays in the collection of data in mixed-methods sequential studies can help capture more accurate and timely data, thereby reducing the risk of response bias.

Although the three validated instruments, ENSS, PANAS, and Brief COPE, utilised in this study have been widely applied in various contexts within nursing research, they fall short of fully capturing the unique dimensions of work-related stress, emotional experiences, and coping strategies of nurses during the pandemic. Specific elements, such as unprecedented fear of infection, the impact of prolonged isolation from the family, specific coping strategies, and the emotional toll of witnessing high mortality rates by nurses, were not adequately addressed by these tools. This highlights the need for the development and validation of pandemic-specific instruments designed to enable nurses to express their complex and unique experiences in exceptional situations.

Furthermore, this study relied on self-reported data, which may have been subject to recall bias. Additionally, the study did not include a breakdown between adult and mental health nurses, limiting the ability to examine potential variations in work-related stress and coping strategies between the two groups. This is particularly relevant given that the ENSS is less applicable to mental health nursing, as it primarily focuses on stressors more commonly encountered in acute and general medical settings. Future research should consider using specialised stress assessment tools tailored to different nursing disciplines to ensure a more accurate representation of work-related stressors.

Lastly, it is essential to recognise that this study was carried out by a single investigator (PhD student), who is also a registered adult nurse. Despite extensive efforts to reduce bias and accurately represent the viewpoints of the participants, the lack of investigator triangulation remains a significant limitation, rendering the study susceptible to observer bias. Academic supervisors played a crucial role in ensuring methodological rigor by consistently requesting examples of the working process, such as quotes supporting conclusions, to validate the findings. The supervisory checks ensured adherence to methodological standards without directly conducting the research alongside me. While academic supervisors provided valuable guidance and constructive feedback to shape the study, the involvement of a second reviewer would have independently confirmed the selection and allocation of codes and the development of themes, minimising the risk of bias. Investigator triangulation, which involves multiple researchers in the data analysis process, is a widely accepted approach to improving the credibility and reliability of research findings. Consequently, the absence of multiple researchers in the current study constitutes a notable methodological limitation that must be taken into account when evaluating the results.

8.3. Implication of the study findings

The study findings have implications for clinical practice, policy and research, contributing to our understanding of nurses' experiences during serious health threats and how to mitigate the work-related stress associated with their experiences.

8.3.1. Implication for future research

This study has laid the foundation for subsequent studies and highlights areas that warrant additional investigation. The work-related stressors identified in this study

existed prior to the pandemic and were exacerbated by the exceptional circumstances of the pandemic. Nevertheless, it remains uncertain whether these stressors will diminish post-pandemic, given other exceptional circumstances such as worsening staff-to-patient ratios, workforce attrition, and periods of industrial action. Therefore, future research should explore the persistence of these stressors and their long-term effects. In addition, studies should focus on developing strategies to mitigate these challenges in an evolving healthcare environment.

Moreover, given the tendency for many to view emotions negatively in such circumstances, it is crucial for researchers to examine positive emotions in order to comprehend how working during a pandemic or health emergency can be beneficial. Future research could focus on the personal and professional growth of nurses during the pandemic and whether this growth is retained over time.

8.3.2. Implication for clinical practice

Substantial evidence strongly supports the necessity for prompt investment in improving nurses' working conditions. This includes optimising their workload by guaranteeing sufficient staffing levels and enhancing health and safety in the workplace. Participants in this study reported that favourable working conditions have the potential to increase job satisfaction among nurses and reduce staff turnover. Developing an environment that is supportive, and provides access to reliable health and safety information, resources, and training opportunities in the workplace, particularly during health crises, can reasonably be assumed to help alleviate work-related stress among nurses.

Despite the numerous challenges presented by the pandemic, the participants in this study identified opportunities for personal and professional development. Although

these opportunities do not constitute a positive outcome of the pandemic as a whole, they represent significant aspects of the response. The participants highlighted the importance of acknowledging and leveraging personal and professional growth as a means of addressing and alleviating the negative emotions associated with the crises. Existing literature supports the notion that acquiring knowledge and skills in managing health emergencies can foster ongoing development and potentially mitigate some of the adverse effects experienced during the pandemic. Therefore, it is recommended that clinical managers should play an active role in supporting this development by providing relevant resources, addressing educational needs, and facilitating reflective practices.

8.3.3. Implication for policy

The findings of this study have implications for policymakers in the re-evaluation of nursing and management practices. The increasing need to enhance the mental and physical well-being of nurses has been clearly highlighted. To address this issue, nurse leaders and managers should implement evidence-based interventions and strategies. These could include raising awareness and ensuring easy access to mental health resources, including local innovations, such as CANOPI. Additionally, creating a more flexible working environment to meet diverse needs is crucial. This might include providing clinical supervision, assigning clinical mentors, offering well-being support, and implementing efficient time management training, as well as allowing sufficient time away from the clinical environment to rest and recuperate.

Moreover, this study highlights the importance of evidence-based interventions designed to bolster resilience and coping mechanisms among nurses, particularly in hospital settings. Integrating structured support within the workplace is vital to

enhancing these skills. Given that early career nurses are especially vulnerable to work-related stress, prioritising their well-being is essential for both improving patient care and fostering a healthier work environment. Effective management of these factors can lead to better outcomes both during and after health emergencies.

8.4. Contribution to knowledge

This study provides empirical evidence on the high levels of work-related stress experienced by registered nurses (Adult/Mental health fields) caring for severely ill COVID-19 patients in Wales and England. It identifies key stressors, including increased workload, staff shortages, inadequate training, frequent protocol changes, poor communication, and the adverse effects of PPE. The findings highlight variations in stress perception, with some nurses viewing it as a hindrance (negative) while others see it as a challenge (potentially adaptive), thereby, providing a distinct understanding of stress appraisal in healthcare settings which many studies have overlooked. Additionally, the study examined coping strategies, offering insights for improving mental health support, workforce planning, and crisis preparedness in future healthcare emergencies.

8.5. Recommendations

Participants were asked towards the end of their interviews to suggest possible recommendations to enhance nurses' effectiveness during future outbreaks. Three main strategies emerged from the data: staff retention, support for well-being, and training.

8.5.1. Staff retention

The shortage of nursing staff in the healthcare sector raises concerns regarding its impact on staff well-being, patient care, and the effectiveness of current staff. While

the emergence of the SARS-CoV-2 pandemic has worsened this issue, it is vital to recognise that the pandemic is not the only root cause for nurses leaving or intent to leave the profession (Martin et al. 2023). Factors such as working conditions and increased demand for pay have been identified as the main causes of the shortage of nurses. To address this issue, healthcare providers have been recruiting "overseas nurses" as interventions. However, participants in this study suggest that this effort is not sufficient to address the underlying issue of dissatisfaction among the "home" trained staff.

Evidence has shown that heavy reliance on temporary nurses, particularly agency staff, costs NHS £10 billion over the last three years (RCN 2023), with no benefit to NHS (Penny 2023). In line with the RCN, participants in this study suggested that measures such as a review of nurses' pay structure and pay rise along with other financial incentives, should be implemented as part of an integral strategy. These measures are not just aimed at attracting new nurses to the profession, but also at fostering an environment that encourages and promotes the retention of current nursing staff.

8.5.2. Support for well-being

The well-being of nurses has substantial consequences for multiple stakeholders, including the nurses themselves, patients, the organisation, and society at large (Wakefield et al. 2020). The emergence of the SARS-CoV-2 pandemic has led to elevated levels of burnout and stress among nurses (Martin et al. 2023). Consequently, the participants in this study recommended the implementation of an ongoing well-being service system for nurses. They suggested that services, such as support groups outside work could be beneficial to nurses. This recommendation aligns with the findings of Whybrow et al. (2023), who explored the experiences of

nurses in accessing bespoke psychological therapy services. They found that well-being services, such as cognitive behavioural therapy (CBT), a psychological therapy focusing on the relationship between cognition, emotions, physical sensations and behaviours, provided nurses with a valuable space to gain perspective on their roles, embrace their humanity and vulnerability, and develop more effective coping strategies (Whybrow, et al. 2023). This highlights the importance of employers ensuring that nurses have access to confidential, independent, and self-referring psychological therapy services (Whybrow et al. 2023).

When discussing strategies to support nurses in coping with the challenges of their work environment, it is imperative for employers to play a more proactive role in facilitating problem-focused coping and social support. Problem-focused coping, which deals with stressors or challenges practically, can be facilitated by creating an atmosphere that encourages cooperation and communication, as well as a firm support system. This would allow nurses and other healthcare professionals to effectively deal with work-related challenges, thereby decreasing the likelihood of stress overload and burnout.

Social support is one of the major factors facilitating problem-focused coping, and should be provided to nurses. This could be anything from building team cohesion to mentorship programmes, to having the leadership accessible and listening to the staff. Nurses often rely on social support networks within the workplace to feel as though they have a support system, that someone understands them, and that they are encouraged to do the best job that they can despite the great emotional and physical demands of their jobs.

When nurses are over-reliant on emotion-focused coping strategies such as suppression of feelings, and avoidance, they tend to experience burnout and in extreme cases develop PTSD. Therefore, employers must implement programmes similar to CANOPI, which emphasises building resilience, peer support, and mental health resources including psychological first aid. These strategies can help to minimise the emotional stress of nurses and other healthcare professionals.

8.5.3. Training

Furthermore, participants recommended that healthcare providers prioritise the provision of regular training in the areas of infection control, disaster preparedness and the management of emergency health disasters. Nurses wanted regular training to equip them with the skills and knowledge to effectively manage outbreaks. Recurring natural disasters, particularly the recent pandemic, have emphasised the need for healthcare professionals, particularly nurses, to be adequately prepared for disaster management. It is of utmost importance that extensive and all-inclusive educational programmes be accessible to nurses and all healthcare professionals to improve their preparedness and leadership abilities in the context of disaster management.

8.6. Dissemination of the results

In order to maximise the benefits of this study's findings for both registered nurses and all healthcare professionals, a range of dissemination strategies should be employed to effectively communicate the results to a wider audience. These strategies (Appendix L) were developed based on evidence-based approaches to translate knowledge into practice.

8.7. Conclusion

The current study highlighted the considerable work-related stress experienced by nurses during the SARS-CoV-2 pandemic and examined the primary coping mechanisms they utilised to manage these stressors. The participants faced numerous challenges during the pandemic, including increased workload, staff shortages, inadequate training, the demanding nature of PPE, and a constantly evolving clinical environment. These factors collectively contribute to elevated stress levels in already demanding work environments.

Despite the various challenges posed by the pandemic, the current study revealed notable resilience and commitment among nurses. Many participants identified opportunities for personal and professional growth amidst these difficulties, reflecting their capacity to adapt and develop professionally even under severe stress. Given these insights, it is imperative for healthcare organisations and policymakers to consider the findings of this study and implement targeted interventions to support nurses' mental well-being. Addressing core issues, such as staffing shortages and inadequate training, while fostering environments that enhance resilience and professional development, will be essential in ensuring the continued provision of high-quality patient care and the well-being of nurses.

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Appendices

Appendix A: Registration of the MMSR on PROSPERO

NIHR | National Institute for Health Research

PROSPERO
International prospective register of systematic reviews

Experience and coping strategies of nurses caring for patients with severe viral disease during an outbreak (pandemic/epidemic): a mixed-methods systematic review and narrative synthesis

Citation

Eunice Temeng, Chris Bundy, Elizabeth Gillen, Rachael Hewitt, Rachael Pattinson, Anna Sydor, Tessa Watts, Dean Whybrow. Experience and coping strategies of nurses caring for patients with severe viral disease during an outbreak (pandemic/epidemic): a mixed-methods systematic review and narrative synthesis. PROSPERO 2021 CRD42021253378 Available from: https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42021253378

Review question

1. What factors influence the experience of nurses caring for patients with severe viral disease during severe respiratory infection outbreak?

2. How does the experience impact on nurses' health and wellbeing (physical, social and psychological)?

3. How does the experience impact on nurses' professional identity and intention to stay in the profession?

4. How does the experience affect patient care?

5. How does the experience affect collaborative working with other healthcare professionals (multidisciplinary teamwork)?

6. What can be learned from the above for SARS-CoV-2 and future outbreak/pandemic/epidemic/disaster?

Searches

We will systematically search the following electronic databases from 2003 to present: MEDLINE, CIHAHL, PsycINFO, ASSIA, and Scopus. Literature search terms and strategies will be developed in collaboration with a specialist librarian using medical subject headings (MeSH).Only research published in peer-reviewed journals in the English language will be included.

Search terms will include:

Experience: "Experience" (MeSH) OR perception OR "lived experience" OR opinion OR understanding OR belief OR view OR judgement OR attitude OR perspective

AND

Influenza outbreak: "influenza outbreak" (MeSH), OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu", OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-2" OR "coronavirus"

AND

Nurses: "Nurse" (MeSH) OR "Registered Nurse" OR "nursing staff " "Staff nurse" OR "Nursing Associates" OR "Associate Nurses"

Types of study to be included

Inclusion criteria: The review will consider primary studies including qualitative, quantitative, and mixed methods designs.

Exclusion criteria: Case studies, Commentaries, conference abstracts, editorials, unpublished empirical data, not published in the English language, social care, grey literature.

Condition or domain being studied

Influenza outbreak/pandemic/epidemic/disaster pose unparalleled threats and challenges to the healthcare system. Frontline nurses in direct contact with severe viral disease patients during outbreaks face high levels of risk, the uncertainty of job role, workload, emotional strain and various difficulties in their professional role. This systematic review, therefore, intends to explore how these experiences and coping strategies impact on individuals.

Participants/population

Inclusion criteria: Registered Nurses, Nursing Associates/ Associates Nurses working in tertiary healthcare settings (hospitals) who directly cared for patients with severe viral disease during an outbreak.

Exclusion criteria: Student nurses, Apprentice nurses, midwives, other healthcare professionals or nurses working in hospitals but did not directly care for patients with severe viral disease during an outbreak or working in primary healthcare settings or community settings.

Intervention(s), exposure(s)

Over the past 18 years, there have been four major influenza outbreaks across the globe. These outbreaks which include SARS, Middle Eastern Respiratory Syndrome (MERS), Swine Flu (H1N1) and currently SARS-CoV-2 (Covid-19) have had their toll on the nursing workforce however, quantitative, qualitative and mixed-methods articles have not yet been systematically reviewed.

Exposures: nurses involved with direct care of patients with severe viral disease.

Comparator(s)/control

Not applicable

Context

Articles on hospital settings from all countries in the world published in English.

Main outcome(s)

The impact of the experiences on nurses: wellbeing; professional identity; carer intentions; patient care; multidisciplinary collaborative work and their reported coping strategies.

Measures of effect

Not applicable

Additional outcome(s)

Effects of the experiences on nurses' wellbeing, professional development, collaborative work, patient care and what can be learned from the experiences and interventions.

Measures of effect

Not applicable

Data extraction (selection and coding) [1 change]

Two reviewers will independently screen titles and abstracts of retrieved papers using Joanna Briggs Institute (JBI) tools. Full text papers will be retrieved for all titles and abstracts meeting the inclusion criteria. Full text papers will also be retrieved for titles and abstracts for which there is uncertainty. Two reviewers will independently screen full text papers for inclusion. Where there is disagreement a third reviewer will help to resolve the discrepancy. Reasons for exclusion of full text papers will be recorded by each reviewer. The reviewers will extract relevant information such as author(s), setting, sample characteristics, objective, outcomes, instrument, and main findings from each included study.

Risk of bias (quality) assessment

The quality of articles will be assessed using the JBI critical appraisal checklists.

Quantitative studies (and quantitative component of mixed methods studies) selected for retrieval will be assessed for methodological validity using the JBI standardized critical appraisal tools for quantitative studies.

Qualitative studies (and qualitative component of mixed methods studies) selected for retrieval will be assessed for methodological validity using the standardized critical appraisal instrument for qualitative studies.

Strategy for data synthesis

Data extracted from both quantitative and qualitative studies, including data from quantitative and qualitative data from mixed methods studies will be synthesised using JBI's convergent integrated approach.

For the quantitative and qualitative data to be integrated, the quantitative data will firstly be converted into "qualitized data" by two researchers independently. This process will involve transformation of the quantitative data into textual narrative in a way that tells the story of the findings from the included quantitative studies whilst responding to the review questions. Data will be transformed using thematic analysis, a process involving the identification of patterns through the process of coding quantitative data.

The integration and synthesis will involve assembling the qualitized data with the qualitative data. Thematic synthesis will be used. The process involves coding, categorising and grouping the qualitized and qualitative data to produce descriptive themes. This will be undertaken by two reviewers independently. The findings will be displayed in a summary of findings table and in narrative form.

Analysis of subgroups or subsets

Not applicable

Contact details for further information

[redacted]

Organisational affiliation of the review

Cardiff University

Review team members and their organisational affiliations [1 change]

Type and method of review

Intervention, Narrative synthesis, Service delivery, Synthesis of qualitative studies, Systematic review

Anticipated or actual start date

01 April 2021

Anticipated completion date

02 August 2021

Funding sources/sponsors

No funding to report

Conflicts of interest

Language

English

Country

Wales

Stage of review [2 changes]

Review Completed published

Details of final report/publication(s) or preprints if available [1 change]

https://doi.org/10.1111/
jocn.16711
13652702,
0,

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

Adaptation, Psychological; Humans; Narration; Pandemics; Patient Care; Virus Diseases

Date of registration in PROSPERO

07 May 2021

Date of first submission

06 May 2021

Stage of review at time of this submission [1 change]

Stage	Started	Completed
Preliminary searches	Yes	Yes
Piloting of the study selection process	Yes	Yes
Formal screening of search results against eligibility criteria	Yes	Yes
Data extraction	Yes	Yes
Risk of bias (quality) assessment	Yes	Yes
Data analysis	Yes	Yes

Revision note

Updated with access to publication link

The record owner confirms that the information they have supplied for this submission is accurate and complete and they understand that deliberate provision of inaccurate information or omission of data may be construed as scientific misconduct.

The record owner confirms that they will update the status of the review when it is completed and will add publication details in due course.

Versions

07 May 2021
27 June 2021
03 August 2021
16 December 2024

Appendix B: MMSR search strategies

Medline 04/05/21

Search ID#	Search Terms	Search Options	Actions
S6	S1 AND S2 AND S3	**Limiters** - Date of Publication: 20030101-20211231; English Language **Expanders** - Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (334) | View Details | Edit
S5	S1 AND S2 AND S3	**Limiters** - English Language **Expanders** - Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (367) | View Details | Edit
S4	S1 AND S2 AND S3	**Expanders** - Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (383) | View Details | Edit
S3	("Nurses" (MeSH) OR "Registered Nurses" OR "Nursing Staff" OR "Staff Nurses" OR "Nursing Associates" OR "Associate Nurses" [tiab])	**Expanders** - Apply related words; Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (111,400) | View Details | Edit
S2	("influenza outbreak" (MeSH) OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-2" OR "coronavirus" [tiab])	**Expanders** - Apply related words; Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (352,575) | View Details | Edit
S1	("Experience" (MeSH) OR "perception" OR "lived experience" OR "opinion" OR "understanding" OR "belief" OR "view" OR "judgement" OR "attitude" OR "perspective" [tiab])	**Expanders** - Apply related words; Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (1,941,514) | View Details | Edit

CINAHL 04/05/21

Search ID#	Search Terms	Search Options	Actions
S6	S1 AND S2 AND S3	**Limiters** - Published Date: 20030101-20211231 **Expanders** - Apply equivalent subjects **Narrow by Language:** - english **Search modes** - Boolean/Phrase	View Results (175) | View Details | Edit
S5	S1 AND S2 AND S3	**Expanders** - Apply equivalent subjects **Narrow by Language:** - english **Search modes** - Boolean/Phrase	View Results (191) | View Details | Edit
S4	S1 AND S2 AND S3	**Expanders** - Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (206) | View Details | Edit
S3	("Nurses" (MeSH) OR "Registered Nurses" OR "Nursing Staff" OR "Staff Nurses" OR "Nursing Associates" OR "Associate Nurses" [tiab])	**Expanders** - Apply related words; Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (116,667) | View Details | Edit
S2	("influenza outbreak" (MeSH) OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-2" OR "coronavirus" [tiab])	**Expanders** - Apply related words; Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (118,107) | View Details | Edit
S1	("Experience" (MeSH) OR "perception" OR "lived experience" OR "opinion" OR "understanding" OR "belief" OR "view" OR "judgement" OR "attitude" OR "perspective" [tiab])	**Expanders** - Apply related words; Apply equivalent subjects **Search modes** - Boolean/Phrase	View Results (564,753) | View Details | Edit

PsycINFO 04/05/21

▼ **Search History** (5) View Saved

	# ▼	Searches	Results	Type	Actions	Annotations
☐	5	limit 4 to (english language and yr="2003 - 2021")	230	Advanced	Display Results | More	
☐	4	1 and 2 and 3	276	Advanced	Display Results | More	
☐	3	("Nurses" or "Registered Nurses" or "Nursing Staff" or "Staff Nurses" or "Nursing Associates" or "Associate Nurses {tiab}").mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	62258	Advanced	Display Results | More	
☐	2	("influenza outbreak" or "pandemic" or "epidemic" or "disaster" or "severe acute respiratory syndrome" or "SARS-CoV" or "Middle East respiratory syndrome coronavirus" or "MERS-CoV" or "Swine flu" or "H1N1" or "Avian Influenza" or "H5N1" or "Covid-19" or "SARS-CoV-2" or "coronavirus {tiab}").mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	29544	Advanced	Display Results | More	
☐	1	("Experience" or "perception" or "lived experience" or "opinion" or "understanding" or "belief" or "view" or "judgement" or "attitude" or "perspective {tiab}").mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]	1318312	Advanced	Display Results | More	

ASSIA 04/05/21

	Set ▾	Search	Databases	Results	Actions
☐	S6	("Experience" (MeSH) OR "perception" OR "lived experience" OR "opinion" OR "understanding" OR "belief" OR "view" OR "judgement" OR "attitude" OR "perspective" [tiab]) AND ("influenza outbreak" (MeSH) OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-2" OR "coronavirus" [tiab]) AND ("Nurses" (MeSH) OR "Registered Nurses" OR "Nursing Staff" OR "Staff Nurses" OR "Nursing Associates" OR "Associate Nurses" [tiab]) ✔ Limits applied	Applied Social Sciences Index & Abstracts (ASSIA)	552	Actions ▾
☐	S5	("Experience" (MeSH) OR "perception" OR "lived experience" OR "opinion" OR "understanding" OR "belief" OR "view" OR "judgement" OR "attitude" OR "perspective" [tiab]) AND ("influenza outbreak" (MeSH) OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-2" OR "coronavirus" [tiab]) AND ("Nurses" (MeSH) OR "Registered Nurses" OR "Nursing Staff" OR "Staff Nurses" OR "Nursing Associates" OR "Associate Nurses" [tiab]) ✔ Limits applied	Applied Social Sciences Index & Abstracts (ASSIA)	552	Actions ▾
☐	S4	("Experience" (MeSH) OR "perception" OR "lived experience" OR "opinion" OR "understanding" OR "belief" OR "view" OR "judgement" OR "attitude" OR "perspective" [tiab]) AND ("influenza outbreak" (MeSH) OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-2" OR "coronavirus" [tiab]) AND ("Nurses" (MeSH) OR "Registered Nurses" OR "Nursing Staff" OR "Staff Nurses" OR "Nursing Associates" OR "Associate Nurses" [tiab])	Applied Social Sciences Index & Abstracts (ASSIA)	689	Actions ▾
☐	S3	("Nurses" (MeSH) OR "Registered Nurses" OR "Nursing Staff" OR "Staff Nurses" OR "Nursing Associates" OR "Associate Nurses" [tiab])	Applied Social Sciences Index & Abstracts (ASSIA)	19,434	Actions ▾
☐	S2	("influenza outbreak" (MeSH) OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-2" OR "coronavirus" [tiab])	Applied Social Sciences Index & Abstracts (ASSIA)	27,421	Actions ▾
☐	S1	("Experience" (MeSH) OR "perception" OR "lived experience" OR "opinion" OR "understanding" OR "belief" OR "view" OR "judgement" OR "attitude" OR "perspective" [tiab])	Applied Social Sciences Index & Abstracts (ASSIA)	310,817	Actions ▾

Scopus 04/05/21

Search history Combine queries... e.g. #1 AND NOT #3

6	(TITLE-ABS-KEY ("Experience" OR "perception" OR "lived experience" OR "opinion" OR "understanding" OR "belief" OR "view" OR "judgement" OR "attitude" OR "perspective")) AND (TITLE-ABS-KEY ("influenza outbreak" OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-... View More	3,060 document results
5	(TITLE-ABS-KEY ("Experience" OR "perception" OR "lived experience" OR "opinion" OR "understanding" OR "belief" OR "view" OR "judgement" OR "attitude" OR "perspective")) AND (TITLE-ABS-KEY ("influenza outbreak" OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-... View More	3,230 document results
4	(TITLE-ABS-KEY ("Experience" OR "perception" OR "lived experience" OR "opinion" OR "understanding" OR "belief" OR "view" OR "judgement" OR "attitude" OR "perspective")) AND (TITLE-ABS-KEY ("influenza outbreak" OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-... View More	3,548 document results
3	TITLE-ABS-KEY ("Nurses" OR "Registered Nurses" OR "Nursing Staff" OR "Staff Nurses" OR "Nursing Associates" OR "Associate Nurses")	468,693 document results
2	TITLE-ABS-KEY ("influenza outbreak" OR "pandemic" OR "epidemic" OR "disaster" OR "severe acute respiratory syndrome" OR "SARS-CoV" OR "Middle East respiratory syndrome coronavirus" OR "MERS-CoV" OR "Swine flu" OR "H1N1" OR "Avian Influenza" OR "H5N1" OR "Covid-19" OR "SARS-CoV-2" OR "coronavirus")	618,969 document results

Appendix C: MMSR excluded studies at the critical appraisal stage

Ahmad, A.S. 2020. Effect of covid-19 pandemic on psychological attitudes' for nurse workers at isolation hospitals in baghdad city. Indian Journal of Forensic Medicine and Toxicology 14(4), pp. 2503–2507. Available at: http://www.ijfmt.com/issues.html.

Fan, J. et al. 2020. A qualitative study of the vocational and psychological perceptions and issues of transdisciplinary nurses during the COVID-19 outbreak. *Aging* 12(13), pp. 12479–12492. Available at: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emexa&NEWS=N&AN=632259764.

Marsaa, K. et al. 2021. Pride and Uncertainty: A Qualitative Study of Danish Nursing Staff in Temporary COVID-19 Wards. *Journal of hospice and palliative nursing : JHPN : the official journal of the Hospice and Palliative Nurses Association* 23(2), pp. 140–144. Available at: http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=149225066&site=ehost-live&scope=site.

Saricam, M. 2020. COVID-19-Related Anxiety in Nurses Working on Frontlines in Turkey. Nursing and Midwifery Studies 9(3), pp. 178–181. doi: 10.4103/nms.nms_40_20.

Zhang, Y. et al. 2020. Stress, Burnout, and Coping Strategies of Frontline Nurses During the COVID-19 Epidemic in Wuhan and Shanghai, China. *Frontiers in Psychiatry* 11, p. 565520. Available at: http://www.frontiersin.org/Psychiatry.

Appendix D: The Study Ethics Approval Letter

School of Healthcare Sciences
Ysgol y Gwyddorau Gofal Iechyd

Interim Head of School and Dean /Pennaeth yr Ysgol Dros Dro a Deon Professor David Whitaker

Cardiff University
Eastgate House
35-43 Newport Road
Cardiff
www.cardiff.ac.uk

Prifysgol Caerdydd
Ty Eastgate
35 – 43 Heol Casnewydd
Caerdydd
www.caerdydd.ac.uk

27 January 2022

[redacted]

Research project title: Understanding Registered Nurses' Experiences of Caring for Severely Ill Patients with COVID-19 in Hospital Settings during the SARS-CoV-2 Pandemic: The **NECESSARY** study

SREC reference: REC857

The School Of Healthcare Science Research Ethics Committee reviewed the above application via its proportionate review process.

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.

Please see attached documentation

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 with highlighted changes 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 HCAREEthics@cf.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 HCAREEthics@cf.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 e.g.

- End of project report ONLY;
- Annual reports;
- Periodic reports from and/or visits to the Chief/Principal Investigator;
- Oral updates to the Committee (by the Chief/Principal Investigator);
- Establishing a project-specific monitoring provision.]

The Committee must be informed when your research project has ended. This notification should be made to HCAREEthics@cf.ac.uk within three months of research project completion.

Complaints/Appeals

If you are dissatisfied with the decision made by the Committee, please contact Dr Kate Button, School Ethics Officer in the first instance to discuss your complaint. If this discussion does not resolve the issue, you are entitled to refer the matter to the Head of School for further consideration. The Head of School may refer the matter to the Open Research Integrity and Ethics Committee (ORIEC), where this is appropriate. Please be advised that ORIEC will not normally interfere with a decision of the Committee and is concerned only with the general principles of natural justice, reasonableness and fairness of the decision.

Please use the Committee reference number on all future correspondence.

The Committee reminds you that it is your responsibility to conduct your research project to the highest ethical standards and to keep all ethical issues arising from your research project under regular review.

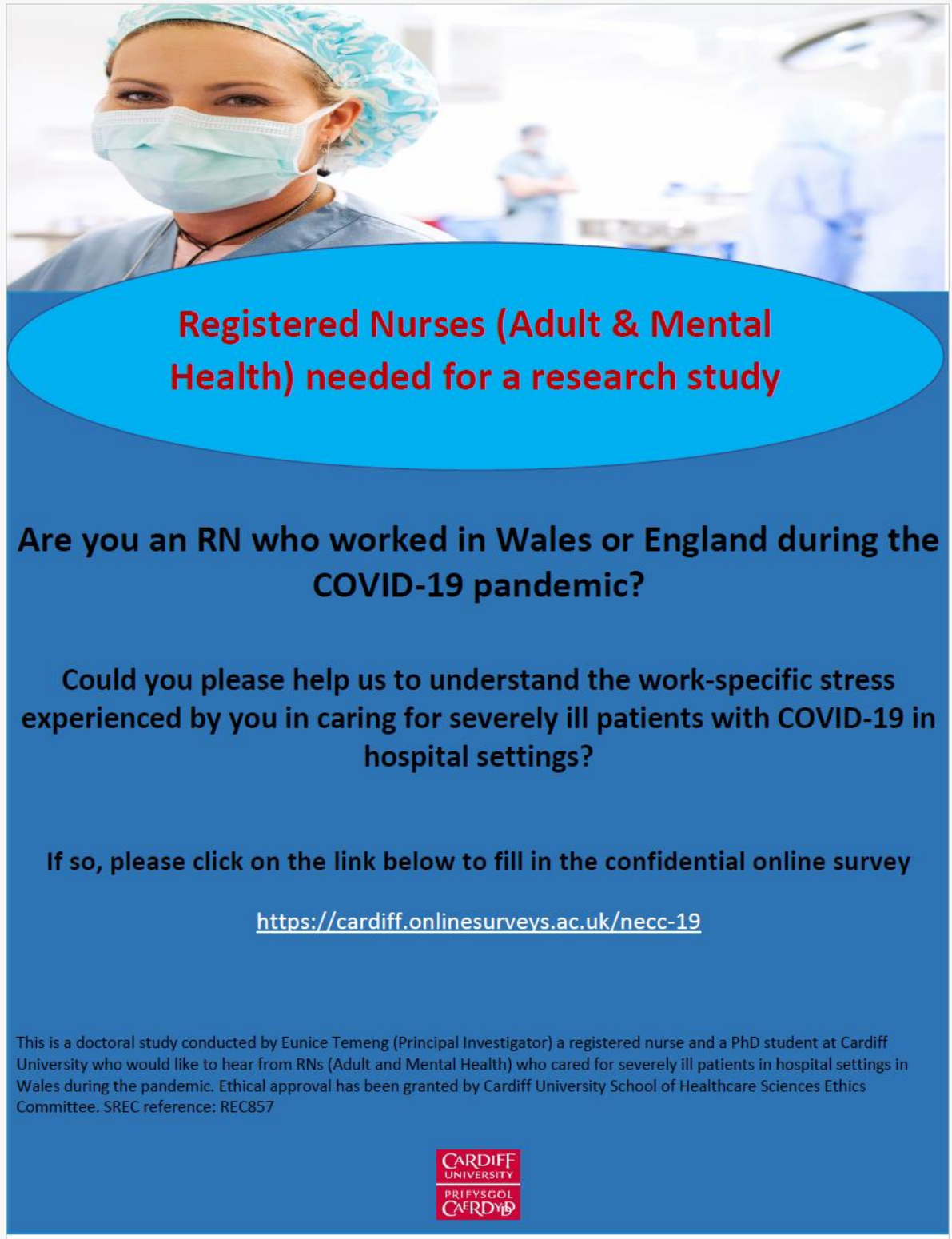
You are expected to comply with Cardiff University's policies, procedures and guidance at all times, including, but not limited to, its Policy on the Ethical Conduct of Research involving Human Participants, Human Material or Human Data and our Research Integrity and Governance Code of Practice.

Yours sincerely,

[redacted]

Appendix E: The Study recruitment flyers

English version for the online survey



English version for the One-to-one interviews

Registered Nurses (Adult & Mental Health) needed for a research study

Are you an RN who worked in Wales or England during the COVID-19 pandemic?

Would you be interested in participating in a one-to-one interview to help us to understand the work-specific stress experienced by you in caring for severely ill patients with COVID-19 in hospital settings?

For more information, please email temenge@cardiff.ac.uk

Interviews will be conducted via phone or video calls.

This is a doctoral study conducted by Eunice Temeng (Principal Investigator) a registered nurse and a PhD student at Cardiff University who would like to hear from RNs (Adult and Mental Health) who cared for severely ill patients in hospital settings in Wales during the pandemic. Ethical approval has been granted by Cardiff University School of Healthcare Sciences Ethics Committee. SREC reference: REC857

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

Welsh version

Angen Nyrsys Cofrestredig (Oedolion ac Iechyd Meddwl) ar gyfer astudiaeth ymchwil yng Nghymru

Ydych chi'n nyrs gofrestredig fu'n gweithio yng Nghymru yn ystod pandemig COVID-19?

Allech chi ein helpu i ddeall y straen yn gysylltiedig yn benodol â'r gwaith a brofoch chi wrth ofalu am gleifion difrifol wael â COVID-19 mewn ysbytai?

Os felly, llenwch yr arolwg cyfrinachol ar-lein

https://cardiff.onlinesurveys.ac.uk/necc-19

Astudiaeth ddoethurol yw hon a gynhelir gan Eunice Temeng (Prif Ymchwilydd), nyrs gofrestredig a myfyriwr PhD ym Mhrifysgol Caerdydd a hoffai glywed gan nyrsys cofrestredig (Oedolion ac Iechyd Meddwl) fu'n gofalu am gleifion difrifol wael mewn ysbytai yng Nghymru yn ystod y pandemig. Mae cymeradwyaeth foesegol wedi'i rhoi gan Ysgol y Gwyddorau Gofal Iechyd Prifysgol Caerdydd. Cyfeirnod SREC: REC857

CARDIFF UNIVERSITY
PRIFYSGOL CAERDYDD

Appendix F: Survey questionnaire

Page 1: Introduction

I am interested in finding out the work-specific stress experienced by registered nurses who cared for severely ill patients with COVID-19 in hospital settings during the SARS-CoV-2 pandemic in Wales. To do this I would like you to answer a series of questions about your life and work as a registered nurse (Adult or Mental Health) during the pandemic and to share any further comments that you may wish to make. This study is being carried out as part of a PhD studies at Cardiff University. I am seeking Registered Nurses (Adults and Mental Health) who have worked in hospital settings with patients who do have COVID-19 during the pandemic. If you are interested in taking part, please read the following details carefully.

Who is running the study?

The study is being carried out by a PhD student with the support of her supervisors:

What will the study involve for me?

You are invited to complete a short online questionnaire once. The questionnaire will ask about you, your work, and how you have been during the pandemic, since March 2020. The questionnaire has been pilot tested with Registered Nurses (Adult and Mental Health) and will ask about you and your work as a registered nurse during the pandemic. It will also ask you questions about the work-specific stress you experienced in caring for severely ill patient with Covid-19, your mental health and well-being and you will be invited to share any further comments that you may have. On the last page of the survey, you will have the option to volunteer to participate in a semi-structured interview which forms part of this study by providing your personal email address. You will then receive a standardised email introducing the researcher and the study.

How much of my time will the study take?

It will take about 35 minutes to complete the questionnaire.

Who can take part in the study?

Registered nurses (Adult and Mental Health) in Wales, UK who have worked during the pandemic and with patients who do have SARS-COV-2 infection in hospital settings.

Do I have to take part in the study?

No, your participation is completely voluntary. It is up to you to decide whether to take part or not. If you decide not to, it will not have any consequence for you.

Are there any disadvantages if I do not take part?

There are no disadvantages to you if you do not take part.

Can I withdraw from the study once I've started if I change my mind?

If you decide to take part in the study and later change your mind, you are free to drop out at any time without giving a reason and with no negative consequences. Submitting your completed questionnaire and signing with your initials is an indication of your consent to participate in the study. You can withdraw at any time before you have submitted the questionnaire. Once you have submitted the questionnaire your responses cannot be withdrawn.

Are there any risks or costs associated with being in this study?

This research project has been reviewed and given a favourable opinion by the Cardiff University School of Healthcare Sciences Research Ethics Committee. SREC reference: REC857. There are no physical risks of taking part in the study. I do not foresee any costs associated with completing this questionnaire, I appreciate that thinking about your experiences could make you feel uncomfortable or distressed. The researcher and the academic supervisors are unable to respond to you personally and if you need urgent help please contact your General Practitioner, General Practitioner out of hours service, the Samaritans (116 123 or http://www.samaritans.org/ (24/7)), Emergency Services or A & E, Health for Health Professionals Wales (nhs.wales) or text FRONTLINE to 85258.

What will happen to information about me that is collected during the study?

Your information will only be used for the purposes outlined here. Cardiff University is the sponsor for this study. The survey is anonymous. I will be using information from you in order to undertake this study and will act as the responsible data controller for this study. Cardiff University will keep identifiable information about you, that is to say personal data, for 6-12 months after the study has finished. Data collected will be

stored for 15 years after the study has finished until the year 2037. Personal identifiable data will be deleted on submission of the PhD thesis. Your information will be stored securely and will be kept strictly confidential except as required by law. Study findings will be published in journals, presented at conferences and submitted as a PhD thesis, but you will not be individually identified in these publications.

Your rights to access, change or move your information are limited, as I need to manage your information in specific ways for the research to be reliable and accurate. If you withdraw from the study, I will keep the information about you that I have already obtained. To safeguard your rights, I will use the minimum personally identifiable information possible.

You can find out more about how we use your information at

https://www.cardiff.ac.uk/public-information/policies-and-procedures/data-protection or by contacting the University Data Protection Officer: inforequest@cardiff.ac.uk

Has this study received ethical approval?

This research project has been reviewed and given a favourable opinion by the Cardiff University School of Healthcare Sciences Research Ethics Committee. SREC reference: REC857.

Can I tell other RNs about the study?

Yes, please do tell other RN's (Adult and Mental Health) in Wales about the study.

What if I would like further information about the study?

If you would like to know more about the study, please feel free to contact me, [redacted]uss the study with you in more detail.

Will I be told the results of the study?

You have a right to be informed about the overall study results. You can tell me that you wish to be informed by answering the relevant question in the online survey and providing me with an e-mail contact address so that I can send you a summary of the study findings in late spring/ early summer 2022.

What if I have a complaint or any concerns about the study?

If you have any queries or concerns about any aspect of this study, you should contact the researcher (details above) who will do their best to answer your questions. If you wish to make a formal complaint about the way you have been [redacted]

Thank you for considering taking part in this study.

Are you currently a registered nurse (Adult or Mental Health) working in Wales in a hospital setting? *Required*

- (•) Yes
- ( ) No

2.I understand that by ticking this box I am giving consent to taking part in this survey. I have been provided with a participant information sheet (provide link) and I understand that by agreeing to participate, the data that I provide will be analysed, and published in an aggregated fashion. I understand that the data that I provide is anonymous; that I cannot be identified at any point. (Please tick to confirm consent) *Required*

- (•) Yes
- ( ) No

3.Please enter your initials and date in this box to confirm that you understand and consent to take part in the study. *Required*

Please be assured that all answers remain 100% confidential.

Page 2: About You

4.What is your age category?

- ( ) 21-30
- ( ) 31-40

- 41-50
- 50+

5.What is your gender?

- Male
- Female
- Transgender
- Intersex
- Non-binary
- Non-Conforming
- Prefer not to say
- Other

6.What is your ethnic or cultural background?

- White British
- White Welsh
- Any other white background (specify below)
- Mixed White and Black Caribbean
- Mixed White and Black African
- Mixed White and Asian
- Mixed other (specify below)
- Asian Indian
- Asian Filipino

- Asian Pakistani
- Asian Chinese
- Asian other (specify below)
- Black Caribbean
- Black British
- Black African
- Black other (specify below)
- Prefer not to Say
- Other (specify below)
- Other

7.Please specify your relationship status

- Married
- Single
- Divorced
- Co-habiting
- Civil partnership
- Other (please specify below)
- Other

8.Do you consider yourself to have a disability?

- Yes
- No

- Prefer not to say

9.Years of experience as a Registered Nurse (Adult / Mental Health)

- Under 1 year
- 1-2 years
- 3-5 years
- 6-10 years
- Over 10 years
- Don't know / or can't remember

10. Who is your main employer?

- NHS Wales
- Private
- Other (please specify below)
- Other

11. Did you return to work to support the COVID-19 response?

- Yes
- No, I was already working

12.Approximately how many patients with **suspected** SARS-COV-2 have you cared for?

- 1-5
- 6-10
- 11-15
- 16+

- ○ Can't remember

13.Approximately how many patients with **confirmed** SARS-COV-2 have you cared for?

- ○ 1-5
- ○ 6-10
- ○ 11-15
- ○ 16+
- ○ Can't remember

14. Have you tested positive for SARS-COV-2?

- ○ Yes
- ○ No
- ○ Prefer not to say

a. Do you consider yourself to have Long-Covid?

- ○ Yes
- ○ No
- ○ Prefer not to say

b. Have you accessed support from any of the following? (tick all that apply)

- ☐ Family / Friends
- ☐ GP
- ☐ Other health facilities/professionals
- ☐ Other, please specify
- ☐ Other

c. How would you rate your overall health before SARS-COV-2?

- Very good
- Good
- Very poor
- Poor

d. How would you rate your health now?

- Very good
- Good
- Very poor
- Poor

15. Do you intend to stay in the nursing workforce?

- Yes
- No
- May be
- Don't know

Page 3: Expanded Nursing Stress Scale (ENSS)

Below is a list of situations that commonly occur in a work setting. For each situation you have encountered in your **PRESENT WORK SETTING during the SARS-CoV-2 pandemic** indicate **HOW STRESSFUL** it has been for you please.

16. Performing procedures that patients experience as painful

- Never stressful
- Occasionally

- Frequently stressful
- Always stressful
- Does not apply

17. Criticism by a physician

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

18. Feeling inadequately prepared to help with the emotional needs of a patient's family

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

19. Lack of opportunity to talk openly with other personnel about problems in the work setting

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

20. Conflict with a supervisor / manager

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

21. Inadequate information from a physician regarding the medical condition of a patient

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

22. Patients making unreasonable demands

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

23. Being sexually harassed

- Never stressful
- Occasionally

- Frequently stressful
- Always stressful
- Does not apply

24. Feeling helpless in the case of a patient who fails to improve

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

25. Conflict with a physician

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

26. Being asked a question by patient for which I do not have a satisfactory answer

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

27. Lack of opportunity to share experiences and feelings with other personnel in the work setting

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

28. Unpredictable staffing and scheduling

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

29.A physician ordering what appears to be inappropriate treatment for a patient

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful

30. Patients' families making unreasonable demands

- Never stressful
- Occasionally
- Frequently stressful

- Always stressful
- Does not apply

31. Experiencing discrimination because of race or ethnicity

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

32. Listening or talking to a patient about his/her approaching death

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

33. Fear of making a mistake in treating a patient

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

34. Feeling inadequately prepared to help with the emotional needs of a patient

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

35. Lack of an opportunity to express to other personnel on the unit my negative feelings towards patients

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

36. Difficulty in working with a particular nurse or nurses in my immediate work setting

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

37. Difficulty in working with a particular nurse or nurses outside my immediate work setting

- Never stressful
- Occasionally

- Frequently stressful
- Always stressful
- Does not apply

38. Not enough time to provide emotional support to the patient

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

39.A physician not being present in a medical emergency

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

40. Being blamed for anything that goes wrong

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

41. Experiencing discrimination on the basis of sex

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

42. The death of a patient

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

43. Disagreement concerning the treatment of a patient

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

44. Feeling inadequately trained for what I have to do

- Never stressful
- Occasionally

- Frequently stressful
- Always stressful
- Does not apply

45. Lack of support of my immediate supervisor

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

46. Criticism by a supervisor

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

47. Not enough time to complete all of my nursing tasks

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

48. Not knowing what a patient or a patient's family ought to be told about the patient's condition and its treatment

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

49. Being the one that has to deal with the patients' families

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

50. Having to deal with violent patients

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

51. Being exposed to health and safety hazards

- Never stressful

- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

52. The death of a patient with whom you developed a close relationship

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

53. Making a decision concerning a patient when the physician is unavailable

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

54. Being in charge with inadequate experience

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful

- Does not apply

55. Lack of support by nursing administration

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

56. Too many non-nursing tasks required, such as clerical work

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

57. Not enough staff to adequately cover the unit

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

58. Uncertainty regarding the operation and functioning of specialised equipment

- Never stressful

- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

59. Having to deal with abusive patients

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

60. Not enough time to respond to the needs of patients' families

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

61. Being held accountable for things over which I have no control

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful

- Does not apply

62. Physician(s) not being present when a patient dies

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

63. Having to organise doctor's work

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

64. Lack of support from other health care administrators

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

65. Difficulty in working with nurses of the opposite sex

- Never stressful

- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

66. Demands of patient classification system

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

67. Having to deal with abuse from patients' families

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

68. Watching a patient suffer

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful

- Does not apply

69. Criticism from nursing administration

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

70. Having to work through breaks

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

71. Not knowing whether patients' families will report you for inadequate care

- Never stressful
- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

72. Having to make decisions under pressure

- Never stressful

- Occasionally
- Frequently stressful
- Always stressful
- Does not apply

Page 4: The Positive and Negative Affect Schedule (PANAS)

We would like to ask you few questions about your feelings and emotions. Please read each item and then indicate from the words below to what extent you feel this way right now, that is, at the present moment OR indicate the extent you have felt this way over the past week.

This part of the survey uses a table of questions, view as separate questions instead?

73. Please choose from the words below that describe your feelings and emotions over the past 2 weeks

Please don't select more than 1 answer(s) per row.

	Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely
Interested	☐	☐	☐	☐	☐
Distressed	☐	☐	☐	☐	☐
Excited	☐	☐	☐	☐	☐
Upset	☐	☐	☐	☐	☐
Strong	☐	☐	☐	☐	☐
Guilty	☐	☐	☐	☐	☐
Scared	☐	☐	☐	☐	☐

Hostile	☐	☐	☐	☐	☐
Enthusiastic	☐	☐	☐	☐	☐
Proud	☐	☐	☐	☐	☐
Irritable	☐	☐	☐	☐	☐
Alert	☐	☐	☐	☐	☐
Ashamed	☐	☐	☐	☐	☐
Inspired	☐	☐	☐	☐	☐
Nervous	☐	☐	☐	☐	☐
Determined	☐	☐	☐	☐	☐
Attentive	☐	☐	☐	☐	☐
Jittery	☐	☐	☐	☐	☐
Active	☐	☐	☐	☐	☐
Afraid	☐	☐	☐	☐	☐

Page 5: Coping Orientation to Problems Experienced inventory (Brief COPE)

We would like to ask you some questions about how you have been coping with the work-related stress

This part of the survey uses a table of questions, view as separate questions instead?

74. Here are some statements about coping with stress. Please describe your experience of each over the last 2 weeks.

Please don't select more than 1 answer(s) per row.

	I haven't been doing this at all	I've been doing this a little bit	I've been doing this a medium amount	I've been doing this a lot
I've been turning to work or other activities to take my mind off things	☐	☐	☐	☐
I've been concentrating my efforts on doing something about the situation I'm in	☐	☐	☐	☐
I've been saying to myself "this isn't real"	☐	☐	☐	☐
I've been using alcohol or other drugs to make myself feel better	☐	☐	☐	☐
I've been getting emotional support from others	☐	☐	☐	☐
I've been giving up trying to deal with it	☐	☐	☐	☐

I've been taking action to try to make the situation better	☐	☐	☐	☐
I've been refusing to believe that it has happened	☐	☐	☐	☐
I've been saying things to let my unpleasant feeling escape	☐	☐	☐	☐
I've been getting help and advice from other people	☐	☐	☐	☐
I've been using alcohol or other drugs to help me get through it	☐	☐	☐	☐
I've been trying to see it in a different light, to make it seem more positive	☐	☐	☐	☐
I've been criticizing myself	☐	☐	☐	☐
I've been trying to come up with a	☐	☐	☐	☐

strategy about what to do				
I've been getting comfort and understanding from someone.	☐	☐	☐	☐
I've been giving up the attempt to cope	☐	☐	☐	☐
I've been looking for something good in what is happening	☐	☐	☐	☐
I've been making jokes about it	☐	☐	☐	☐
I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping	☐	☐	☐	☐
I've been accepting the reality of the	☐	☐	☐	☐

fact that it has happened				
I've been expressing my negative feelings	☐	☐	☐	☐
I've been trying to find comfort in my religion or spiritual beliefs	☐	☐	☐	☐
I've been trying to get advice or help from other people about what to do	☐	☐	☐	☐
I've been learning to live with it	☐	☐	☐	☐
I've been thinking hard about what steps to take	☐	☐	☐	☐
I've been blaming myself for things that happened	☐	☐	☐	☐
I've been praying or meditating	☐	☐	☐	☐
I've been making fun of the situation	☐	☐	☐	☐

75. Is there anything else that you may wish to share about your experience of nursing during the pandemic. If so please comment below. Thank you.

76. Please provide your personal email below if you would like to volunteer for the Phase 2 (one off interview) of this study. The researcher will be in contact with you to explain what is required of you.

1. Final page

Diolch Thank you

Diolch yn fawr am gymryd yr amser i gwblhau'r arolwg hwn.

Many thanks for taking the time to complete this survey. Please note that now you have submitted your questionnaire your responses cannot be withdrawn.

We recognise that completing this questionnaire may have been uncomfortable or distressing. If you are experiencing distress after completing this questionnaire you can seek support from the organisations below.

If you require immediate help because of the distress you are experiencing, **call 999 or go to your local A&E department**. You can also contact:

- Your General Practitioner or General Practitioner out of hours service
- The Samaritans have a free telephone listening service on 116 123, or you can email jo@samaritans.org
- Health for Health Professionals Wales https://hhpwales.nhs.wales/ or text FRONTLINE to 85258

If you have any queries for the research team, please contact:

[redacted]

[redacted]

Thank you again for your time taking part in this research.

Appendix G: Amended ethics approval letter

School of
Healthcare Sciences
Ysgol y Gwyddorau
Gofal Iechyd

Interim Head of School and Dean /Pennaeth yr Ysgol Dros Dro a Deon Professor David Whitaker

Cardiff University
Eastgate House
35-43 Newport Road
Cardiff
www.cardiff.ac.uk

Prifysgol Caerdydd
Ty Eastgate
35 – 43 Heol Casnewydd
Caerdydd
www.caerdydd.ac.uk

13 April 2022

[redacted]

Research project title: Understanding Registered Nurses' Experiences of Caring for Severely Ill Patients with COVID-19 in Hospital Settings during the SARS-CoV-2 Pandemic: The **NECESSARY** study
SREC reference: REC857

The School Of Healthcare Sciences Research Ethics Committee reviewed the above application amendments via its proportionate review process.

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.
>
> However, if recruitment is going to take place in the NHS then sponsorship would be needed. If this is the case this information should be added to the application form.

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 HCAREEthics@cf.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 HCAREEthics@cf.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 e.g.

- End of project report ONLY;
- Annual reports;
- Periodic reports from and/or visits to the Chief/Principal Investigator;
- Oral updates to the Committee (by the Chief/Principal Investigator);
- Establishing a project-specific monitoring provision.

The Committee must be informed when your research project has ended. This notification should be made to HCAREEthics@cf.ac.uk within three months of research project completion.

Complaints/Appeals
If you are dissatisfied with the decision made by the Committee, please contact Dr Kate Button, School Ethics Officer in the first instance to discuss your complaint. If this discussion does not resolve the issue, you are entitled to refer the matter to the Head of School for further consideration. The Head of School may refer the matter to the Open Research Integrity and Ethics Committee (ORIEC), where this is appropriate. Please be advised that ORIEC will not normally interfere with a decision of the Committee and is concerned only with the general principles of natural justice, reasonableness and fairness of the decision.

Please use the Committee reference number on all future correspondence.

The Committee reminds you that it is your responsibility to conduct your research project to the highest ethical standards and to keep all ethical issues arising from your research project under regular review.

You are expected to comply with Cardiff University's policies, procedures and guidance at all times, including, but not limited to, its Policy on the Ethical Conduct of Research involving Human Participants, Human Material or Human Data and our Research Integrity and Governance Code of Practice.

[redacted]

Appendix H: Introductory email to the study's participants

Dear……..

We are contacting you because you have volunteered through our online survey to participate in our one-to-one research interview. The interview is the second phase of an ongoing PhD research study to understand registered nurses' (Adult and Mental Health nurses) experiences of caring for severely Ill patients with COVID-19 in hospital Settings during the SARS-CoV-2 Pandemic in Wales and England (NECESSARY study).

As a registered nurse who worked during the pandemic, you are in an ideal position to give us valuable first-hand information from your perspective. The interview will be one-off and takes around 30 minutes and is very informal. Interviews will be via phone call or Zoom meeting and recorded with your consent. Your responses to the questions will be kept confidential. Each interviewee will be assigned a number code to help ensure that personal identifiers are not revealed during the analysis and write-up of findings.

There is no compensation for participating in this study. However, your participation will be a valuable addition to our research and the findings could lead to a greater public understanding of registered nurses' experiences during pandemics. I have attached to this email Participant Information Sheet and a Consent form.

If you are still willing to participate, please sign the attached Consent form and return it to me by [redacted] and suggest a day and time that suits you and I'll do my best to be available. If you have any questions, please do not hesitate to contact me by email.

Kind Regards

Principal Investigator

Appendix I: Participant's Information Sheet

Understanding Registered Nurses' Experiences of Caring for Severely Ill Patients with COVID-19 in Hospital Settings during the SARS-CoV-2 Pandemic: The **NECESSARY** study

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.

What is the purpose of this research project?

This is a doctoral research project conducted by [redacted] and a postgraduate research student at Cardiff University who is interested in registered nurses' work-related stress during the SARS-CoV-2 pandemic. The project is supervised by [redacted]. The principal purpose of the research project is to understand the work-specific stress experienced by registered nurses who cared for severely ill patients with COVID-19 in hospital settings during the SARS-CoV-2 pandemic in Wales.

Why have I been invited to take part?

The researcher is inviting all registered nurses (Adult or Mental Health) to take part in this study. You have been contacted because you meet the following criteria for the study:

A. Are registrants (Adult and Mental Health nurses) with the Nursing and Midwifery Council (NMC);

B. Have expressed interest to take part in the study through the study online survey or social media;

C. Have worked or works in hospital setting in Wales during the Covid-19 pandemic for a minimum of 2 weeks;

D. Have experience of directly caring for severely ill patients with Covid-19 (adult patients from 17 years and above);

E. Aged 21 years and over;

F. Able to give consent and willing to participate.

Do I have to take part?

No, your participation in this research project is entirely voluntary and it is up to you to decide whether or not to take part. If you decide to take part, we will discuss the research project with you and ask you to sign a consent form. If you decide not to take part, you do not have to explain your reasons and it will not affect your legal rights. **You are free to withdraw your consent to participate in the research project at any time, without giving a reason, even after signing the consent form**. If there is anything you are uncertain about, you can email me at [redacted]

What will taking part involve?

The study is divided into two phases; Phase one is online questionnaire and Phase two is one-to-one interview. If you decide to take participate in the Phase two, you will be asked to take part in a one-to-one semi-structured interview, which will last between 30 to 45 minutes. The interview will be a one-off individual face-to-face, or telephone, or video call interview, as per your preference, on a mutually agreed day, time and venue. The interview will be audio recorded with your consent. During the interview, your consent and willingness to continue will be reaffirmed. You can skip interview questions and can withdraw from the study at any time without any reason. If you would like further information or would like this information in the Welsh language, p[redacted]

Will I be paid for taking part?

No. You should understand that any data you give will be as a gift and you will not benefit financially in the future should this research project lead to the development of a new treatment/method/test/assessment.

What are the possible benefits of taking part?

There may be no direct advantages or benefits to you from taking part, but your contribution will help us understand healthcare professionals' well-being during pandemic. You might feel better knowing that your opinions and views have been heard and that the information shared will be used to influence and improve strategies to support healthcare professionals' health and well-being during and after the current pandemic.

What are the possible risks of taking part?

Some questions may be upsetting at this time (e.g., Long-term impacts of the COVID-19 pandemic and mental well-being). Please remember that you are free to withdraw from study at any time and can skip any questions that you do not want to answer, and your answers will be kept confidential. If emotional distress occurs during one-to-one interview, the researcher will stop recording immediately and you will be comforted. Once composed, you will be asked if you wish to continue or discontinue the interview. At the end of the interview, you will have the opportunity to talk to the researcher about the interview. If any upsetting or unsettling feelings arose or are disclosed at this point, with your consent, you will be signpost to local support services such as their General Practitioner, out-of-hours service, the Samaritans or local employee well-being support systems. The research team is unable to provide a crises response service.

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 any personal information you provide will be managed in accordance with data protection legislation. In exceptional cases, the researcher may be legally and/or professionally required to over-ride confidentiality and to disclose information obtained from (or about) you to statutory bodies or relevant agencies. For example, this might arise where the researcher has reason to believe that there is a risk to your safety, or the safety of others. Where appropriate, the researcher will aim to notify you of the need to break confidentiality (but this may not be appropriate in all cases).

Please see 'What will happen to my Personal Data?' (below) for further information.

What will happen to my Personal Data?

Cardiff University is the Data Controller and is committed to respecting and protecting your personal data in accordance with your expectations and Data Protection legislation. Further information about Data Protection, including:

- your rights
- the legal basis under which Cardiff University processes your personal data for research
- Cardiff University's Data Protection Policy
- how to contact the Cardiff University Data Protection Officer
- how to contact the Information Commissioner's Office

may be found at https://www.cardiff.ac.uk/public-information/policies-and-procedures/data-protection

Printed copies of the above-mentioned documentation and privacy notices are readily available on request.

The researcher will anonymise all the personal data collected from, or about, you in connection with this research project, with the exception of your consent form. The consent form and anonymised information will be retained for 5 years once the project has been completed, in accordance with Cardiff University's Records Retention Schedule and may be accessed by members of the research team and, where necessary, by members of the University's governance and audit teams or by regulatory authorities. Anonymised information may be published in support of the research project and/or retained indefinitely, where it is likely to have continuing value for research purposes. If you withdraw from the research information about you that has already been obtained may be kept by Cardiff University and used in the study.

What happens to the data at the end of the research project?

This is a doctoral research project therefore, information collected about you will be used for the writeup of the study and will be stored as explained above. Information will not be shared with any institution or body outside Cardiff University or outside the United Kingdom.

What will happen to the results of the research project?

It is our intention to publish the results of this research project in academic journals and present findings at conferences and seminars. Participants will not be identified in any report, publication or presentation. We may use anonymised excerpts and/or verbatim quotes from your interview as part of the research publication.

What if there is a problem?

If you have any queries, or have grounds for concerns about any aspect of the manner in which you have been approached or treated during the course of this research, please [redacted]

If you are harmed by taking part in this research project, there are no special compensation arrangements. If you are harmed due to someone's negligence, you may have grounds for legal action, but you may have to pay for it.

Who is organising and funding this research project?

[redacted] the supervision [redacted] Healthcare Sciences, Cardiff University. The research is self-funded.

Who has reviewed this research project?

This research project has been reviewed and given a favourable opinion by the Cardiff University School of Healthcare Sciences Research Ethics Committee. SREC reference: REC857.

Further information and contact details

Should you have any questions relating to this research project, you may contact us during normal working hours. Should you require this information and the survey in the Welsh language, please contact the principal investigator during working hours.

Principal Investigator

[redacted]

[redacted]

Academic Supervisors

[redacted]

[redacted]

[redacted]

Thank you for your time in considering taking part in this research project. If you decide to participate, you will be given a copy of the Participant Information Sheet and a signed consent form to keep for your records.

Appendix J: The Study's Consent form

Title of research project: Understanding Registered Nurses' Experiences of Caring for Severely Ill Patients with COVID-19 in Hospital Settings during the SARS-CoV-2 Pandemic: The **NECESSARY** study

SREC reference: REC857

[redacted]

Please initial box

I confirm that I have read the information sheet dated 27/01/22 version of the NECESSARY study Participant Information Sheet V 1.1 for the above research project.	
I confirm that I have understood the information sheet dated 27/01/22 version of the NECESSARY study Participant Information Sheet V 1.1 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. I understand that if I withdraw, information about me that has already been obtained may be kept by Cardiff University.	
I understand that data collected during the research project may be looked at by individuals from Cardiff University or from regulatory authorities, where it is relevant to my taking part in the research project. I give permission for these individuals to have access to my data.	
I consent to the processing of my personal information such as age, gender, marital status, and religion for the purposes explained to me. 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 will have access to personal information provided, how the data will be stored and what will happen to the data at the end of the research project.	
I consent to take part in an individual interview for the purpose of the research project either face to face or by telephone or secure software videoconferencing and for the interview to be audio recorded. being audio recorded/ video recorded/ having my photograph taken for the purposes of the research project and I understand how the recording it will be used in the research.	
I understand that anonymised excerpts and/or verbatim quotes from my interview may be used as part of the research publication and reports and that any personally identifiable information will be anonymised to protect my identity.	
I understand how the findings and results of the research project will be written up and published. I understand that research data gathered may be used for future research and teaching purposes, and that my name and other identifying information will be removed.	
I agree to take part in this research project.	

_____ _____ _____ _____

Name of participant (print) Date Signature

_____ _____ _____

Name of person taking consent Date Signature

(print)

Principal Investigator_____

Role of person taking consent

(print)

THANK YOU FOR PARTICIPATING IN OUR RESEARCH

YOU WILL BE GIVEN A COPY OF THIS CONSENT FORM TO KEEP

Appendix K:Interview guide

NECESSARY is a cross-sectional mixed-methods study to understand how you experienced and coped with caring for severely ill patients with COVID-19. The study were in two phases; an online survey followed by these one-to-one semi-structured interviews. The findings from the survey helped us to develop this interview.

Interviewer introduction

- Check participants' details and welcome them
- Introduce self and the purpose of the interview
- Check privacy and confidentiality
- Remind participants of:
    - The interview may take up to 30 - 45 minutes
    - The right to withdraw without reason up to 2 weeks after the interview,
    - That they can pause or stop the interview at any time,
    - How their data will be used, including confidentiality/ anonymity,
- Ask participants if they have any questions about the interview or study.
- Consent – confirm that the participant is happy to participate and check periodically
- Make participant aware that you are ready to start recording and commence the interview

Participant Introduction

- Firstly, tell me about yourself personally and professionally
- What does a typical working week look like for you?

how long have you been in the job and specialty, do you work alone or in a team, do you have a family, any vulnerabilities etc. Are the working weeks

often the same? Are there patterns? How do you split up your time (if working partly inpatient/partly theatre or similar)?

Interview Questions

1. Can you outline some of the experiences you faced during the pandemic in caring for severely ill patients with COVID-19? What was that experience like?

NB: Points to cover

- Workload (Can you outline some of the experiences you faced during the pandemic in caring for patients?) – how did you manage a high workload? What helped when you finished work? Is there anything you didn't have/get that would have helped with workload? Was the workload consistent, or did it fluctuate?
- Death and dying – how was that experience? What was it like? How did you manage?
- Tell me about your preparation or training you received – was it helpful? What did it look like? (also, were you redeployed?)If so, how much did your existing experience help with the change? Did you pick some things up "On the job"? What kind of things?
- Uncertainty concerning treatment: Inadequate information from a physician regarding the medical condition of a patient – what was it like caring for patients when there was so much we did not know about COVID-19? How was it when nobody knew? You mentioned it was busy – did that impact the information you'd get about a patient? How did that impact your experience of caring for them? How did it feel?

Pick up here on more person-specific stuff e.g., *you mentioned you were redeployed but also working your outpatient clinics. How did you find moving between your outpatient days and caring for severely ill patients with COVID-19? How did it feel?*

2. Can you say more about your experiences? And the impact it has had on you? Some people told me they felt -

NB: Points to cover

- Distressed
- Upset
- Scared
- Ashamed
- Afraid
- Nervous

Does this sound familiar? If so, can you tell me a little more about that?

3. In what ways do you think this experience has changed you professionally? Have you made any changes to your career/personal life because of these experiences? Do you think you will in the future? Have there been changes to how you feel in work/how you practice nursing? In what way?
4. What kinds of things helped you to cope with these experiences and challenges. This can be personal e.g., exercise, or family time, or professional e.g., reflective supervision, or having a routine when leaving work. They may be helpful things, or things that turned out to feel unhelpful (e.g., alcohol or excessive checking of patient notes)
5. Knowing what you know now, what would you do differently? Is there support or training you would have wanted, or want now?
6. As part of this interview has anything come to mind that we have not discussed or you wish to say more about?

Closing comments

- How have you found our conversation today? This can be heavy to talk about, how are you feeling? How are you going to decompress and relax after this discussion?

If any concerns are raised about well-being, then refer to the risk management protocol

- Thank participants for their time
- Inform them of the next steps
- Ask participants if they would like to be informed of the study findings if so give contact details

Appendix L: Dissemination strategies

Strategies	Details
Journal publications	• MMSR findings published in Journal of Clinical Nursing: https://doi.org/10.1111/jocn.16711 • Other published articles: - The perceived helpfulness and acceptability of a bespoke psychological therapy service for registered nurses experiencing psychological distress: A qualitative study. Journal of Advanced Nursing (10.1111/jan.16160) - Registered Nurses' and nursing students' perspectives on moral distress and its effects: a mixed-methods systematic review and thematic synthesis. Nursing Open 10(9), pp. 6014-6032. • To submit the quantitative and qualitative findings to peer-reviewed journals
Conferences	• Conferences attended include: - Presented a PowerPoint slide at the International Nurses Day 2024 - Attended the online International Nurses Conference, Surrey 2023 - Presented a poster and Chaired a concurrent session at the RCN International Nursing

	Research Conference 2022. - Attended a NHS Staff Well-being webinar: What works, and the case for investment. - Attended: CANOPI Launch, 2022 - Presented a video poster at the European Nursing Congress. • Present at future conferences such as the RCN International Nursing Conference, ICN conference, and European Nursing Congress.
Seminars	• Presented MMSR findings at the Healthcare Sciences Symposium, 2023
	• Attended student seminars at the Healthcare Science College.
Policy Engagement	• Develop policy briefs that summarise the study recommendations. • Engage in consultations with health departments, managers, policymakers and stakeholders .
Evaluation of Impact	• Track citations and downloads of journal articles. • Assess policy or practice changes influenced by the findings.