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REVIEW

Nurses' coping strategies caring for patients during severe viral pandemics: A mixed-methods systematic review

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Abstract

Background: Nurses play an essential role in responding to severe viral disease which bring considerable challenges to their personal and professional well-being. This subsequently can affect the delivery of care and healthcare systems' organisational capacity to respond. Understanding nurses' experiences of these challenges will help inform healthcare policies.

Aim: To explore the experiences and coping strategies of nurses caring for patients during severe viral disease pandemics.

Design: A mixed-methods systematic review informed by the Joanna Briggs Institute (JBI) methodology.

Methods: A mixed-methods systematic review. Five electronic databases Medline, CINAHL, PsychInfo, ASSIA and Scopus were searched on 4th April 2021. Results were reported in accordance with PRISMA. The findings were analysed and reported in the context of the Self-Regulatory Common-Sense Model.

Results: In total, 71 peer-review primary research articles describing nurses' experiences of caring for patients during SARS, MERS, Swine flu H1N1, Avian influenza or SARS-CoV-2 / COVID-19 published in English from 2003 to 2021 were included. We found links between nurses' perception of the health threats, their emotional reactions, and coping strategies. Perceived health threats were influenced by organisational factors including frequent changes in clinical guidelines and workplace protocols, onerous workloads and working hours, unavailability of PPE, and lack of knowledge and training in pandemic management. These impacted nurses' physical, psychological and social well-being. Nurses also reported helpful and unhelpful coping strategies to manage the health threats.

Conclusions: It is vital for stakeholders, policymakers, government and healthcare institutions to recognise and monitor the wider impact on healthcare workers from health emergencies. In addition, support to develop and implement effective systems and individual mechanisms to offset the anticipated impact pre and post pandemics/

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epidemics is needed. Our findings can inform those strategies for similar future health emergencies.

Relevance to Clinical Practice: Nurses are often the first point of contact in providing direct care to patients, hence they are at high risk of being infected. The findings from this review can help managers and policymakers in developing programmes to enhance resilience in the nursing workforce.

No Patient or Public Contribution: This was a literature review study.

KEYWORDS

coping strategy, influenza outbreak, nurses' experience, pandemic, systematic review

1 | INTRODUCTION

Pandemics have significant health, social and economic implications for society. They disrupt all aspects of life including healthcare systems, economic health and the health and well-being of the healthcare workforce (Madhav et al., 2017; Seale et al., 2009). The world has experienced several pandemics, the worst, to date being the 1918 Spanish flu (H1N1) influenza pandemic in terms of reported cases (WHO, 2010). Influenza pandemic, a viral respiratory disease includes severe acute respiratory syndrome (SARS) (Maunder, 2004), H1N1 (swine flu) (Fitzgerald, 2009), Middle East Respiratory syndrome (MERS) (Kim, 2018), and currently SARS-CoV-2 (WHO, 2020). All were unpredictable, extremely contagious and caused high morbidity and mortality in the population (WHO, 2017). Writers argue that lessons should have been learned as those events were similar to the current pandemic. But globally, healthcare institutions failed to meet the challenges of SARS-CoV-2 pandemic, neglecting to protect the general population and healthcare professionals from the infectious disease (Mathews Burwell et al., 2020).

SARS-CoV-2 is a severe viral respiratory pandemic that causes Coronavirus disease 2019 (COVID-19). The virus is contagious and attacks the human respiratory and other systems. There was no pre-existing immunity to SARS-CoV-2 (Mathews Burwell et al., 2020). Since the discovery of SARS-CoV-2 in Wuhan, China in December 2019, over 535,863,000 confirmed cases of COVID-19, including over 6,314,000 deaths have been reported globally (WHO, 2022).

With the high rate of confirmed cases reported among healthcare workers (International Council of Nurses, 2020), this current pandemic will continue to cause significant emotional and physical distress to the thousands of healthcare workers (Tan et al., 2020). Considering the inconsistency in global data report coverage, the most current report estimates 115,500 healthcare workers have died from SARS-CoV-2 (WHO, 2021).

As the largest group of healthcare professionals, nurses are at the forefront of pandemics and epidemics, often providing direct care to affected patients (Fernandez et al., 2020). This role comes with increased risks of severe consequences (Mousavizadeh Merdasi et al., 2021) short and long term. Studies have indicated that nurses' physical and emotional distress is compounded by

What does this paper contribute to the wider global clinical community?

- Nurses' experiences of caring for patients with severe viral disease outbreaks are linked to their emotional reactions and coping strategies.
- Nurses use helpful and unhelpful strategies to manage their perception of the health threat.
- There is the need to implement effective social support, improved workplace, and a better pandemic preparedness and management training for future pandemics.

uncertainty, fear of infection, work overload and ethical dilemmas (Fernandez et al., 2020; Koh et al., 2011). Nurses have reported dermatitis, headache, dehydration, discomfort, general body pain, giddiness and excessive sweating caused by the prolonged wearing of personal protective equipment (PPE) (Erdađi Oral et al., 2022; Jose et al., 2021). These may have impacted on nurses' ability to deliver safe and effective person-centred care. To inform healthcare policies and design appropriate interventions to support nurses in any future pandemic, it is important to understand nurses' current and past experiences.

A preliminary search of the PROSPERO, Cochrane Database of Systematic Reviews and the JBI Database of Systematic Reviews and Implementation Reports revealed two systematic review protocols addressing nurses' experiences during emerging infectious diseases, one quantitative (Rozwaha et al., 2020) and one qualitative (Fernandez et al., 2020). There is a need to understand the impact of an infection outbreak (pandemic) on nurses and how they cope when caring for themselves and their patients.

1.1 | Conceptual framework

The Self-regulatory Common-Sense (SR-CSM) theoretical framework (Leventhal et al., 1980) was used to guide this review. It describes how individuals process information called cognitive

TABLE 1 Inclusion and exclusion criteria employed in the selection process.

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> Reported on severe viral respiratory disease (pandemic) 	<ul style="list-style-type: none"> Reviews (systematic, rapid, integrated and other reviews), Case studies, commentaries, conference abstracts, editorials, unpublished empirical data, grey literature, validation studies, theoretical models
<ul style="list-style-type: none"> 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)) 	<ul style="list-style-type: none"> Not published in the English language
<ul style="list-style-type: none"> Peer reviewed 	<ul style="list-style-type: none"> Social care, primary care, residential care or care home setting
<ul style="list-style-type: none"> Reported on the experiences and/or coping strategies of adult/mental health nurses who cared for infected patients 	<ul style="list-style-type: none"> Nurses not in direct care of patients with viral respiratory disease
<ul style="list-style-type: none"> Hospital /tertiary care setting 	<ul style="list-style-type: none"> Study population of Midwives, Neonatal nurses, School nurses, Students nurses, Nurse assistants, Veterinary nurses, Healthcare professionals Pooled analysis of healthcare professionals data Studies on non-influenza pandemic (e.g. Ebola).

appraisal and respond to health threats called emotional appraisal, predict behavioural outcomes such as coping strategies. This continuous parallel processing of information makes it possible to modify the perceptions and coping mechanisms adopted (Leventhal et al., 1980, 2016). The SR-CSM defines five perceptual dimensions of a health threat as identity, causes, timeline, consequences and control. The model offers a social cognition approach to evaluate how these processes affect adaptation, and outcomes (Leventhal et al., 1980, 2016).

2 | RESEARCH AIM AND OBJECTIVES

We conducted a mixed-methods systematic review on the available literature to:

1. explore nurses' perceptions of their experiences in caring for patients during severe viral influenza outbreaks;
2. investigate the impact of the experiences on nurses' health and well-being (physical, social and psychological);
3. explore nurses' response to the health threat or experience.

3 | METHODS

3.1 | Design

To integrate qualitative and quantitative evidence in this complex research question, a mixed-methods systematic review (MMSR) was conducted. This MMSR was informed by the Joanna Briggs Institute (JBI) methodology for a MMSR (Lizarondo et al., 2020). Results were reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses updated checklist (Page et al., 2021). The checklist is included as Appendix S1.

3.2 | Search strategy

A database systematic search for published studies was undertaken on 4th May 2021 using five electronic databases including Medline, Cumulative Index to Nursing and Allied Health Literature (CINAHL), PsychInfo, ASSIA and Scopus. A subject specialist librarian with systematic reviewing expertise assisted in creating an exhaustive search strategy. The keywords and index terms in relevant article titles and abstracts were used to create a comprehensive search string which was applied to all five included databases. The following keywords variations 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". The full search strategies are provided in Table S1.

3.3 | Selection criteria

Primary qualitative, quantitative and mixed-methods studies published in the English language from January 2003 to May 2021 were included. The WHO definition and classification of disease for severe viral (influenza) outbreaks including SARS, MERS, Swine flu H1N1, Avian influenza and SARS-CoV-2 or COVID-19 was used. Influenza refers to an acute viral infection that spreads easily from person to person in any age group and can cause serious complications (WHO, 2016a). This becomes a pandemic when it spreads globally, or an epidemic when limited to a small geographical area to which there is little or no pre-existing immunity in the human

population (WHO, 2016a). To be included in the review, a study had to meet the inclusion criteria summarised in Table 1.

3.4 | Search outcome and study selection

In total, 4351 citations were identified through the literature search and exported to EndNote X9.2 (Clarivate Analytics), and 684 duplicates were removed. Using Covidence systematic review management software v2627, titles and abstracts were screened by the first author (ET) for assessment against the review's inclusion criteria. Subsequently, 115 citations were included for full-text review. Three review authors (ET, RP and RH) independently screened and assessed the full-text articles for congruence with the inclusion criteria. Of these full-text articles, 39 were excluded with reasons given in the PRISMA flow diagram (Figure 1). Any disagreements between the three reviewers were resolved by a fourth reviewer (DW). A total of 71 peer-reviewed articles were included in the final review.

3.5 | Data extraction

Data extraction was performed using a modified version of the standardised JBI data extraction tool in JBI SUMARI. Data information recorded for each study included author, year of publication, geographical location, study methods, time-frame of data collection, participant characteristics, outcomes measured, measurement methods, analysis and description of main results. Data extraction was performed by the main author (ET) and cross-checked by two review authors (CB and TW). Discrepancies were resolved through discussions among the three reviewers (ET, CB and TW).

3.6 | Quality appraisal

Study quality was assessed by two independent reviewers (ET and AS) using the JBI critical appraisal tools specific to the type of study. Eligible qualitative studies and the qualitative component of mixed-methods studies were evaluated using the standardised JBI qualitative

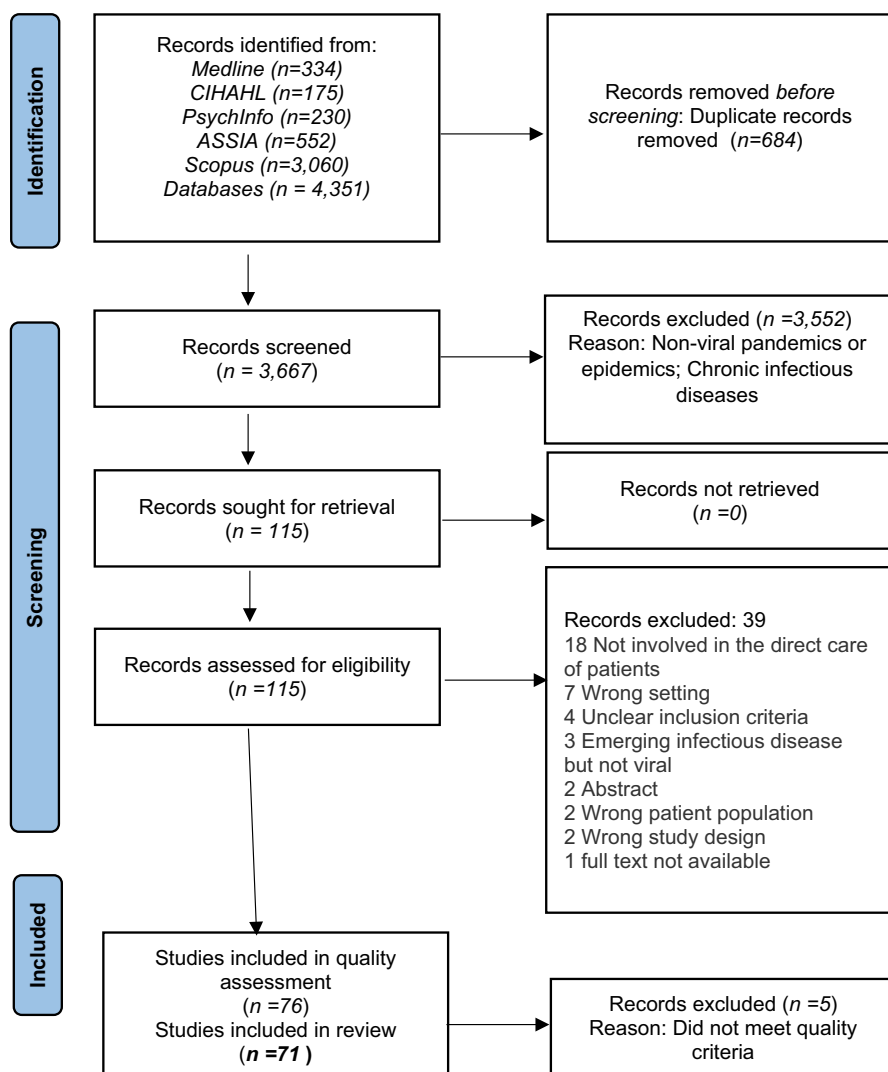


FIGURE 1 PRISMA updated flow diagram (Page et al., 2021).

critical appraisal tool. Included quantitative studies and the quantitative component of mixed-methods studies were also appraised using the standardised JBI quantitative critical appraisal tool. Any disagreement arising between reviewers was resolved through discussion.

Each parameter assessed by the appraisal tool was assigned a quality percentage score. Studies scoring below 50% were deemed low quality and excluded. Five studies were excluded based on the quality threshold. Table S1 indicates how the identified studies were appraised for quality.

3.7 | Data synthesis

Data synthesis and integration was carried out using JBI SUMARI according to the JBI convergent integrated approach. All data sets (qualitative, quantitative and mixed-methods studies) were extracted simultaneously, transformed and then analysed in parallel (Lizarondo et al., 2020). The process entailed converting quantitative data into themes (qualitised data). To develop a collection of integrated findings, data were categorised and pooled together based on similarity in meaning. Leventhal et al.'s (1980) SR-CSM theoretical framework was used to develop a priori a set of themes for reporting the findings of this review (Lizarondo et al., 2020).

4 | RESULTS

4.1 | Characteristics of included studies

The characteristics of the included 71 studies are summarised in Table S1. Of these 26 were quantitative, 39 were qualitative and 6 were mixed-method studies published between 2005 and 2021. The quantitative studies and the quantitative components of the mixed-methods studies were mainly cross-sectional designs. The qualitative studies and the qualitative components of the mixed-methods were predominantly descriptive phenomenological studies. Fourteen studies did not state when data were collected. Participants worked in various hospital settings and cared for patients with severe viral disease. In most studies female nurses predominated. Only, one study (Hoseinabadi et al., 2020) reported more male participants ($n = 82$) than females ($n = 69$). As shown in Figure 2, most studies were conducted in China ($n = 17$). The remaining studies were conducted in Iran ($n = 10$), South Korea ($n = 8$), Turkey ($n = 7$), United States ($n = 6$), Italy ($n = 4$), Taiwan ($n = 3$), Hong Kong ($n = 2$), Canada ($n = 2$), Saudi Arabia ($n = 2$), Spain ($n = 2$), Lebanon ($n = 1$), Ecuador ($n = 1$), Jordan ($n = 1$), Brazil ($n = 1$), Japan ($n = 1$), Philippines ($n = 1$), Indonesia ($n = 1$) and New Zealand ($n = 1$).

4.2 | Quality of the included studies

The overall quality of the included studies was moderate (50%) to high (100%) (see Table S1). Four included studies (Crowe et al., 2021;

Honey & Wang, 2013; Murat et al., 2021; Santos et al., 2021) scored below 70% but 50% and above due to methodological inconsistencies. While all 31 included quantitative studies identified confounding factors such, only 14 clearly stated strategies to deal with these factors. The majority of the qualitative studies inadequately described the researcher's influence on the research, and none considered the relationship between the researcher and the participants. Participants and their voices were not sufficiently represented in five included studies (Chiang et al., 2007; He et al., 2021; Honey & Wang, 2013; Logiudice & Bartos, 2021; Santos et al., 2021).

4.3 | Review findings

This review explored nurses' experiences and coping strategies while caring for patients with severe viral disease during an outbreak (pandemic). The SR-CSM describes how individuals process information and respond emotionally and behaviourally to health threats. These perceptions about a health threat determine the coping strategies and outcomes. The continuous parallel processing of information makes it possible to modify the perceptions and coping mechanisms adopted (Leventhal et al., 1980, 2016). The findings are discussed across the themes outlined below.

4.4 | Nurses' perception of the severe viral disease

The literature clearly shows caring for patients with severe viral disease during an outbreak is challenging (Gordon et al., 2021; He et al., 2021; Lapum et al., 2021; Liu et al., 2020). Nurses reported both organisational factors (external stimuli) and their emotional reactions (internal stimuli) significantly influenced them in caring for patients.

4.4.1 | Organisational factors (external stimuli)

Frequent changes in clinical guidelines, workplace protocols, heavy workloads and working hours, availability of personal protective equipment (PPE) and isolated working environments were the most extensively described organisational factors in the studies.

Responding to the constant changing and even conflicting clinical guidelines was challenging for nurses (Crowe et al., 2021; Fernández-Castillo et al., 2021; Gonzalez-Gil et al., 2021; Schroeder et al., 2020) who also reported 'excessive' workload and long working hours (Catania et al., 2021; Cui et al., 2020; Doo et al., 2021; Fernández-Castillo et al., 2021; Gonzalez-Gil et al., 2021; Gunawan et al., 2021; He et al., 2021; Hong et al., 2021; Hoseinabadi et al., 2020; Kang et al., 2018; Karimi et al., 2020; Li et al., 2021; Moradi et al., 2021; Pourteimour et al., 2020; Sagherian et al., 2020; Labrague & de Los Santos, 2021; Shih et al., 2009; Sun et al., 2020; Tan et al., 2020; Vitale et al., 2021; Wang et al., 2021; Zhan et al., 2020). Though many nurses were aware of workplace protocols and clinical

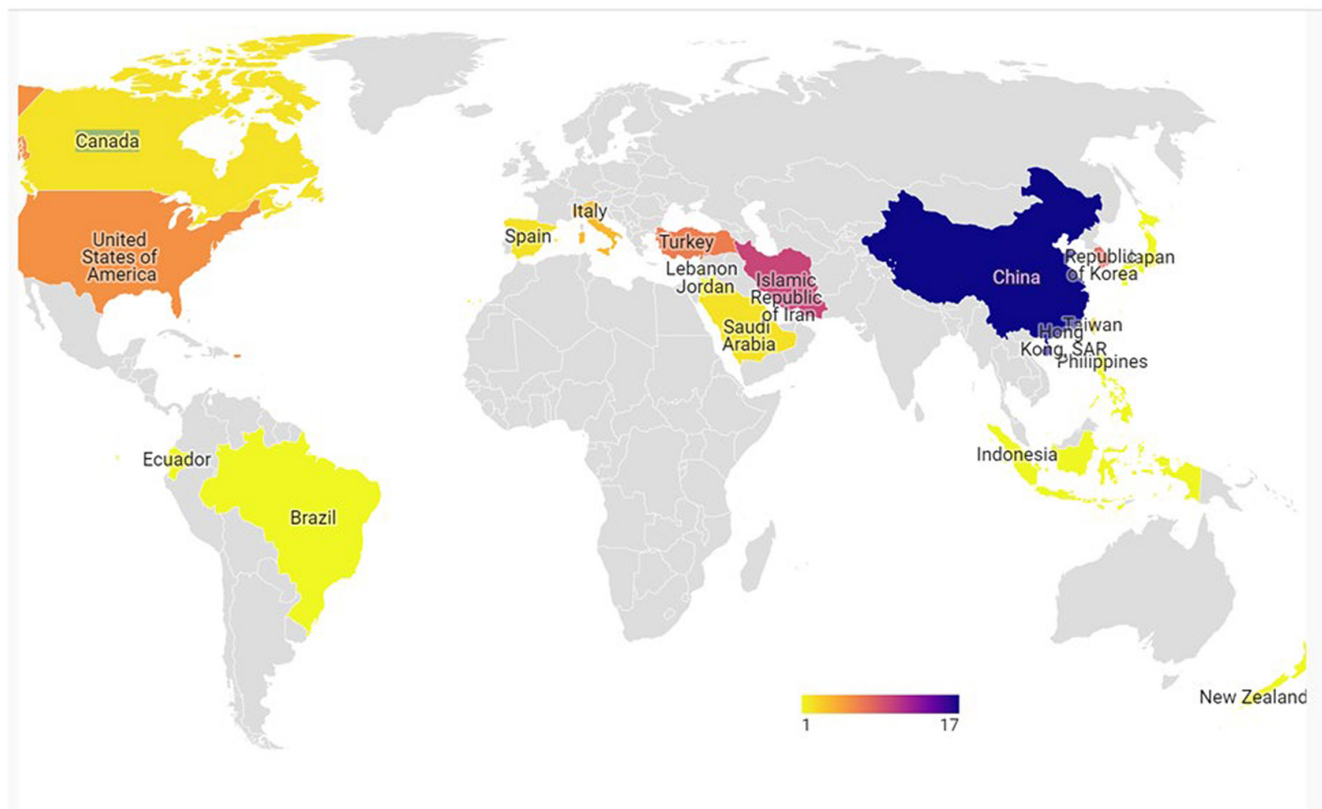


FIGURE 2 Geographical distribution of the included studies.

guidelines (Santos et al., 2021), they felt vulnerable and under pressure to keep up with the constant change in clinical guidelines and protocols (Catania et al., 2021; Crowe et al., 2021; Kim, 2018; Lapum et al., 2021; Lee et al., 2005, 2020; Lee & Lee, 2020; Logiudice & Bartos, 2021; Robinson & Kellam Stinson, 2021; Santos et al., 2021; Schroeder et al., 2020; Shih et al., 2009).

While some nurses reported that their employers tried to provide adequate PPE (Robinson & Kellam Stinson, 2021; Schroeder et al., 2020), they reported there was an inadequate supply of PPE. This resulted in anxiety, frustrations and reduced work efficiency (Catania et al., 2021; Çınar et al., 2021; Franco Coffré et al., 2020; Gonzalez-Gil et al., 2021; Gunawan et al., 2021; Kalateh Sadati et al., 2021; Lee et al., 2005; Lee & Lee, 2020; Leng et al., 2021; Moradi et al., 2021; Murat et al., 2021; Santos et al., 2021; Sun et al., 2020; Xu et al., 2021). In addition, nurses questioned the effectiveness of the available PPE (Crowe et al., 2021; Liu et al., 2020). The PPE provided was described as not 'user-friendly' (Lam & Hung, 2013). This intensified their perception of personal danger (Chung et al., 2005; Lee et al., 2020) leading to inadequacy in providing nursing care to patients (Karimi et al., 2020; Murat et al., 2021; Muz & Erdoğan Yüce, 2020).

Caring for infected patients in isolated environments heightened nurses' fears and concerns. Changes in their work environment (Catania et al., 2021; Gordon et al., 2021; Han et al., 2020; Lee & Lee, 2020; Leng et al., 2021; Sun et al., 2020), high mortality rates (Kackin et al., 2021; Karimi et al., 2020; Shih et al., 2009), unclear

treatments and diagnostic tests (Santos et al., 2021) further influenced care quality. These factors were perceived to reduce the optimal delivery of safe and effective patient care (Deliktas Demirci et al., 2021; Lee & Lee, 2020), and challenged nurses' professional accountability to patients (Catania et al., 2021; Fawaz & Itani, 2021; Fernández-Castillo et al., 2021; Rezaee et al., 2020). Although nurses are obliged to provide person-centred, and compassionate care (Chiang et al., 2007; Wang et al., 2021), some reported they 'cannot be at patient's bedside when he/she needs us' (Rezaee et al., 2020) due to the challenging conditions.

4.4.2 | Emotional reactions (internal stimuli)

Nurses' reported that due to the unclear information and evidence about the health occurrences (Arcadi et al., 2021; Chiang et al., 2007; Lee & Lee, 2020; Ohta et al., 2020), they were concerned they were at a high risk of being infected with the virus and transmitting it to their families and people they cared about (Al Muharraq, 2021; Arcadi et al., 2021; Chiang et al., 2007; Cho & Kim, 2021; Doo et al., 2021; Franco Coffré et al., 2020; Galehdar et al., 2021; Gonzalez-Gil et al., 2021; Gordon et al., 2021; Kackin et al., 2021; Kim, 2018; Labrague and Santos et al., 2021; Lam & Hung, 2013; Liu et al., 2020; Leng et al., 2021; Murat et al., 2021; Sheng et al., 2020; Shih et al., 2009; Vitale et al., 2021; Xu et al., 2021; Zhang et al., 2020). Many reported being concerned about their

personal safety and that of their families, colleagues and patients (Jia et al., 2021; Lam & Hung, 2013; Lee et al., 2005; Logiudice & Bartos, 2021; Shih, 2007).

The fear of becoming infected was reported in all included studies. Keeping family members safe was prioritised, with some nurses opting for self-isolation, restricting social interactions and contacts with family and friends (Han et al., 2020; Lam & Hung, 2013). Fear led to uncertainty and insecurity in the nurses' lives (Moradi et al., 2021; Santos et al., 2021). Nurses reported feeling 'frightened' (Danielis et al., 2021) over something that was not known (Arcadi et al., 2021; Cui et al., 2020; Deliktas Demirci et al., 2021; Fernández-Castillo et al., 2021; Jia et al., 2021; Lee & Lee, 2020; Santos et al., 2021; Su et al., 2007).

Training was an important factor in reducing fear in nurses (Cui et al., 2020; Santos et al., 2021; Sun et al., 2020), but as viral respiratory outbreaks require urgent responses, nurses had inadequate time to train and gain sufficient knowledge to enable them to care safely and effectively for infected patients (Lee & Lee, 2020; Liu et al., 2020; Ohta et al., 2020; Shih et al., 2009). While some nurses had brief training (Han et al., 2020; He et al., 2021; Liu et al., 2020), others had none (Catania et al., 2021). Thus, nurses reported feeling inadequate with a low sense of responsibility, lack of knowledge (Arcadi et al., 2021; Danielis et al., 2021; Gordon et al., 2021; He et al., 2021; Jia et al., 2021; Lee et al., 2005, 2020; Leng et al., 2021; Murat et al., 2021; Tan et al., 2020) and a strong sense of powerlessness (Chung et al., 2005; Fernández-Castillo et al., 2021; Jia et al., 2021; Lapum et al., 2021; Lee et al., 2005, 2020; Sheng et al., 2020; Shih et al., 2009; Sun et al., 2020; Tan et al., 2020).

4.4.3 | Control

Dismayed by the sudden interruption to work and life, nurses believed they had little or no control over the health threat (Catania et al., 2021; Deliktas Demirci et al., 2021; Hong et al., 2021; Yildirim et al., 2021). This lack of control was worsened by media reports that circulated contradictory information (Fernández-Castillo et al., 2021; Schroeder et al., 2020) resulting in information overload (Ohta et al., 2020).

The perception of low control led to high levels of anxiety, stress, depression, panic attacks, frustrations, self-blame and poor mental health among nurses (Bahadır-Yılmaz & Yüksel, 2020; Chung et al., 2005; Crowe et al., 2021; Doo et al., 2021; Fawaz & Itani, 2021; Gordon et al., 2021; Heo et al., 2021; Hong et al., 2021; Karimi et al., 2020; Kim, 2018; Lee et al., 2005; Lee & Lee, 2020; Liu et al., 2020; Logiudice & Bartos, 2021; Murat et al., 2021; Robinson & Kellam Stinson, 2021; Sun et al., 2020; Tan et al., 2020; Vitale et al., 2021; Yildirim et al., 2021; Zhan et al., 2020; Zhang et al., 2020). Besides these experiences, Abu Sharour et al. (2021) and Heo et al. (2021) reported that nurses exhibited good levels of 'self-efficacy' and 'self-confidence' in providing care for infected patients and experienced a strong sense of professional solidarity

among clinical staff during outbreaks (Catania et al., 2021; Chiang et al., 2007; Lee & Lee, 2020; Liu & Liehr, 2009; Robinson & Kellam Stinson, 2021; Schroeder et al., 2020; Sun et al., 2020; Xu et al., 2021).

Of major concern are symptoms of post-traumatic stress disorder (PTSD). Burnout, emotional exhaustion, obsessions, suspicions, loneliness (Crowe et al., 2021; Deliktas Demirci et al., 2021; Galehdar et al., 2020, 2021; Gonzalez-Gil et al., 2021; Gunawan et al., 2021; He et al., 2021; Hoseinabadi et al., 2020; Kackin et al., 2021; Labrague and Santos et al., 2021; Lapum et al., 2021; Leng et al., 2021; Li et al., 2021; Moradi et al., 2021; Ohta et al., 2020; Sagherian et al., 2020; Shih et al., 2009; Su et al., 2007; Wang et al., 2021) and suicidal ideation were all reported (Hong et al., 2021) among nurses.

Reports of the impact of the pandemic on resilience are contradictory, while Doo et al. (2021) reported resilience was considerably lower in nurses who cared for infected patients, Logiudice and Bartos (2021) reported the opposite. Lapum et al. (2021) assert that the resilience acquired through nurses' experiences will provide protection in future situations.

4.5 | Impact

4.5.1 | Disturbance in physical well-being

Nurses' ability to meet patients' needs were compromised by the overwhelming physical exhaustion and discomfort associated with wearing PPE (Franco Coffré et al., 2020; Honey et al., 2013; Kim, 2018; Lam & Hung, 2013; Lapum et al., 2021; Leng et al., 2021; Liu et al., 2020; Liu & Liehr, 2009; Logiudice & Bartos, 2021; Moradi et al., 2021; Robinson and Kellam 2021; Sagherian et al., 2020; Sheng et al., 2020; Sun et al., 2020). The continuous cycle of donning and doffing masks, face shields, hairnets and gowns were described as cumbersome and energy sapping.

Physical symptoms of headaches, dizziness, muscle pain, breathlessness, dermatitis, raised body temperature, sweating and poor vision were widely reported (Bahadır-Yılmaz & Yüksel, 2020; Chung et al., 2005; Cui et al., 2020; Galehdar et al., 2020, 2021; Gordon et al., 2021; Hong et al., 2021; Kang et al., 2018; Laudanski et al., 2021; Lee et al., 2020; Lee & Lee, 2020; Leng et al., 2021; Moradi et al., 2021; Muz & Erdoğan Yüce, 2020; Vitale et al., 2021; Wang et al., 2021). These symptoms further impacted on sleep disturbances (Cui et al., 2020; Galehdar et al., 2021; Gordon et al., 2021; Leng et al., 2021; Sagherian et al., 2020; Su et al., 2007; Vitale et al., 2021; Yildirim et al., 2021).

4.5.2 | Social well-being

Some nurses reported being stigmatised and discriminated against within their communities (Gordon et al., 2021; Gunawan et al., 2021; Kackin et al., 2021; Kim, 2018; Lee & Lee, 2020; Park

et al., 2018; Rezaee et al., 2020; Yildirim et al., 2021). Studies reported that nurses were thought of as the virus (Deliktas Demirci et al., 2021), considered a source of viral transmission (Kackin et al., 2021; Lee & Lee, 2020; Moradi et al., 2021), and that some friends, family members and work colleagues approached them with fear and caution (Deliktas Demirci et al., 2021; Muz & Erdoğan Yüce, 2020; Ohta et al., 2020). This resulted in nurses feeling alienated, isolated and forced to be separated from families and friends (Galehdar et al., 2021; Karimi et al., 2020; Lapum et al., 2021; Lee et al., 2020; Moradi et al., 2021; Murat et al., 2021; Robinson & Kellam Stinson, 2021). This discrimination was extended to their family members (Kim, 2018) and to prevent being rejected and ostracised by their community, some nurses avoided disclosing their profession (Chiang et al., 2007).

4.6 | Response

As a consequence of the threat perception, nurses reported a range of problem-focused and emotion-focused coping strategies. Problem-focused coping included increasing their knowledge about the disease (Abu Sharour et al., 2021; Al Muharraq, 2021; Franco Coffré et al., 2020; Zhang et al., 2020), obtaining support from families and friends (Crowe et al., 2021; Deliktas Demirci et al., 2021; Franco Coffré et al., 2020; Jia et al., 2021), deliberately fostering positive thoughts (Kackin et al., 2020) and engaging in new and old hobbies (Crowe et al., 2021; Jia et al., 2021).

In addition, nurses reported using emotion-focused coping strategies such as using humour, avoidance behaviour including social isolation, or problem-focused strategies such as mindfulness techniques, distraction and reducing working hours (Çınar et al., 2021; Lam & Hung, 2013; Pasay-an, 2020; Sun et al., 2020). They also described finding comfort in cooking, reading books, painting, shopping, watching movies, exercising (Deliktas Demirci et al., 2021; Gordon et al., 2021; Kackin et al., 2021; Lee et al., 2005; Robinson & Kellam Stinson, 2021) and participating in healing programmes (Kang et al., 2018).

Accepting social support from either family, friends or the public was used as problem-focused coping strategies, with nurses reporting that it motivated them to continue to care for infected patients (Kalateh Sadati et al., 2021; Kang et al., 2018; Leng et al., 2021; Sheng et al., 2020; Su et al., 2007; Sun et al., 2020).

Some studies identified a variety of organisational strategies to assist nurses during viral respiratory disease outbreaks. These included financial incentives or bonuses (Abu Sharour et al., 2021; Franco Coffré et al., 2020; Jia et al., 2021; Kang et al., 2018; Sheng et al., 2020), frequent communications 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 Demirci et al., 2021; Hoseinabadi et al., 2020; Lam & Hung, 2013; Lyu et al., 2020) and regular educational programmes (Kang et al., 2018; Lee et al., 2005). The studies urged the need for more of these interventions (Yildirim et al., 2021) to boost morale (Lee et al., 2005).

5 | DISCUSSION

This review highlights what is known about the experiences and coping strategies of nurses caring for patients with severe viral disease during an outbreak. Reports of low control, powerlessness and adverse psychological outcomes were common which in turn reduced coping strategies. Evidence relating to work-related stress in the healthcare sector during pandemics is mounting (Saragih et al., 2021), calling for policy reform and systems level changes in the working environment (West et al., 2020).

Nurses play a key role in any healthcare system, responding to complex humanitarian crises and disasters and provide broad services in different settings (World Health Organization (WHO), 2016a, 2016b; National Audit Office, 2020). Most often, they are frontline responders, spending more time with patients than other healthcare professionals and are considered the most reliable health professionals (Rosa et al., 2020). Frequent changes in clinical guidelines and workplace protocols, heavy workloads and working hours, unavailability of PPE and lack of knowledge and training led to feelings of low personal control. This impacted on nurses' ability to perform basic clinical procedures and providing care for the many patients dying during this pandemic. It also impacted on their own ability to stay healthy. Governments and healthcare providers are urged to provide decent working conditions and increase nurses' autonomy in decision-making and clinical practice (Holloway et al., 2021; World Health Organization (WHO), 2016a, 2016b).

Feelings of powerlessness led to other adverse psychological outcomes including anxiety, stress, depression, panic attacks, frustration, insomnia and self-blame. Our findings are consistent with longitudinal study conducted over the first phase of the COVID-19 pandemic which reported that the UK nursing and midwifery workforce experienced a high prevalence of adverse psychological effects (Couper et al., 2022). Female and young nurses are particularly vulnerable to distress compared to male nurses. To mitigate this impact, healthcare institutions are advised to provide clear communication, and proactive psychosocial support for healthcare workers amidst pandemics (Gee & Skovdal, 2017).

Many challenges are inherent to the nursing role (Botha et al., 2015), but prolonged or intense challenge from a pandemic generates fear and an atmosphere of unease while caring for infected patients (Vizheh et al., 2020). Relevant and current information, resources and disaster-based training (Al Thobaity & Alshammari, 2020; Lee et al., 2021), better preparedness and building healthcare professionals' resilience prior to pandemics (Aiello et al., 2011) may off-set this fear.

The control element of the SR-CSM depicts an individual's beliefs about how much the health threat can be managed or kept under control. Perceptions of low control are associated with more stress and the view that the health threat is uncontrollably complemented by unpleasant severe consequences (Hagger & Orbell, 2003). On the other hand, high control over the health threat is associated with positive outcomes of physical, social and psychological well-being (Hagger & Orbell, 2003). Individual

coping strategies such as using social support, attending educational programmes, increasing knowledge about the disease and engaging in different hobbies are helpful, but in the absence of social support are not enough to regulate levels of stress and may lead to decreased job satisfaction (Lim et al., 2010) and staff potentially leaving the profession (International Council of Nurses, 2021). Workplace factors have been shown to mitigate experiences in pandemics and epidemics (Koh et al., 2011) and organisations as responsible employers could make use of these at these challenging times.

5.1 | Strength and limitations

More than one reviewer was involved to reduce bias in the screening process. Quality assessment was carried out using the standardised JBI critical appraisal approach. The data synthesis and findings drew explicitly on an established theoretical framework which guided the interpretation and presentation of the empirical evidence identified, further reducing bias in reporting the review findings.

We acknowledge the review only included studies published in academic journals and English language. Some grey literature and articles published in other languages may have unintentionally been missed. In addition, we did not include studies after 4th May 2021 and therefore may have missed more recent studies on this topic. The majority of the participants in the included studies were female nurses, which may limit the generalisability of our findings to the wider nursing workforce.

6 | CONCLUSIONS

Nurses experienced considerable physical, psychological and social challenges in the recent pandemic. These challenges impact on nurses' well-being affecting the delivery of care, collaborative work and organisational efficacy. Social support, improved workplace and training can help mitigate the challenges and it is vital for stakeholders, policymakers, the government and healthcare institutions to recognise and monitor nurses' needs to develop and implement effective supportive systems pre and post-pandemics.

7 | RELEVANCE FOR CLINICAL PRACTICE

Nurses are often the first point of contact in providing direct care to patients, hence they are at high risk of being infected. This pandemic was an opportunity to develop a long-term plan to counter the threat to health. Nursing staff need a system that keeps them well informed, supported (professionally and personally) and safe. When events do happen, there will be consequences that affect individuals and the duty of a good employer is to have a way of repairing any damage to those individuals if they are to maintain a healthy workforce. The findings from this review can help managers and

policymakers in developing programmes to enhance resilience in the nursing workforce.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary material.

REGISTRATION

The protocol was registered with the International Prospective Register of Systematic Reviews database (CRD42021253378) on 7th May 2021. https://www.crd.york.ac.uk/PROSPERO/display_record.php?RecordID=253378

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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