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Resilience in Oral Health Professional Education: A Scoping Review

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ABSTRACT

Introduction: Resilience is defined as an individual's capacity to effectively adapt in the face of challenges without detrimental effects on their health and well-being. This scoping review identifies and rationalises the published concepts that underpin resilience in oral health professional (OHP) education. It provides recommendations for the development of evidence-based strategies for promoting resilience in OHP education.

Methods: The PRISMA and Arksey and O'Malley methodological frameworks for scoping reviews were used to determine the methodology and answer the question 'What concepts contribute to resilience in OHP Education?'. The search strategy included published literature searches and internet searches.

Results: In total, 744 articles on resilience and coping were identified, and 59 were included after excluding irrelevant records. Most studies used surveys as their study design and focused on undergraduate dental students in North America and Asia. Three main themes were identified: factors that contribute to resilience, measurement tools and scales and enhancing resilience. This review highlights a positive correlation between increased resilience and improved outcomes for dental students.

Conclusion: Resilience and its related factors are not well understood. There is insufficient evidence to support interventions for building resilience due to inconsistent measuring methods and limited research validating resilience scales in OHP education. Investigators should accurately understand the terminology for clarity and consistency. Validated outcome measures and student feedback should be used to determine the effectiveness of interventions. It is important to teach students coping strategies to manage stressors, and digital applications for building resilience should be developed and tested in OHP student populations.

1 | Introduction

Health can be described as a state of 'complete physical, mental and social well-being' [1]. Poor mental health appears to be increasing across all populations, and the World Health Organization estimates that around one in eight people are now living with a mental health disorder [2]. Students studying oral health professional (OHP) programmes are not immune to this—and the number of students suffering from poor mental health is increasing [3, 4]. Oral health professional education

comprises programmes that train a range of dental care professionals. These programmes include dental surgery, dental therapy, dental hygiene and dental nursing.

There are several reasons why students may report poor mental health and increased stress levels. Oral health professional students must learn scientific knowledge while simultaneously learning technical and patient management skills. The majority of OHP students study within the higher education environment, and this may mean they are living alone and away from

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home for the first time—this can contribute to the stresses felt by students. Academic work and clinical factors have been identified as the most common sources of stress for OHP students [5–7]. The transition into the clinical environment is also reported as stressful [7, 8]. It is widely understood that prolonged levels of stress may lead to physical and psychological exhaustion, known as ‘burnout’. Potentially, in the most serious of cases, this may result in failure to complete an educational programme [9, 10].

To be successful, OHP students must be able to manage the demands of their undergraduate education. Unfortunately, levels of stress do not decrease following graduation, and many dental care professionals will go on to suffer from poor mental health and well-being during their careers [11]. Literature suggests that those working in the dental profession have lower well-being than the general population [11, 12]. Therefore, OHP students may benefit from learning skills which improve their ‘resilience’. There is no widely accepted definition of ‘resilience’ in OHP education; however, many sources refer to the capacity of OHP students to effectively adapt in the face of challenges. It often encompasses the ability to maintain psychological well-being, manage the demands of professional education and demonstrate competence while facing various academic, clinical and personal challenges. Resilience can be defined as the ability to individual’s capacity to effectively adapt in the face of challenges without detrimental effects on their health and well-being [13]. Resilience is not a personality trait, but a multifactorial concept which can be described at an individual or community level [14]. Academic resilience in relation to OHP education has been defined as ‘the ability to continue to effectively work, study and progress through a programme while coping with adverse circumstances’ [15]. Coping is often used synonymously with resilience, and can be defined as the behaviours used to manage internal and external stressors [16].

This review aims to identify and make sense of resilience in OHP education—and to therefore answer the research question ‘What concepts contribute to resilience in OHP Education?’ Due to the ambiguous nature of the term ‘resilience’, and it being a fairly novel concept within the field of OHP education, a scoping review has been selected as the preferred methodology.

2 | Methods

This review uses the guidance for conducting a scoping review described by Arksey and O’Malley and the prisma extension for scoping reviews [17, 18]. Resilience in OHP education is still a fairly novel concept, and the authors felt that a scoping review would be most appropriate to better understand the topic. A scoping review can help provide a map of the literature, especially in topics that are yet to be well-reported [19].

2.1 | Search Strategy

To create the search strategy, the research question was divided into two key concepts: ‘resilience’ and ‘OHP education’. OHP

TABLE 1 | Individual search terms for each search undertaken.

Search	Search terms
ERIC and PubMed	[All] Dental OR Oral Health OR Dental Student OR Dental graduate OR Hygienist OR Hygiene OR dental therapy OR dental therapist AND Education [Title/Abs] Resilience OR Adaption OR Coping Strategy OR Coping Skill January 2000-August 2023, English only
Google Scholar	Dental OR Oral Health AND Education AND Resilience
Google search 1	“Dental Education Resilience Coping”
Google search 2	“Oral Health Education Teaching Resilience or Coping”

education is a broad term that may include the training of dentists, dental therapists and dental hygienists and as such, the search strategy was kept fairly simple. However, early scoping demonstrated that understanding of the term ‘resilience’ is not ubiquitous in the literature, and as such this led to the revised search terms used (see Table 1).

A scoping review aims to generate in-depth and broad results [17], and as such, all study designs were included, and no search restrictions were implemented apart from ‘written in the English language’ and ‘published between January 2000 and August 2023’. The start date was chosen because the research team agreed that resilience in education is a relatively new concept, and it is unlikely that information on the topic would have been published before the year 2000. Two databases were searched: Education Resources Information Centre (ERIC) and PubMed. PubMed was chosen because it is one of the largest sources of biomedical literature in the world representing over 7000 journals [20]. ERIC is another large database which focuses on education literature and resources. Google Scholar and two internet searches were also conducted to search for additional relevant studies; the first 100 search results were considered for these searches. The databases were searched on 5 September 2023 and the internet searches were run on 7 September 2023. Figure 1 shows a summary of the search strategy.

2.2 | Selection of Sources of Evidence

An initial review of the citations picked up a large number of irrelevant studies, particularly relating to the resilience and adaptation of various dental materials and products. In contrast to a systematic review, the inclusion and exclusion criteria were purposefully devised after the initial search had been conducted. Initially, the titles and abstracts retrieved from published literature searches were screened, and any sources that did not report on resilience in OHP education were excluded. Following the initial screening, the full-text articles of the remaining citations

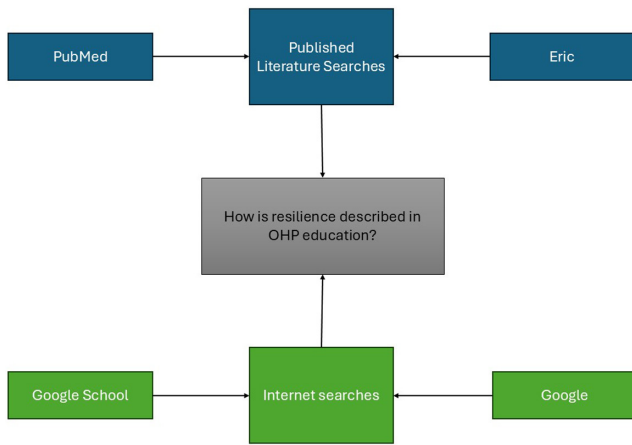


FIGURE 1 | Search strategy for scoping review.

were retrieved and read in full. The inclusion criteria were refined to include the following:

- I. A description of resilience, coping strategies or coping mechanisms.
- II. Involving students in educational programmes for dentistry, dental therapy or dental hygiene.

This meant that literature describing resilience or coping in qualified dentists, or literature simply reporting on stress was excluded.

2.3 | Data Charting Process

Once the included articles had been finalised, the key information from each source was charted. A scoping review does not aim to report all of the information from each source, only the information deemed relevant to the review [17]. As such, the author, year, title, journal, study methods, study population, location of study and important emerging results were charted.

2.4 | Data Analysis

Following the charting of the included sources, the data were analysed using descriptive statistics. The year of publication, study methods and study population were analysed quantitatively with means, modes and percentages calculated to demonstrate the average and most common findings. The ‘relevant results’ consisted of mainly qualitative data. As such, this part of the data was analysed using the six-phase guide to thematic analysis outlined by Braun and Clarke [21]. This process started with familiarisation of the data; initial ideas were noted down, and the data were read through several times. Initial codes were then generated and applied to the entire data set, and these codes were then collated into potential themes. The themes were then reviewed and redefined as necessary. Analysis was inductive and themes were based on information that emerged from the data. The final themes have been presented in the Results and Discussion section.

3 | Results and Discussion

3.1 | Selection of Sources of Evidence

Figure 2 displays a flowchart illustrating the outcomes of the conducted searches, the quantity of sources assessed and the final selection of sources incorporated in the scoping review. A total of 735 published articles were retrieved from the PubMed and ERIC searches. A total of nine sources were identified through internet searches. A total of 630 sources were excluded following an initial screening of the titles and abstracts because they did not report on the topic of interest. In total, 114 full-text records were retrieved. Of these, 49 were excluded because they did not report specifically on resilience, coping strategies or coping mechanisms. Another six records were excluded as they did not report on students in dental education programmes. The final number of included sources was 59.

3.2 | Characteristics of Sources of Evidence

Table 2 provides details on the specific attributes of each source that was included. Additionally, the table delineates the particular search where each source was located and outlines the reporting theme associated with it.

A summary of the most common characteristics of the whole data set can be seen in Table 3. Publication dates ranged from 2003 to 2023, and the most common year of publication for all included sources was 2018. The most common source type was a survey, followed by interviews and quasi-experiments. The majority of sources reported on undergraduate dental programmes with only seven sources reporting on dental hygiene programmes and no sources reporting on dental therapy programmes in isolation.

Thematic analysis of the content reported by all the sources included in the scoping review revealed three overarching themes and seven sub-themes, these are shown in Table 4.

These three thematic areas are discussed in turn. As prescribed by the scoping review methodology, quantitative indicators will be provided to illustrate the coverage of each attribute found in the literature.

3.2.1 | Factors Contributing to Resilience

The concept of OHP resilience has been studied in the literature, with internal and external factors identified as contributing to it. In the United Kingdom, Fulton discovered six factors that impact the resilience of OHP students, as reported by their educators. These factors include background and personal characteristics, environment, life challenges, mood, attitudes and expectations, and actions and strategies [22]. However, this study does not report on the perspectives of the students themselves and it would have been interesting to obtain this data; students may have different insights on factors that promote resilience. Murden proposed five personal factors that influence resilience,

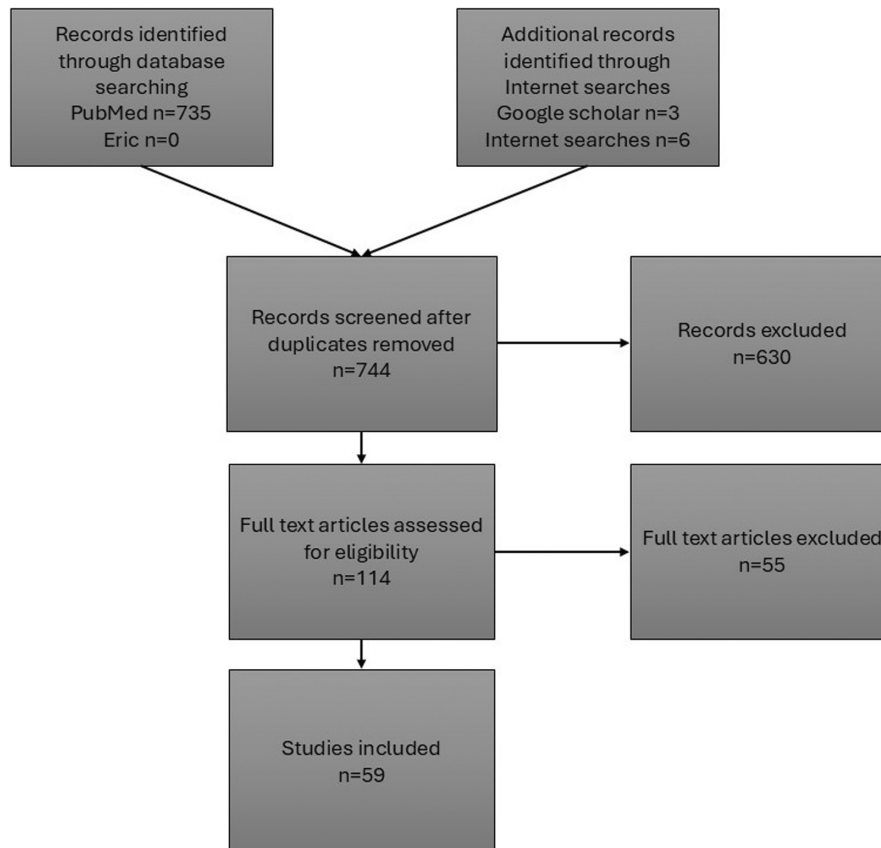


FIGURE 2 | Results flow chart.

namely self-awareness, reflection, personal development, optimism and cognitive flexibility. This particular study focussed solely on personal factors, excluding external factors such as the environment [23]. Additionally, the authors present resilience factors from the viewpoint of qualified clinicians.

This scoping review has identified two subthemes related to resilience: Traits and Environment.

3.2.1.1 | Traits

3.2.1.1.1 | Emotional Intelligence. Several studies included in the review measure emotional intelligence (EI) [24–27]. Emotional intelligence has been defined as ‘the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought’ [28]. Emotional intelligence can be broken down into abilities and traits [28, 29]. A person exhibiting EI may have the ability to manage emotional responses, understand emotions and emotional meanings and identify emotions in faces, voices and postures [28]. Traits linked to emotional resilience may include self-awareness, self-motivation, self-esteem, happiness, empathy and optimism [30–32]. The traits associated with EI are similar to those that are associated with resilience; however, EI is a more specific concept that deals with the recognition and management of emotions as opposed to the broader concept of resilience, which involves the ability to adapt and cope while maintaining mental health. This lack of clarity in precise definitions of resilience and EI may lead to an inaccuracy in the reporting of each concept. Nonetheless, EI has been linked to

academic success in medical programmes and recommendations have been made regarding integration of EI-related skills into curricula [33, 34]. Oral health professional education may also benefit from such initiatives and educators should look for opportunities for development of these skills. For example, active listening allows individuals to engage in a genuine two-way communication. This in turn promotes empathy and allows the listeners to better understand others emotions and perspectives, ultimately improving EI [35]. The use of role play is commonly used within OHP education to promote communication skills and would provide an opportunity to develop students’ active listening skills also [36, 37].

3.2.1.1.2 | Self-Awareness. Self-awareness or insight is described as a conscious knowledge of one’s thoughts, emotions and behaviours. OHP students who can recognise the symptoms and signs of declining mental health are reportedly better placed to deal with them [23]. Given the increasing stress levels within their course, OHP students must be able to recognise the signs of burnout and know where to seek help. Given that resilience describes an individual’s ability to ‘bounce back’, the ability to recognise the signs of declining mental health would allow individuals to seek help sooner and ultimately become more resilient. Typical approaches for teaching self-awareness in medical education include the use of small group discussions to encourage students to share their emotional responses to various clinical experiences, and this could easily be adopted within OHP education [38].

3.2.1.1.3 | Self-Regulation and Perception. Bowman [39] describes how first-year dental students transition to

TABLE 2 | Summary of sources included in the scoping review.

Author	Year	Title	Type	Location	Programme reported	Reporting theme
Abbasi et al.	2020	Comparison of stress levels among medical and dental students in the clinical years of training and their coping strategies	Survey	Asia	Dentistry	Measurement tools and scales
Aboalshamat et al.	2020	The effect of life coaching on psychological distress among dental students: interventional study	Quasi-experiment	Asia	Dentistry	Enhancing resilience
Aboalshamat et al.	2018	The relationship between resilience, happiness, and life satisfaction in dental and medical students in Jeddah, Saudi Arabia	Survey	Asia	Dentistry	Factors contributing to resilience
Adam and Mannion	2020	The 'R' word—do dental core trainees possess it?	Survey	Europe	Postgraduate dentistry	Factors contributing to resilience, measurement tools and scales, enhancing resilience
Aleksejuniene et al.	2022	European student wellness, stress, coping, support and perceptions about remote dental training during COVID-19	Survey	Europe	Dentistry	Measurement tools and scales
Alsharif	2020	The Protective Role of Resilience in Emotional Exhaustion Among Dental Students at Clinical Levels	Survey	Asia	Dentistry	Measurement tools and scales
Alsharif et al.	2023	Impact of resilience and environmental stress on burnout of students in public and private dental schools in Western Saudi Arabia	Survey	Asia	Dentistry	Measurement tools and scales
Al-Sowaygh	2012	Academic distress, perceived stress and coping strategies among dental students in Saudi Arabia	Survey	Asia	Dentistry	Measurement tools and scales
Alzahem et al.	2014	Stress management in dental students: A systematic review	Systematic review	NA	Dentistry	Measurement tools and scales
Al-Zain and Abdulsalam	2022	Impact of grit, resilience, and stress levels on burnout and well-being of dental students	Survey	Asia	Dentistry	Measurement tools and scales
Asokan et al.	2022	Stress amongst paediatric postgraduate dental students in India: A mixed methods approach	Survey and interviews	Asia	Dentistry	Measurement tools and scales
Barnard	2020	Mental health and self-care practices among Dental hygienists	Survey	North America	Dental hygiene	Measurement tools and scales

(Continues)

TABLE 2 | (Continued)

Author	Year	Title	Type	Location	Programme reported	Reporting theme
Bowman	2017	The transition to self-regulated learning for first-year dental students: threshold concepts	Survey and interviews	Europe	Dentistry	Factors contributing to resilience
Chilton et al.	2023	A blended future? A cross-sectional study demonstrating the impacts of the COVID-19 pandemic on student experiences of well-being, teaching and learning	Survey	Europe	Dentistry	Measurement tools and scales
Colley et al.	2018	Teaching stress management in undergraduate dental education: are we doing enough?	Interviews	Europe	Dentistry	Enhancing resilience
Collin et al.	2020	Stress psychological distress, burnout and perfectionism in UK dental schools	Survey	Europe	Dentistry	Factors contributing to resilience
Crego et al.	2016	Stress and Academic Performance in Dental Students: The Role of Coping Strategies and Examination-Related Self-Efficacy	Survey	Europe	Dentistry	Factors contributing to resilience, measurement tools and scales
Cruz et al.	2023	Defining success in healthcare education: US dental student and faculty perspectives	Interviews	North America	Dentistry	Factors contributing to resilience
Dahan et al.	2010	A typology of dental students according to their experience of stress: a qualitative study	Interviews	North America	Dentistry	Factors contributing to resilience
DeAngelis	2003	Noncognitive predictors of academic performance. Going beyond the traditional measures	Survey	North America	Dental hygiene	Measurement tools and scales
Ersan et al.	2017	Perceived sources and levels of stress, general self-efficacy and coping strategies in clinical dental students	Survey	Asia	Dentistry	Measurement tools and scales
Ersan et al.	2018	Perceived sources and levels of stress, general self-efficacy and coping strategies in preclinical dental students	Survey	Asia	Dentistry	Factors contributing to resilience, Measurement tools and scales
Farah-Franco et al.	2023	A 10-year longitudinal study of dental students' emotional intelligence and the impact of COVID-19	Survey	North America	Dentistry	Factors contributing to resilience

(Continues)

TABLE 2 | (Continued)

Author	Year	Title	Type	Location	Programme reported	Reporting theme
Feussner et al.	2022	Somatization symptoms-prevalence and risk, stress and resilience factors among medical and dental students at a mid-sized German university	Survey	Europe	Medicine and dentistry	Factors contributing to resilience
Fulton et al.	2021	Exploring the term “resilience” as understood and experienced by dental educators	Interviews	Europe	Dentistry	Factors contributing to resilience
Gambetta-Tessini et al.	2016	Coping strategies and the Salutogenic Model in future oral health professionals	Survey	Australasia	Dentistry	Measurement tools and scales
Gambetta-Tessini et al.	2013	Stress and health-promoting attributes in Australian, New Zealand, and Chilean dental students	Survey	Australasia	Dentistry	Measurement tools and scales
Garcia et al.	2021	COVID-19 and Dental and Dental Hygiene Students' Career Plans	Survey	North America	Dentistry and dental hygiene	Measurement tools and scales
Graner et al.	2018	Prevalence and correlates of common mental disorders among dental students in Brazil	Survey	South America	Dentistry	Measurement tools and scales
Guihard et al.	2018	Psychometric validation of the French version of the Connor-Davidson Resilience Scale	Exploratory analysis	Europe	Medicine and dentistry	Measurement tools and scales
Hatami and Shekarchizadeh	2022	Relationship between spiritual health, resilience, and happiness among a group of dental students: a cross-sectional study with structural equation modelling method	Survey	Asia	Dentistry	Factors contributing to resilience, measurement tools and scales
Health Education England	2018	Advancing Dental Care: Education and training review	Report	Europe	All dental programmes	Enhancing resilience
Isobe et al.	2018	Relationship Between Resilience and Self-Rated Health in Dental Hygiene Students and Registered Dental Hygienists	Survey	Asia	Dentistry and dental hygiene	Factors contributing to resilience
Jahan et al.	2022	Exploring the Association between Emotional Intelligence and Academic Performance and Stress Factors among Dental Students: A Scoping Review	Scoping review	NA	Dentistry	Factors contributing to resilience
Lopez et al.	2010	Does peer mentoring work? Dental students assess its benefits as an adaptive coping strategy	Quasi-experiment	North America	Dentistry	Enhancing resilience

(Continues)

TABLE 2 | (Continued)

Author	Year	Title	Type	Location	Programme reported	Reporting theme
Malau-Aduli et al.	2022	Preclinical to clinical transition experiences of dental students at an Australian Regional University	Survey and interviews	Australasia	Dentistry	Factors contributing to resilience
Malghani et al.	2021	Level of anxiety in clinical settings and coping mechanisms used by dental undergraduate students to overcome it	Survey	Asia	Dentistry	Measurement tools and scales
Maragha et al.	2022	Mental health and wellness in Canadian dental schools: Findings from a national study	Survey	North America	Dentistry	Enhancing resilience
Maragha et al.	2023	Students' resilience and mental health in the dental curriculum	Survey	North America	Dentistry	Enhancing resilience
McKenzie et al.	2022	A cross-sectional study investigating mental health and resilience among pre-doctoral students at a US dental school	Survey	North America	Dentistry	Factors contributing to resilience
Metz et al.	2022	The stress of success: An online module to help first-year dental students cope with the Impostor Phenomenon	Quasi-experiment	North America	Dentistry	Enhancing resilience
Montas et al.	2021	Relationship of grit and resilience to dental students' academic success	Survey	North America	Dentistry	Factors contributing to resilience
Murden et al.	2018	The impact and effect of emotional resilience on performance: an overview for surgeons and other healthcare professionals	Literature review	NA	Dentistry	Factors contributing to resilience
Pastan	2021	Mind Body Wellness: A compliment to Dental education and Professional Development	Opinion piece	NA	All dental programmes	Enhancing resilience
Pastan et al.	2022	Evaluation of mindfulness practice in mitigating impostor feelings in dental students	Quasi-experiment	North America	Dentistry	Enhancing resilience
Pau et al.	2004	Emotional intelligence and stress coping in dental undergraduates—a qualitative study	Survey and interviews	Europe	Dentistry	Factors contributing to resilience
Piazza-Waggoner	2003	Stress management for dental students performing their first paediatric restorative procedure	Quasi-experiment	North America	Dentistry	Enhancing resilience
Plessas et al.	2022	Mental health and wellbeing interventions in the dental sector: a systemic review	Systematic review	NA	All dental programmes	Enhancing resilience

(Continues)

TABLE 2 | (Continued)

Author	Year	Title	Type	Location	Programme reported	Reporting theme
Prinz et al.	2012	Burnout, depression and depersonalisation—psychological factors and coping strategies in dental and medical students	Survey	Europe	Medicine and dentistry	Measurement tools and scales
Rehman and Jamil	2021	Emotional intelligence as an indicator of coping skills among undergraduate dental students at Peshawar: A correlational study	Survey	Asia	Dentistry	Factors contributing to resilience
Rehnisch et al.	2021	Depressive symptoms in dentistry students—prevalence, risk factors and resilience factors	Survey	Europe	Dentistry	Factors contributing to resilience
Sabrina et al.	2021	Psychological Distress among Bangladeshi Dental Students during the COVID-19 Pandemic	Survey	Asia	Dentistry	Factors contributing to resilience
Saeed et al.	2017	Building Resilience for wellness: A faculty development Resource	Quasi-experiment	North America	Dentistry	Enhancing resilience
Silverstein	2020	Stress and coping strategies in paediatric dental residents	Survey	North America	Dentistry	Measurement tools and scales
Smith et al.	2020	An Analysis of resilience in dental students using the resilience scale for adults	Survey	North America	Dentistry	Factors contributing to resilience
Stewart et al.	2006	Canadian dental students' perceptions of their learning environment and psychological functioning over time	Survey	North America	Dentistry	Factors contributing to resilience, Measurement tools and scales
Stormon et al.	2022	Understanding the well-being of dentistry students	Survey	Australasia	Dentistry	Factors contributing to resilience
Sun et al.	2023	Correlation between life satisfaction and symptoms of attention deficit hyperactivity disorder (ADHD) in dental students: The mediation of resilience	Survey	Asia	Dentistry	Measurement tools and scales
Weraarchakul	2016	Resilience Quotient among Dental Students at Clinical Level, Faculty of Dentistry, Khon Kaen University, Thailand	Survey	Asia	Dentistry	Factors contributing to resilience

TABLE 3 | Most common characteristics of the whole data set.

Data variable	Findings
The most common year of publication	2018
Range of publication dates	2003–2023
Most common source types	Survey (41), interviews (8), quasi-experiment (6)
OHP programmes most commonly reported	Undergraduate dentistry (57), dental hygiene (7) and all dental programmes (3)
The most common locations of programmes reported	North America (18), Asia (17) and Europe (14)

TABLE 4 | Themes and sub-themes identified in the data set.

Themes	Subthemes
Factors contributing to resilience	Traits
	Environment
Measurement tools and scales	Resilience scales
	Coping scales
	Alternative scales
Enhancing resilience	Interventions

self-regulated learning during their initial 12 months at university. Self-regulation refers to the ability to monitor, manage and regulate one's thoughts, emotions, behaviours and impulses to achieve personal goals. Self-regulation requires self-awareness and has been identified as a factor contributing to resilience in OHP students by other authors [23].

Self-regulation requires the student to first exhibit self-awareness. Oral health professional students have reported that the use of personal reflection is helpful during clinical training, in helping them to learn from their mistakes [40]. Reflection is a coping strategy that uses self-regulation. Reflective practice as a concept has been included in curriculum guidelines for providers of OHP education in Europe and beyond, for at least a decade [41–45]. A recent systematic review has described how reflective writing may have a positive impact on students' critical thinking, self-assessment and problem-solving in OHP education [41, 46]. The connection between resilience and reflective practice in OHP students hasn't yet been reported, but it is suggested that self-reflection might enhance resilience [47]. Educators should promote reflective practice in the OHP curriculum to nurture resilience in students.

The 'growth mindset' is a belief that intelligence and abilities are changeable, rather than fixed [48]. Healthcare students with a growth mindset are demonstrably more prepared to learn, adapt and continually pursue excellence [49]. Richardson et al. describes how the traditional performance-orientated culture of medical and dental education risks promotion of a fixed mindset, where trainees appear confident but often hide areas requiring further development. Identification of areas of weakness requires careful reflection and planning

by the OHP students, and this must be nurtured by a supportive academic environment where students are encouraged to be open and transparent about their experiences without feeling pressured to conform to social norms within the cohort, or indeed their institutions.

Perception of personal control relates to one's belief in influencing life events. Students who believe they can control stress, demonstrate perceived personal control, making them better equipped to handle OHP education without becoming overwhelmed [50, 51]. Providing OHP students with a range of coping strategies helps them feel better prepared to overcome challenges.

Somatoform disorders refer to a set of mental health conditions where individuals experience physical symptoms without any identifiable physiological cause. In a study conducted by Feussner [52], the association between somatisation symptoms and various resilience factors was examined. A negative association was found between resilience factors and somatisation score, those students with lower resilience were more likely to experience somatoform complaints [52]. This type of data collection relies purely on the participants perception and demonstrates a good example of 'response bias'. The protection from somatisation symptoms may be related to the participant's perception of their resilience as opposed to their actual resilience. Other studies showed a potential relationship between self-rated health and resilience, suggesting that those who perceive themselves as healthy may be more resilient [53, 54]. The way that individuals perceive health is complex and the opposite could also be true. As such, perhaps it could be resilience that influences our perception of health?

3.2.1.1.4 | Self-Efficacy. Self-efficacy is a concept introduced by psychologist Albert Bandura and describes an individual's confidence in their capacity to execute certain behaviours and achieve particular goals. It is suggested that those students who have a strong positive belief in their ability to succeed may be more likely to achieve their goals. Oral health professional students who believe they possess effective coping abilities tend to enter exams with greater confidence, resulting in reduced stress levels and an improved likelihood of achieving success [55]. Experiential learning involves applying classroom theory to real-life patient scenarios, bridging the gap between theory and practice for students. It is reported that OHP students' confidence increases with clinical exposure and the opportunity for experiential learning

[56]. Oral health professional students may therefore benefit from early clinical exposure to build confidence; however, educators should ensure that students are well prepared for clinical encounters to avoid students building negative associations with the experiences.

3.2.1.1.5 | Optimism. Optimism is a mental attitude or disposition characterised by a positive outlook on life and a belief that favourable outcomes are more likely than unfavourable ones. Studies included in this review describe how optimism and positivity can promote resilience and decrease stress in OHP students [23, 57–60]. A recent study by Cruz [61] aimed to identify themes linked to success in dental students. Students within this study identified a constant positive attitude as a contributing factor to success. Optimistic students may interpret and cope with adverse situations more constructively than pessimistic students. Students who view difficulties as temporary and manageable may be more likely to apply problem-solving strategies making them more likely to overcome the issues. This is in contrast to students who are pessimistic and do not believe that they can overcome issues, and who may be more likely to turn to maladaptive coping strategies such as procrastination. Optimism is linked to self-efficacy because it is demonstrated that those students who believe they can achieve a goal, are more likely to.

3.2.1.1.6 | Grit. Grit and resilience are terms that are often used interchangeably. Grit is a psychological trait or characteristic that refers to an individual's perseverance, passion and long-term persistence in pursuing challenging goals [62]. Grit is often associated with achieving high levels of success and excellence. One study included in this review shows the associations between resilience and grit in OHP students [63]. Montas [63] surveyed US dental students using the 'Short Grit' and 'Brief Resilience scales', odds ratios were then calculated to determine associations between the results. The results of the study suggested that those with higher levels of grit and resilience were more likely to achieve academic success.

According to Storman [60], there is a possibility that OHP students who show persistence may have a lower chance of experiencing depression. However, it is unclear which factor affects the other. It could be that depression leads to a decrease in persistence. While resilience and grit both involve overcoming challenges and adversity, resilience focuses more on adaptability and emotional well-being, while grit is more specific to perseverance in pursuit of long-term goals. Therefore this paper advises against the use of grit and resilience interchangeably within OHP education research.

3.2.1.1.7 | Perfectionism. Perfectionism describes the need to be (or to appear to be) perfect. The trait is perfectionism could be viewed as a positive or negative attribute. Perfectionist striving describes a self-orientated striving for perfection while setting while setting high personal performance standards. When the need to be 'perfect' or constantly improve becomes unrealistic for a student, they may become stressed which could lead to burnout [64]. In this situation students may be described as having perfectionistic concerns, these concerns may include a fear of making mistakes, fear of negative social evaluation, feelings

of discrepancy between ones expectations and performance, and negative reactions to imperfection [64]. Two studies included in this review described how perfectionism has been linked to increased levels of stress and burnout [50, 65]. Not all students who report high stress are struggling academically; it is purported that it is their perception of themselves and their performance, that is increasing their stress levels. Constant comparison with other students may lead to students feeling inadequate. Fulton [22] emphasises the significance of managing expectations and interpretations, even when others appear to have everything under control. Students who can recognise their success may be less stressed and more resilient.

3.2.1.2 | Environment

3.2.1.2.1 | Culture. A resilience approach based on traits overlooks external factors and places sole responsibility on individuals [66]. External factors may also affect an OHP student's resilience. There is disagreement regarding the resilience levels of OHP students across the literature with some studies reporting that students have high resilience levels [67, 68] and some reporting low resilience levels [57, 69]. Studies reporting high resilience were based in North America, while those reporting low resilience were based in Asia and Europe. These differences may be due to cultural variations in values, language, customs and norms. These variations should be considered when evaluating the literature surrounding resilience in OHP education.

3.2.1.2.2 | Support. Social support is essential for maintaining physical and psychological health and has been shown to influence OHP student's resilience [53]. In 2021, Rehnisch conducted a study comparing the depressive symptoms of OHP students with potential resilience factors. The study found that emotional support could help protect against depressive symptoms. However, individuals experiencing depressive symptoms may feel that they have less emotional support, and the direction of the correlation is uncertain.

When resilience levels were measured in Thai dental students, those raised with less authoritarian parenting and separated parents showed higher resilience [70]. It was suggested that these students faced adversity, learned to have realistic expectations and goals and developed their communication skills and flexibility, resulting in higher resilience [70].

This review recommends that educators in OHP education should attempt to recognise the external factors which may be affecting OHP student resilience, and where possible try to control them. For example, consideration should be given to the placement of exams or residential placements away from busy periods. Information should be easy to find and well-organised, and timetabling should be clear. Students' cultural and family backgrounds should also be considered when assessing student resilience. Where possible educators should provide a supportive environment for students to help them achieve academic success [71].

3.2.2 | Measurement Tools and Scales

3.2.2.1 | Resilience Scales. Despite the lack of clarity around how resilience should be measured, and the

heterogeneous nature of the tools used to assess it, the literature suggests that low resilience may lead to negative outcomes for OHP students [69, 72, 73]. This is problematic for OHPs, as they will be faced with difficult and complex clinical scenarios on a regular basis. As discussed previously, prolonged levels of stress can lead to burnout, which likely explains why studies report higher levels of burnout and emotional exhaustion in students with low resilience [74, 75]. It is unsurprising that these students also report lower levels of well-being [74]. One study reported how OHP students with lower levels of resilience are more likely to change their career plans following graduation [76]. Again, this seems logical, given that if a student is unable to cope with the demands of the profession, it may be that a change of career would indeed be beneficial. Nonetheless the authors would suggest it is appropriate to continue measuring the resilience scores of OHP students, as better outcomes seem linked to higher scores. However, resilience may not be the only factor contributing to success in OHP students, other factors such as socio-economic status, support systems and access to resources may also be playing a role.

A range of different resilience scales have been used in the studies reported in this review. The scales specifically measuring resilience include the Connor–Davidson Resilience Scale (CDRSC) [77], the Resilience Scale-14 [78], the Resilience Scale for Adults [79] and the Brief Resilience Scale (BRS) [59, 80, 81]. Indicators of resilience can be measured from a trait, process or outcome process [82]. The CDRSC assesses resilience as a trait, while the BRS measures the ability to ‘bounce back’, which can be seen as an outcome measure. Although it was not used in any of the studies reviewed, the Current Experience Scale measures resilience as a process [83]. This makes comparison and pooling of the data unreliable and highlights one of the major difficulties when assessing the literature around resilience generally. This scoping review identified one study that validated a scale for measuring resilience. In this particular study, the CDRSC was validated for use by dental students studying in France [84].

3.2.2.2 | Coping Scales. Coping refers to the ways individuals manage stress, while resilience often refers to an individual’s overall ability to ‘bounce back after adversity’ [85]. Coping can be broken down into styles and strategies. There are three well-known coping styles: problem-focused, emotion-focused and avoidance-focused [86]. Coping strategies can be categorised into styles and are specific to certain situations or stressors. Scales that measure coping strategies, not coping styles, are reportedly more valid and reliable [87].

Coping strategies used by OHP students have been well-reported in the literature and various scales have been used including: The Brief Coping Scale, Brief Resilient Coping Scale (BRCS), Ways of Coping Checklist (WCCL) and the Tactics for Coping with Stress Inventory [7, 51, 55, 58, 59, 88–96]. Positive associations are seen between strategies such as active coping and improved well-being [68, 94, 97, 98]. The use of coping strategies could provide OHP students with effective methods to help them deal with situations they may face during their training, and this review recommends that educators consider explicitly teaching a range of coping strategies to students.

3.2.2.3 | Alternative Scales. The Salutogenic Model is a framework for evaluating psycho-social characteristics that focuses on understanding and promoting well-being rather than just studying disease and risk factors. The model aims to explore the origins of health and the factors that contribute to it. The Salutogenic Model has been mentioned in several of the papers included in this review [93, 99]. The Salutogenic potential of an individual can be represented by an individual’s sense of coherence (SOC), a personality trait that helps us cope with adverse experiences [93]. The better an individual can understand, manage and make sense of a situation the better they can cope with an adverse event [93]. This may be an alternative or surrogate method for measuring resilience, aside from the traditional resilience scales. The Salutogenic Model emphasises the importance of empowering individuals to take an active role in their health and well-being.

The Problem Solving Inventory (PSI) is a psychological assessment tool designed to measure an individual’s problem-solving abilities and skills. It is particularly valuable for understanding how people cope with various challenges and stressors. The PSI has been used to measure OHP students’ perception of their coping skills. Students who indicated a positive appraisal of their problem-solving skills were more likely to achieve academic success [100]. Strong problem-solving skills contribute to an individual’s ability to adapt and overcome obstacles, and therefore the PSI may provide an alternative method of measuring resilience in OHP students.

The General Self-Efficacy Scale (GES) is a 17-item scale that asks respondents to indicate how strongly they feel about statements that address a particular problem [101]. There is a positive correlation between general self-efficacy scores and resilience, indicating that an OHP student’s belief in their ability to accomplish tasks and overcome challenges can contribute to their ability to manage stress and adversity [51, 102, 103].

These alternative scales may be valuable in further research for measuring the specific attributes related to resilience, especially when combined with other scales. Any scale used in OHP education should be validated for use in OHP students specifically to ensure that questions are meaningful to the OHP student population [104].

3.2.3 | Enhancing Resilience

Health Education England (HEE) is the national leadership organisation for education and workforce development across the health sector in England. In a recent review, HEE describes the importance of leadership and management skills being taught to students to address resilience issues that have been identified in recent graduates [105]. Resilience training appears to be perceived as important to OHP students. Postgraduate dental trainees have suggested that approaches supported by literature may be beneficial to help them improve their resilience, as have students in undergraduate dental programmes [69, 106]. Although educators and students alike agree that teaching resilience is important, there is a lack of evidence for the success of interventions aimed at improving resilience in OHP education.

Some interventions aimed at improving resilience have been tested in OHP education, including the use of a life coaching intervention. This intervention however, showed a reduction in dental student resilience following the intervention. This may be because senior students provided the life coaching and were not certified professionals [107]. These results though are in-keeping with the findings from Maragha et al. [108] who showed that of the eight out of ten Canadian dental schools that included didactic resilience teaching in their curriculum, activities aimed at improving resilience appeared to be ineffective. Training on relaxation strategies was introduced to a group of OHP students in one study; however, no significant difference was found with regard to anxiety in the control or experimental groups [109]. The interventions introduced in these studies may have produced apparently negative results due to the scales used for measuring their impact. The Brief COPE, Resilience Scale and CDRSC were utilised, but given the dynamic nature of resilience and potential variations in interpretation, the authors suggest it would be prudent to validate these scales within the population where they are to be deployed.

Peer mentoring is a structured and mutually beneficial relationship in which individuals of a similar age, status or experience level support and learn from each other. Reports from OHP students stated that they found peer mentoring an effective tool in helping them deal with stress, especially during the transition to clinical work [110]. A workshop focusing on building resilience and well-being showed good initial results when tested on students and faculty. However, pre and post-resilience were not measured, only delegate opinions [111]. Both studies relied solely on participant opinions as outcome measures. Participants' perceptions may not accurately reflect the impact on their resilience. These studies could have been improved by the addition of a validated measure for resilience.

The imposter phenomenon, also known as imposter syndrome, is a psychological pattern in which individuals doubt their accomplishments and have a persistent fear of being exposed as frauds, despite evidence of their competence. An online module aimed at educating students about the imposter phenomenon and providing coping mechanisms showed positive initial results in OHP students [112]. The imposter phenomenon was the focus of another intervention teaching OHP students about using mindfulness as a coping strategy [113, 114]. Mindfulness is a mental practice and state of awareness that involves paying deliberate attention to the present moment. The majority of students who underwent the mindfulness training reported that they felt confident utilising mindfulness practices as a coping strategy following the intervention.

A systematic review of mental health and well-being interventions in the dental sector describes three levels of well-being interventions [115]. The study split interventions into three categories.

- I. Primary prevention, described as taking action to modify or eliminate sources of stress.
- II. Secondary prevention, described as the detection of well-being issues and the improvement of coping strategies.
- III. Tertiary prevention, described as the treatment of psychological ill health [115].

The secondary interventions are placed at the ideal level for the introduction of psychoeducational interventions aimed at improving resilience. Primary interventions that remove the stressors present in dental education are often unrealistic, and tertiary interventions are primarily aimed at treating psychological ill health and come too late.

Generation Z, born between 1996 and 2010, is the first generation to grow up with the internet as part of daily life. They are often referred to as digital natives [116]. The majority of students entering OHP education are representative of this generation. These students prefer to learn at their own pace with the use of quick-access technology [117]. A groups a dental students from a dental school in the United Kingdom have described how digital education tools can be more efficient and allow them to consume relevant information quickly [118]. It will be interesting to see how these preferences for learning change in the future as Generation Alpha enter OHP education.

Recent studies have shown an increasing trend in the use of digital platforms for OHP education [119–121]. A systematic review conducted in 2021 by Ang et al. identified 22 randomised control trials that examined the effectiveness of digital interventions for resilience. According to the meta-analysis, such interventions have shown moderate improvements in resilience. However, the authors suggest conducting additional large-scale randomised controlled trials to confirm their effectiveness [122]. Although no digital tools were found to enhance OHP students' resilience specifically, mobile applications are increasingly being used in medical education, and the initial results of interventions using these applications are promising [123].

3.3 | Limitations

Many of the sources identified in this scoping review explore factors associated with resilience, due to the lack of clarity surrounding the definition of resilience we cannot be sure that studies in the review are measuring the same construct. The factors identified as related to resilience vary widely across different populations and cultures, this review included sources from across the world where OHP students will be exposed to varying cultures and environments which may influence their resilience.

Due to the diverse methodologies of these sources, it is challenging to synthesise the findings into a coherent pattern of relationships. This is one potential weakness of a scoping review approach, whereby strict inclusion criteria are not applied to the source methodology.

4 | Conclusion

It appears that there is a positive association between an increase in resilience and improved outcomes for students. However, there remains uncertainty regarding the direction of the relationships between resilience and its associated factors. Both students and educators acknowledge the significance of fostering resilience. Nevertheless, there is a lack of support for

the interventions proposed in the literature. This could be attributed to the absence of uniformity in the methods used to measure resilience and a limited body of evidence validating resilience scales within the context of OHP education literature.

5 | Recommendations

- I. The definitions of resilience and its related factors are confusing to both investigators and study participants. Therefore, researchers should ensure they have an accurate understanding and grounding of terminology.
- II. Tools for measuring resilience and coping should be validated in the target population of OHPs before use.
- III. Additional research should determine the effectiveness of interventions for building resilience in OHP education using validated outcome measures and student feedback.
- IV. A range of recognised coping strategies should be taught to OHP students to help them manage the stressors they encounter, these may include the strategies such as reflective practice.
- V. Digital applications should be developed for building resilience and tested in OHP student populations.

Conflicts of Interest

Dr. James Field reports Grants from Immersify, outside the submitted work.

Data Availability Statement

The authors have nothing to report.

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