1-1-2023

The impact of pandemics on healthcare providers' workloads: A scoping review

Gemma Doleman
Edith Cowan University

Annemarie De Leo
Edith Cowan University

Dianne Bloxsome
Edith Cowan University

ORIGINAL RESEARCH: EMPIRICAL
RESEARCH - MIXED METHODS

JAN
Leading Global Nursing Research

WILEY

The impact of pandemics on healthcare providers' workloads: A scoping review

Gemma Doleman[1,2] | Annemarie De Leo[3] | Dianne Bloxsome[1]

[1]School of Nursing and Midwifery, Edith Cowan University, Perth, Western Australia, Australia

[2]Centre for Nursing Research, Sir Charles Gardiner Osbourne Park Healthcare Group, Perth, Western Australia, Australia

[3]School of Medical Health Sciences, Edith Cowan University, Perth, Western Australia, Australia

Correspondence
Gemma Doleman, School of Nursing and Midwifery, Edith Cowan University, 270 Joondalup Drive, Joondalup, Perth, WA 6027, Australia.
Email: g.doleman@ecu.edu.au

Abstract

Aims: To review and synthesize available evidence exploring the impact of pandemics on direct healthcare providers' workloads in the acute care setting.

Design: Scoping review.

Data Sources: A review of English research articles published up to August 2022 that examined the impact of pandemics on healthcare providers' workloads was undertaken. Studies were identified by searching four electronic databases: Medline (EBSCO), CINAHL (EBSCO), Web of Science and PsychInfo (EBSCO). Fifty-five studies met the inclusion criteria.

Review Methods: The review followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses Scoping Review checklist.

Results: Healthcare workers experience an increase in workload pressures during a pandemic. This included patients requiring more care, undertaking non-normal work activities, increase in work content including changes to documentation, increase in demand and skills required, an increase in overtime and hours of work per week and higher patient-to-nurse ratios. The review also highlighted changes to the work environment and worsened work environments, including staffing shortages.

Conclusion: Focused efforts from health organizations to prioritize supportive conditions, policies focused on improved work environments, staffing adequacy and fair and reasonable workloads will enhance retention of the current workforce and future planning for pandemics.

Impact: Understanding workload challenges faced by frontline health professionals during the pandemic can improve planning, including policies and procedures, and resource allocation for future pandemic or emergency situations. In addition, extended periods of high workloads can impact staff retention. As many countries return to life after COVID-19, it is important that healthcare organizations examine staff pressures and identify ways to support staff moving forward. This will be vital for the future sustainability of the workforce.

Patient or Public Contribution: No patient or public contribution.

Gemma Doleman, Annemarie De Leo and Dianne Bloxsome contributed equally to this work.

1 | INTRODUCTION

The global Coronavirus COVID-19 pandemic has caused unprecedented challenges for the healthcare system and its staff. These challenges have resulted in staffing levels, workloads, mental and physical health issues, death within the workforce and the identification of system inefficiencies (Buchan et al., 2022; Frawley et al., 2021). Healthcare professionals are central to the global preparedness and response effort for a pandemic in all countries (Buchan et al., 2022; Liu et al., 2020; Wu et al., 2020). Therefore, maintaining the health and safety of this workforce is crucial for controlling outbreaks, educating the community, managing mental health and non-communicable diseases, emergency preparedness and response and providing safe and quality patient-centred care (World Health Organization, 2020). If the well-being of staff is not maintained, the healthcare system's capacity to deliver quality patient care is at risk (Liu et al., 2020; Wu et al., 2020).

A global healthcare response to pandemics has been the mandated implementation of public health measures in hospitals to prevent the virus's spread from patients to healthcare workers (Choi et al., 2020; Leo et al., 2003). These measures were implemented during the severe acute respiratory syndrome (SARS) outbreak of 2003 and included the use of essential equipment, such as gloves, gowns and KN95 masks (Leo et al., 2003). In addition, restrictions to hospital access, screening of employees, visitors and family members when entering hospitals, mandatory vaccinations, use of protective equipment, isolation, 1.5-metre distancing where possible, and restrictions on transfers of patients between institutions and wards have been introduced (Department of Health, 2022a, 2022b).

Healthcare workers in previous pandemics have expressed an increase in workload pressures, depression, social stigmas, post-traumatic stress, anxiety, burnout and moral distress (Chan & Huak, 2004; Goulia et al., 2010; McAlonan et al., 2007). The COVID-19 pandemic has been no different, with healthcare workers experiencing greater patient acuity, an increase in mortality exposure, changes to staffing patterns, environmental demands (Gavin et al., 2020; Shanafelt et al., 2020) and a heightened sense of personal danger caused by the lethality of the virus (Spiers et al., 2021). To date, an estimated 115,000 healthcare workers have lost their lives to COVID-19 (World Health Organization, 2021).

In addition, staff are also experiencing strain from greater workload demands (Gavin et al., 2020; Shanafelt et al., 2020; Spiers et al., 2021). Research has shown that heavier workloads and longer working hours caused by the pandemic significantly impacted healthcare workers' mental health (Spiers et al., 2021; Varghese et al., 2021; Zhou et al., 2022). As workloads increase, job satisfaction decreases, which results in many leaving the profession (Buchan et al., 2022; Hunter et al., 2022). This is of great concern

considering the predicted future global shortage of healthcare workers (Buonsenso et al., 2021; International Council of Nurses, 2021). Researchers are urging healthcare organizations to provide supportive conditions, policies focused on improved work environments, staffing adequacy and fair and reasonable workloads (Buchan et al., 2022; Hunter et al., 2022). Hopefully, these measures will assist with burnout and retention challenges caused by the pandemic (Buchan et al., 2022; Hunter et al., 2022).

While healthcare workers' workloads have increased due to past and present pandemics, there is currently no synthesis of research on this topic, including resource allocation. Therefore, this scoping review aimed to explore the impact of pandemics on direct healthcare providers' workload in the acute care setting. The term 'workload' for the purpose of this study relates to direct care activities (e.g. bathing, medication administration, taking blood and patient interactions) and indirect care activities (e.g. clerical work, interaction with team members). These activities can differ depending on the speciality, ward area and patient acuity level. Also, the definition for this study explores workloads as a result of staff shortages, including higher patient-to-healthcare provider ratios and hours of work.

2 | METHODS

The review was conducted in accordance with the JBI methodology for systematic reviews, which provides the most recent approach to reporting a scoping review (Peters et al., 2020). The results were reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews checklist (PRISMA-ScR) (Tricco et al., 2018).

2.1 | Data sources and search strategy

In accordance with the JBI approach, a three-step approach to the search strategy was used. Step 1 involved consultation with a health information librarian to develop the search strategy, key terms used for this search and initial search of the databases. See Table 1 for a list of terms used. Step 2 involved searching for studies using four electronic databases: Medline (EBSCO), CINAHL (EBSCO), Web of Science and PsychInfo (EBSCO). Step 3 involved forward citation searching and hand searching of reference lists of included studies.

2.1.1 | The inclusion criteria and exclusion criteria

Studies were included if the impact of a pandemic on direct healthcare workers' workloads was measured. For this scoping review, a

direct healthcare worker is referred to any individual providing continual in-patient care, that is, doctors, nurses, midwives and allied healthcare workers. All included studies were written in English,

TABLE 1 Search keywords

Problem	Intervention	Context
Nursing	Pandemic	Hospital*
Nurse*	Epidemic	"Acute care"
Midwife*	Outbreak	"Acute care setting" OR hospital
"Medical workers"		"Health services"
"Healthcare professionals"		Ward
"Medical personnel"		Inpatient
Healthcare worker*		
"Healthcare workers"		NOT: Community OR "Home care"
"Healthcare personnel"		NOT: "Nursing home" OR "Aged care"
Workload		
"work load"		
work-load		

The * is a truncation symbol used for database searching.

Note: All keywords were searched using TX search field unless specified. TX=all text.

available in full text, published up to August 2022 and conducted in the acute care hospital setting. Studies were excluded if workloads were mentioned but not measured or analysed, if studies were conducted in the community, paediatric or aged care sector and if they solely measured workloads of non-direct healthcare workers or those with limited patient contact, that is, administrative workers, pharmacists and radiographers. Grey literature and research presented as editorials, letters and at conferences were also excluded from this study, as it was felt that peer-reviewed journals would provide sufficient literature for review.

2.2 | Search outcomes

The initial search resulted in 1510 articles. After removing duplicates, 1083 articles were reviewed by title and abstract. Each title and abstract were independently screened against the inclusion criteria by two reviewers, 978 articles were excluded as they did not measure workloads of direct care workers during a pandemic or were conducted in the wrong population, resulting in 105 eligible studies for full-text screening. Fifty-six articles were removed during full-text screening as they did not focus on direct care providers or measure and report on workload changes. An additional 6 articles were found
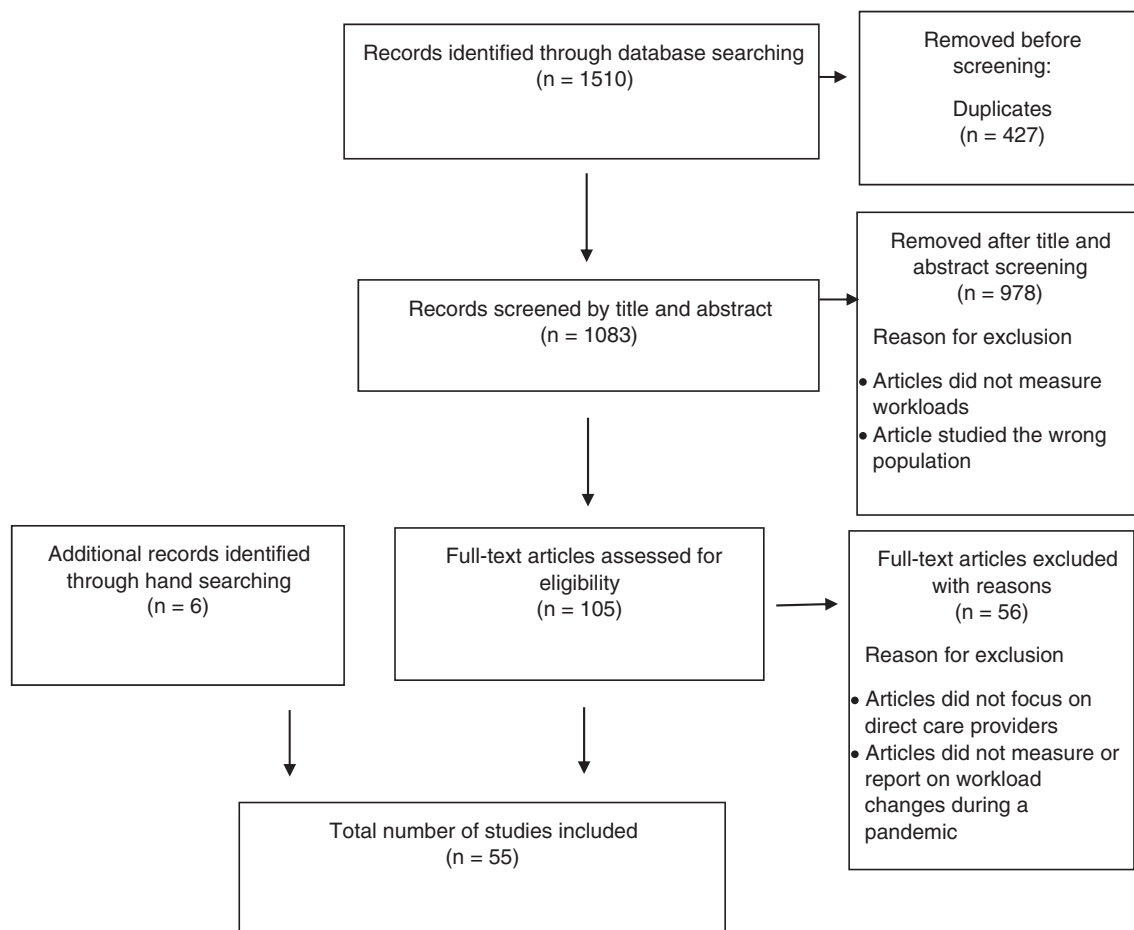

FIGURE 1 Search and retrieval process.

TABLE 2 Study characteristics

Author, date and country, *title*	Setting	Population	Aim
Akova et al. (2022) Turkey *Prevalence of Burnout, Depression, Anxiety, Stress, and Hopelessness Among Healthcare Workers in COVID-19 Pandemic in Turkey*	HCW across the whole of Turkey	Physician $n = 569$ (56.1) Nurse $n = 252$ (24.8) Other HCWs $n = 388$	To explore the mental health levels of HCWs and factors affecting them one and a half years into the pandemic.
Arslan et al. (2021) Turkey *The effects of the COVID-19 outbreak on physicians' psychological resilience levels*	Pandemic Hospital staff $n = 332$ (49.6%) Other hospital staff $n = 51$ (7.6%) Primary Health Care staff $n = 212$ (31.6%) Administrative Units staff $n = 76$ (11.2%)	Doctors and dentists $n = 671$	To examine the level of anxiety, depression, and psychological resilience among physicians during Covid-19 and to explore the factors associated with their psychological resilience.
Bellanti et al. (2021) Italy *Factors Related to Nurses' Burnout during the First Wave of Coronavirus Disease-19 in a University Hospital in Italy*	University hospital in Foggia Italy	Nurses $n = 293$	To examine burnout among nurses working in an Italian University Hospital during the first wave of COVID-19 pandemic.
Bergman et al. (2021) Sweden *Registered nurses' experiences of working in the intensive care unit during the COVID-19 pandemic*	Hospital ICU setting.	Registered nurses specialized in ICU or anaesthesia who had been working during the pandemic $n = 282$	To describe Swedish ICU nurses' experiences of caring for patients during the COVID-19.
Brophy et al. (2021) Ontario *Sacrificed: Ontario Healthcare Workers in the Time of COVID-19*	Healthcare organizations including small rural to large urban centres.	Hospital-based registered practical nurses $n = 4$ Long-term care-based registered practical nurse $n = 1$ Hospital cleaner $n = 1$ Clerical staff $n = 2$ Long-term care patient support workers $n = 2$	To explore, document, and understand the HCWs' lived experience of working in COVID-19.
Bruyneel, Gallani, et al. (2021) Belgium *Impact of COVID-19 on nursing time in intensive care units in Belgium.*	3 Belgian French-speaking hospitals, including 5 ICUs.	Exploration of Nursing Activity Score (NAS) for 95 patients with COVID-19 and 1604 non-COVID-19 patients.	To examine the nurse-to-patient ratio required by COVID-19 patients and to identify the factors that influence nursing.
Bruyneel, Smith, et al. (2021) Belgium *Prevalence of burnout risk and factors associated with burnout risk among ICU nurses during the COVID-19 outbreak in French-speaking Belgium*	French-s	ICU nurses $n = 1135$	To assess ICU nurse's burnout risk and facilitating factors during COVID-19.
Butera et al. (2021) Belgium *Prevalence and Associated Factors of Burnout Risk Among Intensive Care and Emergency Nurses Before and During the Coronavirus Disease 2019 Pandemic: A Cross-Sectional Study in Belgium*	French-speaking hospitals in Belgium.	ICU and emergency nurses First wave of the study before COVID-19 $n = 442$ Second Wave of the study during COVID-19 $n = 1616$	To examine burnout risk among ICU and emergency department nurses before and during COVID-19 and the factors that result in burnout.
Cengiz et al. (2021) Turkey *Behaviours and experiences of nurses during the COVID-19 pandemic in Turkey: A mixed methods study*	Nurses working in seven geographical regions of Turkey.	Nurses $n = 1306$	To explore nurses' experiences of working during the COVID-19 pandemic.

Study design	Measure of workloads	Overall findings
Cross-sectional study	Workload was measured as a single measure asking staff about their workload intensity during the pandemic.	Eighty-two per cent reported an increase in workload intensity. Workload intensity negatively impacted on the mental state of HCWs. Specifically, emotional exhaustion.
Descriptive cross-sectional study	Workload was measured using a single item asking staff if their workload had increased or decreased.	35.8% of physicians reported an increase in their workloads since the onset of the COVID-19 pandemic. However, 47.1% of physicians reported a decrease in their workloads. The depression score was higher in those with increased workloads.
Cross-sectional study	Workload was measured using true/false items. My workload has increased I must work overtime I must do things that I should not do at work	84% reported an increase in their workload, 59.4% stated that they must work overtime and 51.5% said that they must undertake activities that they do not normally undertake. Workload and stress have a direct impact on nurses' levels of exhaustion, burnout, depersonalization and of emotional support.
Mixed method survey design. Surveys were distributed via social medica.	Workload was discussed during interviews through interviews.	Nurses felt that patient safety and care quality were compromised, and care was deprioritized, which increased ethical stress. Increased nurse-=patient ratio and worsened work environments impacted nurses' health and well-being. Three themes were identified from the qualitative data: tumbling into chaos, diminished nursing care and transition to the pandemic.
Qualitative study	Workload was discussed during the interviews	HCWs are suffering from excessive pandemic-related mental distress. "Organizational factors" including such as access to personal protective equipment, workload; and systems-level factors such as prevalence of COVID-19, exacerbated mental distress. An increase in workload and understaffing resulted in exhaustion and burnout.
Retrospective observational study	Nursing Activity Score represents 81% of nursing activities and is independent of the severity of the pathology.	The Nursing activity score was significantly higher among COVID-19 patients than non-COVID patients. In the COVID-19 group, these scores were also observed at each hospital per shift. COVID-19 patients required more time, which increased nursing workloads in the activities of monitoring and titration, mobilization, and hygiene. A COVID-19 diagnosis was associated independently with an increase in nursing time.
Online survey	The following workload questions were asked: 1. perception of workload, 2. number of COVID-19 patients in the ward, 3. number of deaths from COVID-19, 4. amount of personal protective equipment	89% of participants reported an increase in workload during the COVID-19 pandemic. Twenty-two per cent of participants had a ratio of 1:3 with 3% having a ratio of more than 3 patients to one nurse. During the first wave of the pandemic, two-thirds of ICU nurses were at risk of burnout. This risk was associated with their working conditions. Those who reported higher workloads were at a higher risk of burnout. A 1:3 nurse-to-patient ratio increased the risk of emotional exhaustion.
Cross-sectional study released over two waves.	Workload data was collected in the second wave of the survey release.	Burnout and emotional exhaustion significantly associated with workload changes and limited access to PPE. Workload was significantly different between ICU and emergency nurses. 89.1% of ICU nurses reported an increase in workload after COVID-19 pandemic and 2.3% a decrease in workload. In contrast, 45.1% of emergency nurses reported an increase in workload and 37% reported a decrease in workload.
Parallel mixed pattern converging quantitative and qualitative research methods.	Workload was a subtheme identified through the qualitative interviews.	Nurses felt that they were "extremely busy". Depressive emotions and obsessive behaviours were caused by excessive workloads and changes to work environments. High workload caused intensive stress.

(Continues)

TABLE 2 Continued

Author, date and country, *title*	Setting	Population	Aim
Cheong et al. (2022) Korea *Workload of Healthcare Workers During the COVID-19 Outbreak in Korea: A Nationwide Survey*	16 healthcare facilities that provide COVID-19 treatment.	Nurse $n=20$ (47.6%) Doctor $n=13$ (31.0%) Hospital administrators and maintenance workers $n=6$ (14.3%) Radiologic technologist $n=3$ (7.1%)	To investigate the workload of healthcare workers working during COVID-19 outbreak in South Korea.
Daneshvar et al. (2022) Iran *Sources of anxiety among health care workers in Tehran during the COVID-19 pandemic*	Four hospitals in Tehran.	Healthcare workers $n=723$	To examine the source of anxiety for HCW's during the COVID-19 pandemic and how these differ by demographic and professional characteristics in the context of Iran will be assessed.
Duru (2021) Turkey *The Continuing Effect of COVID-19 Pandemic on Physical Well-Being and Mental Health of ICU Healthcare Workers in Turkey: A Single-Centre Cross-Sectional Later-Phase Study*	A tertiary care hospital in Turkey	ICU healthcare workers $n=-51$	To assess the physical and mental impact of the pandemic on HCW's.
Ebrahimi et al. (2021) Iran *The effect of workload on nurses' quality of life with moderating perceived social support during the COVID-19 pandemic*	5 hospitals affiliated with the Iran University of Medical Sciences where COVID-19 patients are hospitalized.	Iranian nurses $n=n=336$	To examine the impact of workload and social support on nurses' quality of life during the COVID-19 pandemic.
Evcili and Demirel (2022) Turkey *The effects of workload on the styles of anger expression and "trait anger" of healthcare professionals working in a COVID-19 pandemic hospital*	A COVID-19 hospital in Turkey.	Healthcare workers $n=493$	To determine the effects of workload on the styles of anger expression and "trait anger" of health professionals working in a COVID-19 pandemic hospital.
Felice et al. (2020) Italy *Impact of COVID-19 outbreak on healthcare workers in Italy: Results from a national e-survey*	The survey was released via social media to healthcare workers in Italy.	Healthcare workers $n=388$	To assess the impact of the outbreak on healthcare workers (HCW).
Fernández-Castillo et al. (2021) Spain *Intensive care nurses' experiences during the COVID-19 pandemic: A qualitative study.*	Tertiary teaching hospital in Spain	ICU nurses $n=17$	To explore and describe the experiences and perceptions of nurses working in an ICU during the COVID-19 global pandemic.
Fournier et al. (2022) France *Impact of the COVID-19 pandemic on the mental health of professionals in 77 hospitals in France*	Multicentre study across 73 departments in France.	Healthcare professionals $n=4370$	To assess HCW's mental health working during COVID-19 and to identify factors influencing the risk of mental health disorders.
Gao et al. (2020) China *Nurses' experiences regarding shift patterns in isolation wards during the COVID-19 pandemic in China: A qualitative study*	Hospital of Shanghai and Wuhan	Nurses working in a COVID-19 isolation ward $n=14$	To explore nurses' perceptions of shift patterns during the COVID-19 outbreak.
García-Hedrera et al. (2021) Spain *Intensive care unit professionals during the COVID-19 pandemic in Spain: social and work-related variables, COVID-19 symptoms, worries, and generalized anxiety levels*	Critical care units throughout Spain.	Healthcare workers working in the ICU $n=448$	To describe HCW's experience of work conditions, symptoms, worries and anxiety.

Study design	Measure of workloads	Overall findings
Cross-sectional survey	A survey with a questionnaire examining, workforce for COVID-19 inpatient care, workforce & operation of COVID-19 screening centre; HCWs infected with COVID-19 in enrolled healthcare facilities.	The nurse-to-patient ratio for COVID-19 patients was higher than the highest national standard in South Korea (3.8 vs. 2 for critical care). As the number of COVID-19 patients increases, the number of HCWs required increases as the workload for COVID-19 patients is much greater than other situations.
Quantitative survey design with open- and closed-ended questions and interviews.	Participants were asked whether their workload had increased.	30% of respondents reported heavy workloads with an increase in hours of work as a result of a large number of COVID-19 patients and a shortage of staff. The increase in workloads was found to be a source of Anxiety.
Cross-sectional study	Working hours were examined. ≥ 200 h/per month was considered a heavy workload.	76.5% of HCWs reported having a heavy workload (working ≥200 h/month). Heavy workload was associated with a decrease in sleep duration, Vit B12 and Vit D. Anxiety was higher in those more hours per month.
Cross-sectional descriptive analysis study. Questionnaires distributed via virtual channels.	Workload assessment was measured using the NASA-TLX Task Load Index that Hart and Steveland first used in 1988. Composed of 6 subscales: Mental Demand, Physical Demand, Temporal Demand, Performance, Frustration and Effort. Each subscale includes one question.	The workload score of the nurses was high. High workloads can upset the balance between work and quality of life. Perceived social support as a moderator can reduce the negative impact of workloads on quality of life.
Descriptive study	Workloads were assessed by an 11-item scale developed by Duxbury et al. (1994). The scale assessed the extent to which participants experienced overload, inflexibility, and lack of control in their jobs. A sample item was 'in my job, I have too much to do'.	HCW's with high workloads, could not tolerate their work, had higher levels of 'trait anger' and their anger was suppressed. The workload score points were higher in females, those ≤25 years, those with an associate or undergraduate degree, those with <10 years of experience, those working shifts and those with >11 patients per day and in those with insufficient staff in the unit.
Online survey	COVID-19 on HCW was also assessed in terms of psychological safety, experience of deaths among acquaintances, availability of psychological support at the workplace, and degree of workload.	44% of participants felt their workloads had increased. 42% felt it had decreased and 14.4% felt their workload had unaltered.
Qualitative research was undertaken, using an empirical approach and inductive content analysis techniques.	Workloads were discussed in the interviews as a sub-theme.	Patient isolation led to an exponential increase in workload levels of nurses. As the number of professionals decreased in the room nursing responsivities and the time spent in a patient's room increased. Nurses found they were undertaking a greater number of activities usually undertaken by other healthcare professionals.
Cross-sectional study	The questionnaire had questions related to the changes to work schedule, number of hours worked, changes to working hours	32.3% felt that they worked more during the pandemic. In 14 out of the 18 professional groups indicated excessive workloads. Workload increased due to taking PPE on and off and applying specific decontamination procedures. In addition, working hours double also increased, due to colleagues being sick, or because additional beds were made available to cope with the massive influx of patients.
Qualitative descriptive study using semi-structured interviews.	Workloads were discussed in the interviews as a major theme.	Four themes were identified from the data: use scientific methods to assign work, reorganize nursing workflow and shift patterns, communication between nurses and managers and nurses' various feelings and views on shift patterns.
Cross-sectional study using online survey	The questionnaire included work variables.	94.9% of participants felt that their workloads had increased during the pandemic even though patient to professional ratio had not increased. Workloads during the pandemic in Madrid were considered higher than in other regions.

(Continues)

TABLE 2 Continued

Author, date and country, *title*	Setting	Population	Aim
Goel et al. (2021) India *Post-lockdown challenges for ophthalmologists during COVID-19 pandemic in India: A survey-based analysis*	Practising ophthalmologists across India via the All-India Ophthalmological Society (AIOS)	Ophthalmologists $n=794$	To evaluate the COVID-19 post-lockdown challenges experienced among the ophthalmologists in India.
Gomez et al. (2020) *Benchmarking Critical Care Well-Being: Before and After the Coronavirus Disease 2019 Pandemic*	Four hospitals	Critical care professionals $n=481$	To assess ICU staff burnout and professional fulfilment as a result of the virus.
González-Gil et al. (2021) Spain *Nurses' perceptions and demands regarding COVID-19 care delivery in critical care units and hospital emergency services.*	26 public hospitals across Madrid	Critical care and emergency nurses	To identify needs of critical care and emergency nurses in the region of Madrid, Spain, during the acute phase of the epidemic crisis.
Grailey et al. (2021) *Lived experiences of healthcare workers on the front line during the COVID-19 pandemic: a qualitative interview study*	One National Health Service Trust.	All staff working within the emergency ad critical care departments $n=49$.	To assess HCW perceived stressors, psychological safety and teamwork.
Hoogendoorn et al., 2021 Netherlands *The impact of COVID-19 on nursing workload and planning of nursing staff on the Intensive Care: A prospective descriptive multicenter study*	Six hospitals in the Netherlands.	Data of 36,754 shifts of 3994 ICU patients: 218 patients with COVID-19 and 1367 non-COVID ICU patients in the COVID-19 period; 147 patients with pneumonia and 2262 non-pneumonia ICU Patients in the non-COVID period.	To describe different nursing workloads of nursing patients with COVID-19 and non-COVID-19 and to the planning of nursing staff in the ICU.
Jiang et al. (2022) China *Nurses' experience of work stress related to COVID-19 regular prevention and control in China: A qualitative study*	Two hospitals in China	Thirty nurses and eight nurse managers	To explore nurses' work stress related to COVID-19.
Kabunga and Okalo (2021) Uganda *Frontline Nurses' Post-Traumatic Stress Disorder and Associated Predictive Factors During the Second Wave of COVID-19 in Central, Uganda*	Two referral hospitals and seven general hospitals	Nurses $n=601$	To assess nurses' PTSD level and predictive factors during COVID-19.
Koh et al. (2005) Singapore *Risk Perception and Impact of Severe Acute Respiratory Syndrome (SARS) on Work and Personal Lives of Healthcare Workers in Singapore: What Can We Learn?*	Nine major healthcare institutions	Healthcare workers $n=15,025$	To understand the fears and anxieties of HCWs during the severe acute respiratory syndrome (SARs)
Li et al. (2021) Australia *Emergency clinicians' knowledge, preparedness and experiences of managing COVID-19 during the 2020 global pandemic in Australian healthcare settings*	Online through the College of Emergency Nursing Australasia (CENA), Australasian College for Emergency Medicine (ACEM), Australasian college of paramedicine (ACP).	Emergency nurses $n=159$, emergency physicians $n=110$, paramedics $n=161$	To assess Australian nurses, physicians and paramedics preparedness, knowledge and experience of working during the COVID-19 pandemic.
Liang et al. (2021) Taiwan *Nurses' experiences of providing care during the covid-19 pandemic in Taiwan: A qualitative study.*	Nurses looking after COVID patients in a negative pressure isolation room across 5 hospitals	Registered nurses	To explore Taiwanese nurses' experiences of providing care during a pandemic.

Study design	Measure of workloads	Overall findings
Survey-based study	The questionnaire was used to cover various parameters.	A third of ophthalmologists experienced a significant reduction in their surgical workload during this period. 57% of respondents reported a 75% reduction in their surgical workload while 35% stated reduction of more than 90%. However, quite strikingly in contrast to the above, 12.7% reported workload amounting to 75–100% of their pre-lockdown load.
Longitudinal assessment of a cross-sectional survey	Workload was measured through the candidate risk of burnout by Shanafelt and Noseworthy.	ICU workers reported an increase in expectations and things to do. Workload and job demand were identified as drivers of burnout. Well-being was measured from meaning in work, culture and values of Work community, control and flexibility, and social support.
Cross-sectional study using online questionnaires	Information relating to work situation of ICU professionals was collected.	28.2% of nursing staff felt that there was a personnel shortage, which resulted in elevated workloads and more responsibilities, high nurse-to-patient ratios and shifts that did not allow them to disconnect or rest. They also felt that there were deficiencies in communication with middle management.
Qualitative interview study.	Workloads were discussed in the interviews.	To manage workload increases, many non-specialists staff were 'redeployed' into the critical care and emergency departments. This resulted in mixed feelings and increased the burden on existing staff due to lack of knowledge and lack of time for training.
Retrospective analysis of database.	Nursing Activities Score (NAS) per patient, the number of patients per nurse and the nursing activities score per nurse.	The nurse-to-patient ratio increased significantly as did the NAS per Intensive care nurse in the COVID period compared to the non-COVID period. The NAS was significantly higher in COVID-19 patients compared to both the pneumonia patients and the non-COVID patients. This was related to intense hygienic procedures, mobilization and positioning, support and care for relatives and respiratory care.
Semi-structured in-depth interviews	Workload was a sub-theme identified from the interviews.	The workload of nurses has increased. Infection prevention and control has added much work to nurses. The work content has increased, but there are no more nursing human resources, which makes nurses busier and more stressed.
Cross-sectional study	Workload was measured using a single item asking nurses if their workload had increased	31.6% of participants felt that their workload had increased. An increase in workload was more likely to result in PTSD compared to colleagues who had less workload.
3-part questionnaire	88 questions comprising single choice, multiple choice, and open-ended questions pertaining to the perception of exposure to SARS, perceived risk of infection, and impact of the SARS outbreak on personal and work life; and Impact of Events Scale	53% of HCWs reported an increase in workload. 54% had to undertake activities that they "normally do not do," and 36% had to work overtime. Compared with doctors, all other categories of workers were more likely to report increased workload. Other predictors of increased workload were those married with children, impact of event scale score.
Cross-sectional study	One section measured the experiences of working as an emergency physician during the COVID-19 pandemic.	36.4–40% of nurses and physicians felt that their workloads had increased significantly. While one-third of paramedics reported that their workload had lessened.
Descriptive qualitative study using semi-structured interviews	Each survey contained questions about knowledge of COVID-19, preparedness for COVID-19 and experiences working during the COVID-19 pandemic.	Nurses reported heavier workloads as a result of COVID-19. They had to keep themselves up to date on new knowledge and skills related to the evolving pandemic, undertaking new training, and paying attention to other practice changes. It took them 10–15 minutes to prepare to enter a patient's room, where they would do all nursing activities for the patient at the same time.

(Continues)

TABLE 2 Continued

Author, date and country, *title*	Setting	Population	Aim
Magnavita et al. (2021b) Italy *Prolonged Stress Causes Depression in Frontline Workers Facing the COVID-19 Pandemic-A Repeated Cross-Sectional Study in a COVID-19 Hub-Hospital in Central Italy*	COVID-19 hub hospital Rome	All workers in anaesthesiology department $n = 152$	To assess HCWs well-being and mental health after the 10 months of COVID-19 and to evaluate the extent to which their attitude towards the pandemic had changed and measures to manage prolonged stress.
Magnavita et al. (2021a) Italy *A One-Year Prospective Study of Work-Related Mental Health in the Intensivists of a COVID-19 Hub Hospital*	COVID-19 hub hospital Rome	All workers in anaesthesiology department $n = 120$	To measure the perception of organizational justice and occupational stress and how these varied in relation to external factors
Malinowska-Lipień et al. (2021) Poland *The Correlation between Nurses' COVID-19 Infections and Their Emotional State and Work Conditions during the SARS-CoV-2 Pandemic*	Polish healthcare facilities	Nurses $n = 158$. 79 with COVID-19 patients, 79 without COVID-19 patients.	To examine the relationship between COVID-19 infections among nursing staff and emotion levels and to identify changes to work conditions during the Pandemic.
Matsuishi et al. (2012) Japan *Psychological impact of the pandemic (H1N1) 2009 on general hospital workers in Kobe*	Three hospitals in Japan looking after patients with H1N1	Healthcare workers $n = 1625$ Hospital X,Y,Z Hospital X and Z received both inpatient and outpatient H1N1 patients. Hospital Y only outpatients.	To examine the psychological impact of the pandemic (H1N1) 2009 on HCWs and how it was affected by the hospital, gender, age, job and work environment.
Matsuo et al. (2021) Japan *Health care worker burnout after the first wave of the coronavirus disease 2019 (COVID-19) pandemic in Japan*	Tertiary hospital in Tokyo	Healthcare workers $n = 672$	To examine HCWs burnout according to job category after the first wave of COVID-19 in Japan and to explore its associated factors.
Mattila et al. (2021) Finland *COVID-19: anxiety among hospital staff and associated factors.*	Two hospital medical care centres.	Healthcare workers.	To examine finished HCWs anxiety levels during the COVID-19 pandemic and contributing background factors.
Nahidi et al. (2022) Australia *Australian critical care nurses' knowledge, preparedness, and experiences of managing SARS-COV-2 and COVID-19 pandemic*	Online survey distributed via the Australian College of Critical Care nurse members	Critical care nurses n=	To explore critical care nurses' knowledge, preparedness, and experiences of managing severe acute respiratory syndrome coronavirus 2 infection (SARS-CoV-2) and COVID-19 infected patients
Naldi et al. (2021) Italy *COVID-19 pandemic-related anxiety, distress and burnout: prevalence and associated factors in healthcare workers of North-West Italy*	Four hospitals in Northern Italy	Healthcare workers $n = 797$	To investigate HCWs' anxiety, distress and burnout during CXOVI-19 and to detect potential psychosocial factors associated with their emotional response.
Niu et al. (2022) China *Professional quality of life in nurses on the frontline against COVID-19*	One hospital in Wuhan	Nurses $n = 102$	To investigate nurses' quality of life while working during COVID-19 and its related factors.
Ozkan and Unlu (2021) Turkey *The effect of workload caused by the pandemic on depression, anxiety and stress levels in surgical and operating room nurses*	One state hospital operating room, surgical intensive care unit and surgical clinic.	Nurse $n = 166$	To examine the effect of surgical and operating nurses on the effect of pandemic workload on depression, anxiety and stress levels.
Rashid et al. (2020) Lahor, Pakistan *Perception, Challenges, and Consequences of Covid-19 Pandemic on Doctors Working in Government and Private Hospitals of Lahore*	Services hospital Lahore, Mayo hospital Lahore and Shalimar hospital Lahore.	Healthcare workers $n = 122$	To examine the problems experienced by HCWs during COVID-19 in hospitals of Lahore.

Study design	Measure of workloads	Overall findings
A repeated cross-sectional study	The questionnaire had 43 questions divided into 6 sections.	Workers reported an increase in workload in the second wave. 52.2% felt that their workload had increased/ greatly increased in the first wave and 88.1% felt that their workload had increased/ greatly increased in the second wave.
A repeated cross-sectional study	Questionnaire	Doctors reported an increase in workload, isolation at work and socially, a lack of time for physical activity and meditation, and compassion fatigue. For many, the type of medical activity had also become progressively more repetitive and monotonous.
A diagnostic poll method was used	54 questions concerning work conditions during the pandemic.	84.1% of nurses reported an increase in workload during the pandemic. Many reported personal shortages ($n=135$; 85.44%). During the pandemic, 57.59% worked in the 12-h shift system ($n=91$), 16.46% in the alternate 12-and-24-h system ($n=26$), and 13.29% in the 24-h shift system ($n=21$). Due to the pandemic, 68.99% of the polled nurses ($n=109$) worked overtime.
Self-administered paper-based questionnaires.	Two items workload items were asked (1) Burden of change of quality of work (2) Burden of increase in quantity of work.	Nurses reported higher workloads than doctors. Workers at hospital x reported higher workloads than hospital Y. Workers in high-risk work environments felt that they had a higher workload than workers in low-risk work environments.
Online cross-sectional survey	Questions were asked on mean weekly working hours, days off per month, frequency of direct contact with patients with COVID-19 per week, and frequency of COVID- 19- related work per week.	207 respondents reported that their working hours have worsened compared to the peak period. Nurses reported significantly higher hours of work compared to other health professional groups. These results suggest that nurses may be experiencing an increase in workload and working hours, despite all but physicians work in shifts.
Cross-sectional survey.	A question asking an increase in workloads that threatens your psychological health (yes, uncertain, no).	28% ($n=537$) felt that the workload had increased during COVID-19 to the degree that it threatened their physical and psychological health.
Exploratory cross-sectional study	17 items exploring experience of working during the ongoing COVID-19 outbreak.	55.7% felt that the pandemic had increased their workloads. In contrast, 6.9% felt that their workloads had lessened and 7.6% felt that their workload had remained the same.
Cross-sectional survey	Variations in workload (increased or decreased, based on the subjective opinion of HCW)	59.6% felt that their workloads had increased. An increase in workload was associated with worst psychological outcomes.
Cross-sectional research design	Working hours at Wuhan, a nurse's working hours per day during the pandemic, the number of night shifts per week, workload, job satisfaction	29.4% felt that their workload was very heavy, 65.7% felt that their workload was general and 4.9% said no it was not very heavy. 4.9% were working more than 12h per day. Heavy workload was related to burnout, compassion satisfaction and secondary traumatic stress.
Descriptive cross-sectional	Workload questionnaire developed by Duxbury et al. (1994). Higher scores indicated a higher workload.	The average weekly working hours was 45.48 (min–max=32–72). 64.5% reported high workloads during the pandemic.
Cross-sectional study	Workload was measured by asking staff if their workload had increased yes/no	72 (59%) reported that their workload had increased.

TABLE 2 Continued

Author, date and country, *title*	Setting	Population	Aim
Razu et al. (2021) Bangladesh *Challenges Faced by Healthcare Professionals During the COVID-19 Pandemic: A Qualitative Inquiry from Bangladesh*	Across different hospitals and clinics in Khulna and Dhaka	Healthcare professionals $n = 15$	To assess the challenges faced by nurses and doctors during COVID-19 in Bangladesh.
Ren et al. (2022) China *Nursing allocation in isolation wards of COVID-19 designated hospitals: a nationwide study in China*	117 hospitals across China	Head nurses $n = 229$ Nurses $n = 1378$	To review nursing workforce allocation on COVID-19 isolation wards and provide examination of strategies to deploying first-line nurses in the future.
Said and El-Shafei (2021) Egypt *Occupational stress, job satisfaction, and intent to leave: nurses working on front lines during COVID-19 pandemic in Zagazig City, Egypt*	Fever hospital with COVID-19 patients and general hospital non-COVID-19 hospital	Nurse = 210 group 1 Nurses = 210 group 2	To assess occupational stress, job satisfaction, and intent to leave among nurses dealing with suspected COVID-19 patients.
Scott et al. (2022) Australia *I was prepared to become infected as a frontline medical staff': A survey of Australian emergency department staff experiences during COVID-19*	Online via professional association memberships.	Healthcare workers $n = 162$	To identify challenges faced by Australian hospital healthcare staff during the COVID-19 pandemic.
Sethi et al. (2020) Pakistan *Impact on Frontline Nurses in the Fight Against Coronavirus Disease*	Private and public hospitals in Pakistan	Nurses $n = 210$	To explore the impact of COVID-19 on nurses and the associated challenges.
Shiao et al. (2007) Taiwan *Factors predicting nurses' consideration of leaving their job during the SARS outbreak*	Four health care settings. One hospital with SAR's patients and three with no SARs patients	Nurses $n = 753$	To examine nurses' perception of SARS and the proportion considering to leave including associated non-work related factors.
Shimels (2021) Ethiopia *Has the COVID-19 Pandemic Impacted Healthcare Service Uptake at Hospitals in Addis Ababa?*	Two hospitals	Data from 12 departments of each hospital Interviews $n = 8$	To examine health service utilization before and during the COVID-19 pandemic
Shoja et al. (2020) Iran *Covid-19 effects on the workload of Iranian healthcare workers*	Healthcare workers in Iran Ministry of Health and Medical Centre	Healthcare workers $n = 495$	To evaluate the impact of the COVID-19 epidemic on the workload and mental health of Iranian medical staff using the General Health Questionnaire (GHQ-12) and NASA-Task Load Index (NASA-TLX) Questionnaire
Tang et al. (2021) China *A survey of coping strategies among clinical nurses in China during the early stage of coronavirus disease 2019 pandemic: A cross-sectional study*	Seven designated COVID-19 hospitals	Nurses $n = 957$	To investigate coping strategies and identify their associated factors among Chinese clinical nurses during the early stage of coronavirus disease 2019 pandemic
Villar et al. (2021) Qatar *The lived experiences of frontline nurses during the coronavirus disease 2019 (COVID-19) pandemic in Qatar: A qualitative study*	One COVID-19 facility	Nurses $n = 30$	To explore nurses' experience of providing care during the COVID-19 pandemic.

Study design	Measure of workloads	Overall findings
Qualitative study	The interview guide consisted of questions related to workload, severity of the illness and associated stress, PPE availability and quality of POPE, challenges and coping strategies to manage the barriers.	Seven themes were identified. participants experienced an increase in workloads, distress, PPE shortage, social exclusion/ stigmatization, lack of incentives, absence conditions and proper management during their service. Staff shortages resulted in an increase in workloads. Doctors were given one day off per week and worked longer hours.
Online survey	Hours of work, nurses' allocation were measured in the questionnaires	Nurse-to-bed ratios differed in isolation wards. In suspected case ward 1:0.56, in confirmed case wards 1:0.45 and in severe case ICU wards 1:1.88. Nurses worked on average 5 hours per shift for ICU wards and 6 h for other wards. Both factors impacted patient length of stay and hours of work impacted on nurse job satisfaction.
Comparative cross-sectional study	Workload was measured using 9 items in the Expanded Nursing Stress Scale	Workload was higher in the hospital with COVID-19 patients. This included overtime, frequent night shifts, unstable work/rest regimes and work under pressure to have tasks done in a short period of time. Workloads increase occupational stress in 98.6% of nurses in a COVID ward compared to 51.4% in a non-COVID ward.
Online survey	Survey questions focused on issues pertaining to personal protective equipment (PPE), information flow, patient care, infection concerns, workload impacts, impact on mental health, biggest challenges encountered, and what helped or could help with dealing with those challenges	42% looked after more patients, although 82% of respondents reported that their caseload decreased. Compared to the same time in 2019, 9% of respondents reported low or very low workload, 51% reported a moderate workload and 40% reported high or very high workload.
Descriptive survey	A questionnaire asking open-ended questions about the impact of COVID-19 on personal and professional lives and challenges experienced.	Clinical nurses felt that their workloads had increased and resources were constrained. They reported more hours of work due to COVID-19 crises, infected nurses, and overall shortage of nurses. Even after their shift, they spent time in quarantine, which affected them both personally and professionally.
Self-administered questionnaire	Questionnaire measured perceptions of workload.	49.9% of nurses felt 'an increase in workload', 7.6% of nurses felt they should not look after SARS patients and were looking at leaving their position. The main predictors of nurses' consideration of leaving their job were shorter tenure, increased work stress, perceived risk of fatality from SARS, and affected social relationships.
Cross-sectional study using mixed method approach – databases and interviews.	For the quantitative trend analysis, a monthly patient load of various outpatient and inpatient service delivery units was considered.	Results showed changes in workload, poor infrastructure, low service utilization, poor job satisfaction of health professionals, and perception or attitude-related problems. The workload increased due to staff acquiring the infection and high-risk staff going on leave to prevent infection.
Cross-sectional study using online questionnaires	To assess workload the NASA-TLX (NASA-Task Load Index) technique was used.	Healthcare workers with COVID-19 patients were subjected to more task load compared to those with no contact with COVID-19 patients. Workload scores were higher in nursing than other health staff groups.
Cross-sectional study	The NASA–TLX was used to measure workload higher scores indicate higher workloads.	The score of the NASA– TLX was 84.76 (SD = 13.92). The item with the highest score was physical demand (mean = 17.70, SD = 3.56), and the item with the lowest score was frustration (mean = 8.92, SD = 5.60), which was linked to lower levels of coping.
Qualitative, Phenomenological.	Workload was a theme discussed in the interviews.	Results showed challenges to include: working in a new context and new working environment, worn out by the workload, the struggle of wearing protective gear, fear of COVID-19, witnessing suffering).

TABLE 2 Continued

Author, date and country, *title*	Setting	Population	Aim
Wanninayake et al. (2022) Sri Lanka *Covid-19 and job demands and resources experienced by nurses in Sri Lanka*	One public hospital and one private hospital.	Nurses $n = 14$	To examine if nurses receive the necessary job resources to mitigate the impact of COVID-19related job demands.
Zamanzadeh et al. (2021) Iran *Nurses' experiences during the COVID-19 pandemic in Iran: a qualitative study*	Public hospitals affiliated with Tabriz University of Medical Sciences, Iran.	Nurses $= 20$	To explore nurses' experiences of caring for patients with COVID-19.
Zhan et al. (2020) China *The Current Situation and Influencing Factors of Job Stress Among Frontline Nurses Assisting in Wuhan in Fighting COVID-19*	One Wuhan hospital	Nurses $n = 110$	To explore factors including nurses' job stress during COVID-19.
Zhang, Zhang, et al. (2021) China *Influence of perceived stress and workload on work engagement in front-line nurses during COVID- 19 pandemic*	Hospitals treating coronavirus disease.	Registered nurses $n = 1040$	To examine nurses' engagement and influencing factors and provide reference for target interventions.
Zhang, Xiang, and Alejok (2021) Sudan *Coping with COVID-19 in United Nations peacekeeping field hospitals: increased workload and mental stress for military healthcare providers*	UN level II hospital was deployed in the city of Wau, South Sudan	Healthcare workers $n = 47$	To examine the impact of COVID-19 on the United Nations peacekeeping field hospitals where medical supply and manpower are extremely insufficient.

through hand searching. Fifty-five articles met the inclusion criteria and were included for data extraction. Any disagreement between the reviewers was resolved by a third reviewer. See Figure 1 for the Prisma flow chart.

2.3 | Data extraction and synthesis

The following data were extracted from the eligible studies; country, setting, population, aims, study design and the overall findings. See Table 2 for study characteristics. As the studies used a variety of designs and analysis techniques, no comparison or meta-analysis could be undertaken for this review. Instead, a narrative summary is provided.

3 | RESULTS

Fifty-five studies measured the impact of pandemics on direct healthcare provider workloads. Of these, 51 were conducted during the COVID-19 pandemic, one study measured workloads during the influenza H1N1 pandemic of 2009 and two from the SARs pandemic. Twenty-five of the studies explored workloads among all healthcare workers, 2 explored workloads among doctors only, 26 explored workloads among nurses only and 2 studies were undertaken using databases only. Twenty-three studies measured workload by asking working condition questions, for example, perception of workload, number of patients, hours of work and experience of working in a

pandemic. One study measured workload using the Candidate risk of burnout scale, and four studies used the NASA-TLX task load index survey, two studies used the Nursing Activity Score measure, one study used the workload questionnaire, one study used the nurse job stressors scale and one used the Expanded Nursing Stress Scale. Nine of the studies measured workloads using yes or no/ true or false items, 12 discussed workloads following thematic analysis and one study compared workloads pre- and post-COVID-19. See Table 3 for a summary of results.

3.1 | Workload changes

Fifty-four of the fifty-five included studies indicated that the workload of healthcare workers had increased due to working during the pandemic. These increases were related to healthcare workers undertaking activities that they do not usually do (Bellanti et al., 2021; Fernández-Castillo et al., 2021; Gomez et al., 2020; Koh et al., 2005; Zhang, Xiang, & Alejok, 2021) or increasing work content (Jiang et al., 2022; Shoja et al., 2020), including changes to documentation (Fournier et al., 2022; Gomez et al., 2020), demand (Gomez et al., 2020; Tang et al., 2021; Villar et al., 2021; Wanninayake et al., 2022; Zamanzadeh et al., 2021; Zhan et al., 2020), skills required (Jiang et al., 2022; Liang et al., 2021; Tang et al., 2021; Wanninayake et al., 2022) and patient characteristics (Bruyneel, Gallani, et al., 2021; Felice et al., 2020), including isolation (Fernández-Castillo et al., 2021). An increase in working overtime hours or more

Study design	Measure of workloads	Overall findings
Qualitative interviews.	Workload was discussed as a subtheme in the interviews.	Nurses felt that COVID-19 increased physical job demand from wearing PPE and an increase in anxiety from potentially transmitting the disease to family members. The combination of high job demands, and low job resources increased the levels of exhaustion and mental distress experienced by many nurses.
Descriptive Qualitative study using semi-structured interviews.	Workload was discussed as a theme in the interviews.	Workloads increased due to the increased psychological burden in the living and working environment of nurses, as well as the high care load of COVID-19 patients.
Online survey	The nurse job stressors scale was developed by Li and Liu.	25.5% of nurses worked between 7–10h per day. 5.4% of nurses worked more than 11h per day. Working hours per day impacted frontlines nurses' job stress scores.
Cross-sectional descriptive study. Surveys were used to collect the data.	The NASA Task Load Index (NASA-TLX) was developed in 1970 for the use of assessing pilot and air traffic controller workload	Nurses with higher workloads while were aged 30 and older, working 6years or longer, married, having one or more children, master's degree, intermediate seniority, working in fever clinic or other location, previously working in emergency department and working 21 days or longer. Work engagement was negatively correlated with workload.
Pre-COIVD and post-COVID analysis of medical reports.	The medical reports were reviewed to determine the weekly number of patients vising/staying in the hospital, shift schedule. The pre-COVID and post-COVID workloads were then compared.	COVID-19 caused pressure on peacekeeping field hospitals. Increased workload and mental stress among frontline workers. Workloads showed an increase in non-medical work post the pandemic with an increase in hygiene and anti-epidemic work. The overall hours of work increased.

hours per day/week (Bellanti et al., 2021; Daneshvar et al., 2022; Duru, 2021; Evcili & Demirel, 2022; Fournier et al., 2022; Gao et al., 2020; Koh et al., 2005; Malinowska-Lipień et al., 2021; Matsuo et al., 2021; Niu et al., 2022; Ozkan & Unlu, 2021; Ren et al., 2022; Said & El-Shafei, 2021; Sethi et al., 2020; Zhan et al., 2020; Zhang, Xiang, & Alejok, 2021), an increase in healthcare provider-patient ratios (Bergman et al., 2021; Bruyneel, Smith, et al., 2021; Cheong et al., 2022; Evcili & Demirel, 2022; García-Hedrera et al., 2021; González-Gil et al., 2021; Hoogendoorn et al., 2021; Ren et al., 2022; Scott et al., 2022), staffing shortages (Brophy et al., 2021; Evcili & Demirel, 2022; Fournier et al., 2022; González-Gil et al., 2021; Jiang et al., 2022; Malinowska-Lipień et al., 2021; Razu et al., 2021; Scott et al., 2022; Sethi et al., 2020; Shimels, 2021; Wanninayake et al., 2022) and staff re-deployment (Bergman et al., 2021; Grailey et al., 2021), worsened work environment (Bergman et al., 2021) or work environments that were substantially different (Cengiz et al., 2021; Villar et al., 2021). In addition, Bruyneel, Gallani, et al. (2021) and Hoogendoorn et al. (2021) identified that nursing activity scores were higher among the COVID-19 patients as they required more time, which increased nursing workloads. However, some of the participants in these studies also reported a reduction in their workloads (Akova et al., 2022; Arslan et al., 2021; Butera et al., 2021; Felice et al., 2020; García-Hedrera et al., 2021; Li et al., 2021; Matsuo et al., 2021; Nahidi et al., 2022; Scott et al., 2022). For example, Butera et al. (2021) identified that 2.3% of nurses in the ICU and 37% in the emergency department reported a decrease in workload. However, the overall prevalence of burnout

risk was higher among emergency nurses than nurses working in the ICU during the pandemic. Similarly, Arslan et al. identified 47% of physicians reported their workload had also decreased (2021). Of the included studies, one reported only a reduction in workloads for ophthalmologists (Goel et al., 2021). The study reported a 90% reduction in workloads, specifically surgical work.

4 | DISCUSSION

The aim of this scoping review was to explore the impact of pandemics on direct care providers' workload in the acute care setting. Fifty-five studies met the criteria for inclusion. Most of the included studies were conducted during the COVID-19 pandemic and among the nursing profession. Overall, the included studies indicated an increase and in some instances a decrease in workloads, depending on the department and role of the healthcare worker. In some instances, the reported decrease in workload was expected, for example, Goel et al. (2021) reported a 90% reduction in physical workloads, specifically surgical work, which is in keeping with global elective surgery restrictions implemented because of the pandemic (COVIDSurg Collaborative, 2020). Of concern from this review, is the overwhelming report of higher workloads across the included studies because of a pandemic.

Healthcare research has long shown the impact of high workloads on workers' job satisfaction, mental health, retention and patient outcomes. As early as the 1980s, nursing research linked high workloads

TABLE 3 Summary of results.

Studies conducted during COVID-19	Akova et al. (2022); Arslan et al. (2021); Bellanti et al. (2021); Bergman et al. (2021); Brophy et al. (2021); Bruyneel, Gallani, et al. (2021); Bruyneel, Smith, et al. (2021); Butera et al. (2021); Cengiz et al. (2021); Cheong et al. (2022); Daneshvar et al. (2022); Duru (2021); Ebrahimi et al. (2021); Evcili and Demirel (2022); Felice et al. (2020); Fernández-Castillo et al. (2021); Fournier et al. (2022); Gao et al. (2020); García-Hedrera et al. (2021); Goel et al. (2021); Gomez et al. (2020); González-Gil et al. (2021); Grailey et al. (2021); Hoogendoorn et al. (2021); Jiang et al. (2022); Kabunga and Okalo (2021); Li et al. (2021); Liang et al. (2021); Magnavita et al. (2021a, 2021b); Malinowska-Lipień et al. (2021); Matsuo et al. (2021); Mattila et al. (2021); Nahidi et al. (2022); Naldi et al. (2021); Niu et al. (2022); Ozkan and Unlu (2021); Rashid et al. (2020); Razu et al. (2021); Ren et al. (2022); Said and El-Shafei (2021); Scott et al. (2022); Sethi et al. (2020); Shimels (2021); Shoja et al. (2020); Tang et al. (2021); Villar et al. (2021); Wanninayake et al. (2022); Zamanzadeh et al. (2021); Zhan et al. (2020); Zhang, Zhang, et al. (2021); Zhang, Xiang, and Alejok (2021)
Studies conducted during H1N1 pandemic	Matsuishi et al. (2012)
Studies conducted in the SARs pandemic	Koh et al. (2005); Shiao et al. (2007)
Workloads explored among all health care workers	Akova et al. (2022); Brophy et al. (2021); Cheong et al. (2022); Daneshvar et al. (2022); Duru (2021); Evcili and Demirel (2022); Felice et al. (2020); Fournier et al. (2022); García-Hedrera et al. (2021); Gomez et al. (2020); Grailey et al. (2021); Koh et al. (2005); Li et al. (2021); Magnavita et al. (2021a, 2021b); Matsuishi et al. (2012); Matsuo et al. (2021); Mattila et al. (2021); Naldi et al. (2021); Rashid et al. (2020); Razu et al. (2021); Scott et al. (2022); Shimels (2021); Shoja et al. (2020); Zhang, Xiang, and Alejok (2021)
Workloads explored among doctors only	Arslan et al. (2021); Goel et al. (2021)
Workloads explored among nurses only	Bellanti et al. (2021); Bergman et al. (2021); Bruyneel, Smith, et al. (2021); Butera et al. (2021); Cengiz et al. (2021); Ebrahimi et al. (2021); Fernández-Castillo et al. (2021); Gao et al. (2020); González-Gil et al. (2021); Jiang et al. (2022); Kabunga and Okalo (2021); Liang et al. (2021); Malinowska-Lipień et al. (2021); Nahidi et al. (2022); Niu et al. (2022); Ozkan and Unlu (2021); Ren et al. (2022); Said and El-Shafei (2021); Sethi et al. (2020); Shiao et al. (2007); Tang et al. (2021); Villar et al. (2021); Wanninayake et al. (2022); Zamanzadeh et al. (2021); Zhan et al. (2020); Zhang, Zhang, et al. (2021)
Workloads explored through databases only	Bruyneel, Gallani, et al. (2021); Hoogendoorn et al. (2021)
Workloads measured by asking working condition questions, for example, perception of workloads, number of patients, hours of work and experience of working during a pandemic	Bruyneel, Smith, et al. (2021); Butera et al. (2021); Cheong et al. (2022); Duru (2021); Evcili and Demirel (2022); Felice et al. (2020); Fournier et al. (2022); García-Hedrera et al. (2021); Goel et al. (2021); González-Gil et al. (2021); Koh et al. (2005); Li et al. (2021); Liang et al. (2021); Magnavita et al. (2021a, 2021b); Malinowska-Lipień et al. (2021); Matsuishi et al. (2012); Matsuo et al. (2021); Nahidi et al. (2022); Ren et al. (2022); Scott et al. (2022); Sethi et al. (2020); Shiao et al. (2007)
Workload measured using Candidate risk of burnout scale	Gomez et al. (2020)
Workloads measured using the NASA-TLX task load index survey	Ebrahimi et al. (2021); Shoja et al. (2020); Tang et al. (2021); Zhang, Zhang, et al. (2021)
Workloads measured using Nursing Activity Score	Bruyneel, Gallani, et al. (2021); Hoogendoorn et al. (2021)
Workloads measured using the workloads questionnaire	Ozkan and Unlu (2021)
Workloads measured using the Nurse Job Stressor scale	Zhan et al. (2020)
Workloads measured using the Expanded Nursing Stress scale	Said and El-Shafei (2021)
Workloads measured using yes/no or true/false items	Akova et al. (2022); Arslan et al. (2021); Bellanti et al. (2021); Daneshvar et al. (2022); Kabunga and Okalo (2021); Mattila et al. (2021); Naldi et al. (2021); Niu et al. (2022); Rashid et al. (2020)
Workloads discussed using thematic analysis	Bergman et al. (2021); Brophy et al. (2021); Cengiz et al. (2021); Fernández-Castillo et al. (2021); Gao et al. (2020); Grailey et al. (2021); Jiang et al. (2022); Razu et al. (2021); Shimels (2021); Villar et al. (2021); Wanninayake et al. (2022); Zamanzadeh et al. (2021)
Workloads compared pre and post COVID-19	Zhang, Xiang, and Alejok (2021)

to outcomes such as stress and job dissatisfaction (Crickmore, 1987; Weisman et al., 1981). These results are mirrored in medical research (Bates & Moore, 1975; Deary et al., 1996). More recently, research has reported the relationship between healthcare workers' job satisfaction and retention. That is the higher the workload perception, the lower the levels of job satisfaction and the more likely workers are to leave their profession (Buchan et al., 2022; Hunter et al., 2022; Phillips, 2020). In light of this, it is important that healthcare organizations maintain staff satisfaction through supportive leadership and the creation of favourable work environments, including the provision of adequate staffing, skill mix and patient ratios (Alnuaimi et al., 2020; Alrawashdeh et al., 2021; Gedif et al., 2018).

There was also a clear link in this review between increased workloads and mental health distress for healthcare workers working in a pandemic. Many reported that they were emotionally and physically exhausted (Akova et al., 2022; Bellanti et al., 2021; Brophy et al., 2021; Bruyneel, Gallani, et al., 2021; Butera et al., 2021; Wanninayake et al., 2022), which has impacted on their ability to be compassionate (Niu et al., 2022). Further, many healthcare workers have suffered from depression (Arslan et al., 2021; Cengiz et al., 2021; Duru, 2021), distress (Grailey et al., 2021; Naldi et al., 2021; Razu et al., 2021; Wanninayake et al., 2022) stress (Bergman et al., 2021; Cengiz et al., 2021; Fournier et al., 2022; Sethi et al., 2020; Zhan et al., 2020; Zhang, Xiang, & Alejok, 2021; Zhang, Zhang, et al., 2021), PTSD (Kabunga & Okalo, 2021) and anxiety (Daneshvar et al., 2022; Duru, 2021) due to high workloads. In addition, the incidence of healthcare worker burnout has also risen due to being exposed to chronic stress on a day-to-day basis over an extended period (Bellanti et al., 2021; Brophy et al., 2021; Bruyneel, Smith, et al., 2021; Butera et al., 2021; Gomez et al., 2020; Niu et al., 2022). Gramaglia et al. (2021) studied Italian resident doctors and nurses, finding the prevalence of burnout was higher in intensive care units, females aged <30 years and those who were required to frequently change their roles at work. Hormone level fluctuations and menstrual changes were also reported in female healthcare workers in India as a result of burnout during the Covid-19 pandemic (Khasne et al., 2020). High workload is a key stressor; which can lead to stress and burnout and an inability to perform tasks effectively leading to poor patient outcomes (Bergman et al., 2021). These negative healthcare worker outcomes when not managed well lead to an increase in turnover intention (Mosadeghrad, 2013; Xiaoming et al., 2014). It is, therefore, important that healthcare organizations monitor staff workloads, including patient ratios, and the use of overtime and allow for adequate breaks between shifts (Bellanti et al., 2021; Brophy et al., 2021; Bruyneel, Smith, et al., 2021; Butera et al., 2021) to reduce the incidence of burnout and high turnover, which is essential for the future sustainability of the workforce (Buchan et al., 2022).

Heavy workloads can also result in suboptimal care, leading to a decrease in patient satisfaction (Bergman et al., 2021; Carayon & Gurses, 2008; Havaei & MacPhee, 2020) and in some cases an increase in both physical and emotional violence (Abdellah & Salama, 2017; Havaei & MacPhee, 2020). Several studies in our review identified that patient safety and quality of care were compromised (Bergman

et al., 2021) due to staff shortages (Brophy et al., 2021). In some studies, nurses reported not wanting to care for infected patients due to the fear they may become infected and pass it on to their loved ones (Bellanti et al., 2021; Shiao et al., 2007). Also, nursing care was deprioritized during the pandemic (Bergman et al., 2021), and nurses reported grouping their nursing activities due to the requirement to don and doff PPE (Liang et al., 2021). Therefore, support for staff, including an increase in staffing and resources is needed to promote quality of care and patient safety during times of high workloads.

5 | LIMITATIONS

A scoping review methodology offers particular affordances and limitations, which we acknowledge and report accordingly. While a thorough search and screening process was undertaken, relevant literature was possibly missed and may have been applicable to our review question. Selection bias may have also been an issue as grey literature and research in a language other than English were not included in this review. However, the exploratory nature of this scoping review allowed us to capture a varied spectrum of evidence; providing a more comprehensive snapshot of the state of the literature to date.

6 | CONCLUSION

It is well known that workload is a complex construct. Our scoping review's objective was to explore pandemics' impact on direct healthcare providers' workload in the acute care setting. The results highlight the impact of healthcare workers' workloads during a pandemic and the significance of our review findings in the broader context of international research. Additionally, the review findings shed light on the negative impact that high workloads can have on healthcare workers and the patients they are caring for. Despite the literature undisputedly demonstrating the link between pandemics and high workloads, and the negative consequences as a result, forward planning has not yet occurred. Through the course of this review, we identified several research priorities that would contribute to an improved understanding of how pandemics impact healthcare systems, care providers and service delivery. A particular focus on identifying supportive factors that enhance workplace culture during a pandemic would be beneficial. Similarly, further exploration of the factors that impact workload delegation and quality care delivery may help improve staff retention during a pandemic. Inevitably, pandemics heighten the workload, stress and rates of burnout among healthcare providers; thus, future research exploring these core concepts would improve healthcare systems preparedness and planning of the healthcare workforce for future pandemics.

CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

PEER REVIEW

The peer review history for this article is available at https://www.webofscience.com/api/gateway/wos/peer-review/10.1111/jan.15690.

DATA AVAILABILITY STATEMENT

Data that supports this study is available in electronic databases.

ORCID

Gemma Doleman ⓘ https://orcid.org/0000-0001-5566-5681
Annemarie De Leo ⓘ https://orcid.org/0000-0002-0667-5995
Dianne Bloxsome ⓘ https://orcid.org/0000-0003-0419-1249

REFERENCES

Abdellah, R. F., & Salama, K. M. (2017). Prevalence and risk factors of workplace violence against health care workers in emergency department in Ismailia, Egypt. _Pan African Medical Journal_, 26(1), 1–8.

Akova, İ., Kiliç, E., & Özdemir, M. E. (2022). Prevalence of burnout, depression, anxiety, stress, and hopelessness among healthcare workers in COVID-19 pandemic in Turkey. _INQUIRY: The Journal of Health Care Organization, Provision, and Financing_, 59, 00469580221079684.

Alnuaimi, K., Ali, R., & Al-Younis, N. (2020). Job satisfaction, work environment and intent to stay of Jordanian midwives. _International Nursing Review_, 67(3), 403–410.

Alrawashdeh, H. M., Al-Tammemi, A. B., Alzawahreh, M. K., Al-Tamimi, A., Elkholy, M., Al Sarireh, F., Abusamak, M., Elehamer, N. M., Malkawi, A., & Al-Dolat, W. (2021). Occupational burnout and job satisfaction among physicians in times of COVID-19 crisis: A convergent parallel mixed-method study. _BMC Public Health_, 21(1), 1–18.

Arslan, H. N., Karabekiroglu, A., Terzi, O., & Dundar, C. (2021). The effects of the COVID-19 outbreak on physicians' psychological resilience levels. _Postgraduate Medicine_, 133(2), 223–230.

Bates, E. M., & Moore, B. N. (1975). Stress in hospital personnel. _Medical Journal of Australia_, 2(20), 765–767.

Bellanti, F., Lo Buglio, A., Capuano, E., Dobrakowski, M., Kasperczyk, A., Kasperczyk, S., Ventriglio, A., & Vendemiale, G. (2021). Factors related to Nurses' burnout during the first wave of coronavirus Disease-19 in a University Hospital in Italy. _International Journal of Environmental Research and Public Health_, 18(10), 1–14.

Bergman, L., Falk, A.-C., Wolf, A., & Larsson, I.-M. (2021). Registered nurses' experiences of working in the intensive care unit during the COVID-19 pandemic. _Nursing in Critical Care_, 26(6), 467–475.

Brophy, J. T., Keith, M. M., Hurley, M., & McArthur, J. E. (2021). Sacrificed: Ontario healthcare Workers in the Time of COVID-19. _New Solutions: A Journal of Environmental and Occupational Health Policy: NS_, 30(4), 267–281.

Bruyneel, A., Gallani, M.-C., Tack, J., d'Hondt, A., Canipel, S., Franck, S., Reper, P., & Pirson, M. (2021). Impact of COVID-19 on nursing time in intensive care units in Belgium. _Intensive and Critical Care Nursing_, 62, 102967.

Bruyneel, A., Smith, P., Tack, J., & Pirson, M. (2021). Prevalence of burnout risk and factors associated with burnout risk among ICU nurses during the COVID-19 outbreak in French speaking Belgium. _Intensive and Critical Care Nursing_, 65, 103059.

Buchan, J., Catton, H., & Shaffer, F. A. (2022). _Sustain and retain in 2022 and beyond: The global nrusing workforce and the COVID-19 pandemic._ https://www.icn.ch/system/files/2022-01/Sustain%20and%20Retain%20in%202022%20and%20Beyond-%20The%20global%20nursing%20workforce%20and%20the%20COVID-19%20pandemic.pdf

Buonsenso, D., De Rose, C., & Pierantoni, L. (2021). Doctors' shortage in adults COVID-19 units: A call for pediatricians. _European Journal of Pediatrics_, 180(7), 2315–2318.

Butera, S., Brasseur, N., Filion, N., Bruyneel, A., & Smith, P. (2021). Prevalence and associated factors of burnout risk among intensive care and emergency nurses before and during the coronavirus disease 2019 pandemic: A cross-sectional study in Belgium. _Journal of Emergency Nursing_, 47(6), 879–891.

Carayon, P., & Gurses, A. P. (2008). _Nursing workload and patient safety—A human factors engineering perspective._ An evidence-based handbook for nurses.

Cengiz, Z., Isik, K., Gurdap, Z., & Yayan, E. H. (2021). Behaviours and experiences of nurses during the COVID-19 pandemic in Turkey: A mixed methods study. _Journal of Nursing Management_, 29(7), 2002–2013.

Chan, A. O., & Huak, C. Y. (2004). Psychological impact of the 2003 severe acute respiratory syndrome outbreak on health care workers in a medium size regional general hospital in Singapore. _Occupational Medicine_, 54(3), 190–196.

Cheong, H. S., Kwon, K. T., Hwang, S., Kim, S. W., Chang, H. H., Park, S. Y., Kim, B., Lee, S., Park, J., Heo, S. T., Oh, W. S., Kim, Y., Park, K. H., Kang, C. K., Oh, N., Lim, S. J., Yun, S., & Son, J. W. (2022). Workload of healthcare workers during the COVID-19 outbreak in Korea: A Nationwide survey. _Journal of Korean Medical Science_, 37(6), e49. https://doi.org/10.3346/jkms.2022.37.e49

Choi, K. R., Jeffers, K. S., & Logsdon, M. C. (2020). Nursing and the novel coronavirus: Risks and responsibilities in a global outbreak. _Journal of Advanced Nursing_, 76, 1486–1487.

COVIDSurg Collaborative. (2020). Elective surgery cancellations due to the COVID-19 pandemic: Global predictive modelling to inform surgical recovery plans. _Journal of British Surgery_, 107(11), 1440–1449.

Crickmore, R. (1987). A review of stress in the intensive care unit. _Intensive Care Nursing_, 3(1), 19–27.

Daneshvar, E., Otterbach, S., Alameddine, M., Safikhani, H., & Sousa-Poza, A. (2022). Sources of anxiety among health care workers in Tehran during the COVID-19 pandemic. _Health Policy and Planning_, 37(3), 310–321.

Deary, I. J., Blenkin, H., Agius, R. M., Endler, N. S., Zealley, H., & Wood, R. (1996). Models of job-related stress and personal achievement among consultant doctors. _British Journal of Psychology_, 87(1), 3–29.

Department of Health. (2022a). _COVID-19 infomaiton for health professionals: Notifciation of COVID-19._ Governement of Western Australia.

Department of Health. (2022b). _COVID-19 visitor guideline for WA public hosptial and health services._ Governement of Western Australia.

Duru, H. (2021). The continuing effect of COVID-19 pandemic on physical well-being and mental health of ICU healthcare Workers in Turkey: A single-Centre cross-sectional later-phase study. _Journal of Intensive Care Medicine_, 08850666211070740, 1206–1214.

Duxbury, L., Higgins, C., & Lee, C. (1994). Work-family conflict: A comparison by gender, family type, and perceived control. _Journal of Family Issues_, 15(3), 449–466.

Ebrahimi, H., Jafarjalal, E., Lotfolahzadeh, A., & Kharghani Moghadam, S. M. (2021). The effect of workload on nurses' quality of life with moderating perceived social support during the COVID-19 pandemic. _Work_, 70(2), 347–354.

Evcili, F., & Demirel, G. (2022). The effects of workload on the styles of anger expression and "trait anger" of healthcare professionals working in a COVID-19 pandemic hospital. *Perspectives in Psychiatric Care*, 58(4), 1932–1939.

Felice, C., Di Tanna, G. L., Zanus, G., & Grossi, U. (2020). Impact of COVID-19 outbreak on healthcare workers in Italy: Results from a national e-survey. *Journal of Community Health: The Publication for Health Promotion and Disease Prevention*, 45(4), 675–683.

Fernández-Castillo, R. J., González-Caro, M. D., Fernández-García, E., Porcel-Gálvez, A. M., & Garnacho-Montero, J. (2021). Intensive care nurses' experiences during the COVID-19 pandemic: A qualitative study. *Nursing in Critical Care*, 26(5), 397–406.

Fournier, A., Laurent, A., Lheureux, F., Ribeiro-Marthoud, M. A., Ecarnot, F., Binquet, C., & Quenot, J.-P. (2022). Impact of the COVID-19 pandemic on the mental health of professionals in 77 hospitals in France. *PLoS One*, 17(2), e0263666.

Frawley, T., Van Gelderen, F., Somanadhan, S., Coveney, K., Phelan, A., Lynam-Loane, P., & De Brún, A. (2021). The impact of COVID-19 on health systems, mental health and the potential for nursing. *Irish Journal of Psychological Medicine*, 38(3), 220–226.

Gao, X., Jiang, L., Hu, Y., Li, L., & Hou, L. (2020). Nurses' experiences regarding shift patterns in isolation wards during the COVID-19 pandemic in China: A qualitative study. *Journal of Clinical Nursing*, 29(21), 4270–4280.

García-Hedrera, F. J., Gil-Almagro, F., Carmona-Monge, F. J., Peñacoba-Puente, C., Catalá-Mesón, P., & Velasco-Furlong, L. (2021). Intensive care unit professionals during the COVID-19 pandemic in Spain: Social and work-related variables, COVID-19 symptoms, worries, and generalized anxiety levels. *Acute and Critical Care*, 36(3), 232–241.

Gavin, B., Hayden, J., Adamis, D., & McNicholas, F. (2020). Caring for the psychological well-being of healthcare professionals in the Covid-19 pandemic crisis. *Irish Medical Journal*, 113(4), 51.

Gedif, G., Sisay, Y., Alebel, A., & Belay, Y. A. (2018). Level of job satisfaction and associated factors among health care professionals working at University of Gondar Referral Hospital, Northwest Ethiopia: A cross-sectional study. *BMC Research Notes*, 11(1), 1–7.

Goel, M., Goel, S., Sachdev, M. S., Sharma, N., Mishra, D., Yadav, G., Barua, N., & Aggarwal, S. (2021). Post-lockdown challenges for ophthalmologists during COVID-19 pandemic in India: A survey-based analysis. *Indian Journal of Ophthalmology*, 69(4), 946–950.

Gomez, S., Anderson, B. J., Yu, H., Gutsche, J., Jablonski, J., Martin, N., Kerlin, M. P., & Mikkelsen, M. E. (2020). Benchmarking critical care well-being: Before and after the coronavirus disease 2019 pandemic. *Critical Care Explorations*, 2(10), e0233.

González-Gil, M. T., González-Blázquez, C., Parro-Moreno, A. I., Pedraz-Marcos, A., Palmar-Santos, A., Otero-García, L., Navarta-Sánchez, M. V., Alcolea-Cosín, M. T., Argüello-López, M. T., & Canalejas-Pérez, C. (2021). Nurses' perceptions and demands regarding COVID-19 care delivery in critical care units and hospital emergency services. *Intensive and Critical Care Nursing*, 62, 102966.

Goulia, P., Mantas, C., Dimitroula, D., Mantis, D., & Hyphantis, T. (2010). General hospital staff worries, perceived sufficiency of information and associated psychological distress during the A/H1N1 influenza pandemic. *BMC Infectious Diseases*, 10(1), 322.

Grailey, K., Lound, A., & Brett, S. (2021). Lived experiences of healthcare workers on the front line during the COVID-19 pandemic: A qualitative interview study. *BMJ Open*, 11(12), e053680.

Gramaglia, C., Marangon, D., Azzolina, D., Guerriero, C., Lorenzini, L., Probo, M., Rudoni, M., Gambaro, E., & Zeppegno, P. (2021). The mental health impact of 2019-nCOVID on healthcare workers from north-eastern Piedmont, Italy. Focus on burnout. *Frontiers in Public Health*, 9, 667379.

Havaei, F., & MacPhee, M. (2020). The impact of heavy nurse workload and patient/family complaints on workplace violence: An application of human factors framework. *Nursing Open*, 7(3), 731–741.

Hoogendoorn, M. E., Brinkman, S., Bosman, R. J., Haringman, J., de Keizer, N. F., & Spijkstra, J. J. (2021). The impact of COVID-19 on nursing workload and planning of nursing staff on the intensive care: A prospective descriptive multicenter study. *International Journal of Nursing Studies*, 121, 104005.

Hunter, R., Willis, K., & Smallwood, N. (2022). The workplace and psychosocial experiences of Australian junior doctors during the COVID-19 pandemic. *Internal Medicine Journal*, 52, 745–754.

International Council of Nurses. (2021). *Policy Brief: the global nursing shortage and nurse retention*. https://www.icn.ch/sites/default/files/inline-files/ICN%20Policy%20Brief_Nurse%20Shortage%20and%20Retention_0.pdf

Jiang, Z., Wang, S., Shen, Z., Zhao, X., Wang, F., Chen, Y., Qiao, Y., Wei, T., Dong, P., & Ding, S. (2022). Nurses' experience of work stress related to COVID-19 regular prevention and control in China: A qualitative study. *Journal of Nursing Management*, 30(2), 375–383.

Kabunga, A., & Okalo, P. (2021). Frontline Nurses' post-traumatic stress disorder and associated predictive factors during the second wave of COVID-19 in central, Uganda. *Neuropsychiatric Disease and Treatment*, 17, 3627–3633.

Khasne, R. W., Dhakulkar, B. S., Mahajan, H. C., & Kulkarni, A. P. (2020). Burnout among healthcare workers during COVID-19 pandemic in India: Results of a questionnaire-based survey. *Indian Journal of Critical Care Medicine: Peer-Reviewed, Official Publication of Indian Society of Critical Care Medicine*, 24(8), 664–671.

Koh, D., Lim, M. K., Chia, S. E., Ko, S. M., Qian, F., Ng, V., Tan, B. H., Wong, K. S., Chew, W. M., Tang, H. K., Ng, W., Muttakin, Z., Emmanuel, S., Fong, N. P., Koh, G., Kwa, C. T., Tan, K. B.-C., & Fones, C. (2005). Risk perception and impact of severe acute respiratory syndrome (SARS) on work and personal lives of healthcare Workers in Singapore: What can we learn? *Medical Care*, 43(7), 676–682.

Leo, Y., Chen, M., Heng, B., & Lee, C. (2003). Severe acute respiratory syndrome-Singapore, 2003. *MMWR: Morbidity & Mortality Weekly Report*, 52(18), 405.

Li, C., Sotomayor-Castillo, C., Nahidi, S., Kuznetsov, S., Considine, J., Curtis, K., Fry, M., Morgan, D., Walker, T., Burgess, A., Carver, H., Doyle, B., Tran, V., Varshney, K., & Shaban, R. Z. (2021). Emergency clinicians' knowledge, preparedness and experiences of managing COVID-19 during the 2020 global pandemic in Australian healthcare settings. *Australasian Emergency Care*, 24(3), 186–196.

Liang, H. F., Wu, Y. C., & Wu, C. Y. (2021). Nurses' experiences of providing care during the COVID-19 pandemic in Taiwan: A qualitative study. *International Journal of Mental Health Nursing*, 30(6), 1684–1692.

Liu, Q., Luo, D., Haase, J. E., Guo, Q., Wang, X. Q., Liu, S., Xia, L., Liu, Z., Yang, J., & Yang, B. X. (2020). The experiences of health-care providers during the COVID-19 crisis in China: A qualitative study. *The Lancet Globalization and Health*, 8, e790–e798.

Magnavita, N., Soave, P. M., & Antonelli, M. (2021a). A one-year prospective study of work-related mental health in the intensivists of a COVID-19 hub hospital. *International Journal of Environmental Research and Public Health*, 18(18), 1–12.

Magnavita, N., Soave, P. M., & Antonelli, M. (2021b). Prolonged stress causes depression in frontline workers facing the COVID-19 pandemic-a repeated cross-sectional study in a COVID-19 hub-Hospital in Central Italy. *International Journal of Environmental Research and Public Health*, 18(14), 1–13.

Malinowska-Lipień, I., Suder, M., Wadas, T., Gabryś, T., Kózka, M., Gniadek, A., & Brzostek, T. (2021). The correlation between Nurses' COVID-19 infections and their emotional state and work conditions during the SARS-CoV-2 pandemic. *International Journal of Environmental Research and Public Health*, 18(23), 1–13.

Matsuishi, K., Kawazoe, A., Imai, H., Ito, A., Mouri, K., Kitamura, N., Miyake, K., Mino, K., Isobe, M., Takamiya, S., Hitokoto, H., & Mita, T. (2012). Psychological impact of the pandemic (H1N1)

2009 on general hospital workers in Kobe. *Psychiatry and Clinical Neurosciences*, *66*(4), 353–360.

Matsuo, T., Taki, F., Kobayashi, D., Jinta, T., Suzuki, C., Ayabe, A., Sakamoto, F., Kitaoka, K., Uehara, Y., & Mori, N. (2021). Health care worker burnout after the first wave of the coronavirus disease 2019 (COVID-19) pandemic in Japan. *Journal of Occupational Health*, *63*(1), e12247.

Mattila, E., Peltokoski, J., Neva, M. H., Kaunonen, M., Helminen, M., & Parkkila, A. K. (2021). COVID-19: Anxiety among hospital staff and associated factors. *Annals of Medicine*, *53*(1), 237–246.

McAlonan, G. M., Lee, A. M., Cheung, V., Cheung, C., Tsang, K. W., Sham, P. C., Chua, S. E., & Wong, J. G. (2007). Immediate and sustained psychological impact of an emerging infectious disease outbreak on health care workers. *The Canadian Journal of Psychiatry*, *52*(4), 241–247.

Mosadeghrad, A. M. (2013). Occupational stress and turnover intention: Implications for nursing management. *International Journal of Health Policy and Management*, *1*(2), 169–176.

Nahidi, S., Sotomayor-Castillo, C., Li, C., Currey, J., Elliott, R., & Shaban, R. Z. (2022). Australian critical care nurses' knowledge, preparedness, and experiences of managing SARS-COV-2 and COVID-19 pandemic. *Australian Critical Care: Official Journal of the Confederation of Australian Critical Care Nurses*, *35*(1), 22–27.

Naldi, A., Vallelonga, F., Di Liberto, A., Cavallo, R., Agnesone, M., Gonella, M., Sauta, M. D., Lochner, P., Tondo, G., Bragazzi, N. L., Botto, R., & Leombruni, P. (2021). COVID-19 pandemic-related anxiety, distress and burnout: Prevalence and associated factors in healthcare workers of north-West Italy. *Bjpsych Open*, *7*(1), e27.

Niu, A., Li, P., Duan, P., Ding, L., Xu, S., Yang, Y., Guan, X., Min, S., Jiang, Y., & Luo, Y. (2022). Professional quality of life in nurses on the frontline against COVID-19. *Journal of Nursing Management*, *30*, 1115–1124.

Ozkan, S., & Unlu, H. A. (2021). The effect of workloads caused by the pandemic on depression, anxiety and stress levels in surgical and operating room nurses. *Journal of Basic and Clinical Health Sciences*, *5*(2), 134–143.

Peters, M. D., Godfrey, C., McInerney, P., Munn, Z., Tricco, A. C., & Khalil, H. (2020). Chapter 11: Scoping reviews. In E. Aromataris & Z. Munn (Eds.), *JBI manual for evidence synthesis*. JBI. https://synthesismanual.jbi.global

Phillips, C. (2020). Relationships between workload perception, burnout, and intent to leave among medical–surgical nurses. *JBI Evidence Implementation*, *18*(2), 265–273.

Rashid, N., Ashraf, A., Ayub, R., Bashir, A., Ali, M., & Fatima, N. (2020). Perception, challenges, and consequences of Covid-19 pandemic on doctors working in government and private hospitals of Lahore. *Pakistan Journal of Medical & Health Sciences*, *14*(4), 1069–1072.

Razu, S. R., Yasmin, T., Arif, T. B., Islam, M. S., Islam, S. M. S., Gesesew, H. A., & Ward, P. (2021). Challenges faced by healthcare professionals during the COVID-19 pandemic: A qualitative Inquiry from Bangladesh. *Frontiers. Public Health*, *9*, 647315.

Ren, H.-F., Chen, F.-J., He, L.-X., Liu, C.-Q., Liu, Y.-Y., Huang, Y.-J., Han, H., Fu, S., Zhang, M.-G., & Jiang, Y. (2022). Nursing allocation in isolation wards of COVID-19 designated hospitals: A nationwide study in China. *BMC Nursing*, *21*(1), 1–9.

Said, R. M., & El-Shafei, D. A. (2021). Occupational stress, job satisfaction, and intent to leave: Nurses working on front lines during COVID-19 pandemic in Zagazig City, Egypt. *Environmental Science and Pollution Research International*, *28*(7), 8791–8801.

Scott, A. M., Murray, A., Jones, M., Keijzers, G., & Glasziou, P. (2022). 'I was prepared to become infected as a frontline medical staff': A survey of Australian emergency department staff experiences during COVID-19. *Emergency Medicine Australasia*, *34*(4), 569–577.

Sethi, A., Aamir, H. S., Sethi, B. A., Ghani, N., & Saboor, S. (2020). Impact on frontline nurses in the fight against coronavirus disease. *Annals of King Edward Medical University Lahore Pakistan*, *26*, 120–125.

Shanafelt, T., Ripp, J., & Trockel, M. (2020). Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *JAMA*, *323*(21), 2133–2134.

Shiao, J. S.-C., Koh, D., Lo, L.-H., Lim, M.-K., & Guo, Y. L. (2007). Factors predicting nurses' consideration of leaving their job during the SARS outbreak. *Nursing Ethics*, *14*(1), 5–17.

Shimels, T. (2021). Has the COVID-19 pandemic impacted healthcare service uptake at hospitals in Addis Ababa? *Ethiopian Journal of Health Sciences*, *31*(4), 689–698.

Shoja, E., Aghamohammadi, V., Bazyar, H., Moghaddam, H. R., Nasiri, K., Dashti, M., Choupani, A., Garaee, M., Aliasgharzadeh, S., & Asgari, A. (2020). Covid-19 effects on the workload of Iranian healthcare workers. *BMC Public Health*, *20*(1), 1636.

Spiers, J., Buszewicz, M., Chew-Graham, C., Dunning, A., Taylor, A. K., Gopfert, A., Van Hove, M., Teoh, K. R.-H., Appleby, L., & Martin, J. (2021). What challenges did junior doctors face while working during the COVID-19 pandemic? A qualitative study. *BMJ Open*, *11*(12), e056122.

Tang, J., Zhang, Y., Xiong, F. F., Li, F. Y., Zheng, Z. H., Gao, X., & Luo, Z. C. (2021). A survey of coping strategies among clinical nurses in China during the early stage of coronavirus disease 2019 pandemic: A cross-sectional study. *Nursing Open*, *8*(6), 3583–3592.

Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., Moher, D., Peters, M. D., Horsley, T., & Weeks, L. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine*, *169*(7), 467–473.

Varghese, A., George, G., Kondaguli, S. V., Naser, A. Y., Khakha, D. C., & Chatterji, R. (2021). Decline in the mental health of nurses across the globe during COVID-19: A systematic review and meta-analysis. *Journal of Global Health*, *11*, 1–15.

Villar, R. C., Nashwan, A. J., Mathew, R. G., Mohamed, A. S., Munirathinam, S., Abujaber, A. A., Al-Jabry, M. M., & Shraim, M. (2021). The lived experiences of frontline nurses during the coronavirus disease 2019 (COVID-19) pandemic in Qatar: A qualitative study. *Nursing Open*, *8*(6), 3516–3526.

Wanninayake, S. D., O'Donnell, M., & Williamson, S. (2022). COVID-19 and job demands and resources experienced by nurses in Sri Lanka. *The Economic and Labour Relations Review*, *33*(1), 100–116.

Weisman, C. S., Alexander, C. S., & Chase, G. A. (1981). Determinants of hospital staff nurse turnover. *Medical Care*, *19*, 431–443.

World Health Organization. (2020). *State of the world's nursing: Investing in education, jobs and leadership*. https://www.who.int/publications/i/item/9789240003279

World Health Organization. (2021). *The impact of COVID-19 on health and care workers: A closer look at deaths*. https://www.icn.ch/news/icn-says

Wu, A. W., Connors, C., & Everly Jr, G. S. (2020). COVID-19: Peer support and crisis communication strategies to promote institutional resilience. *Annals of internal medicine*, *172*(12), 822–823.

Xiaoming, Y., Ma, B.-J., Chang, C. L., & Shieh, C.-J. (2014). Effects of workload on burnout and turnover intention of medical staff: A study. *Studies on Ethno-Medicine*, *8*(3), 229–237.

Zamanzadeh, V., Valizadeh, L., Khajehgoodari, M., & Bagheriyeh, F. (2021). Nurses' experiences during the COVID-19 pandemic in Iran: A qualitative study. *BMC Nursing*, *20*, 198.

Zhan, Y., Ma, S., Jian, X., Cao, Y., & Zhan, X. (2020). The current situation and influencing factors of job stress among frontline nurses assisting in Wuhan in fighting COVID-19. *Frontiers in Public Health*, *8*, 579866.

Zhang, M., Zhang, P., Liu, Y., Wang, H., Hu, K., & Du, M. (2021). Influence of perceived stress and workload on work engagement in frontline nurses during COVID-19 pandemic. *Journal of Clinical Nursing*, *30*(11–12), 1584–1595.

Zhang, Y., Xiang, D., & Alejok, N. (2021). Coping with COVID-19 in United Nations peacekeeping field hospitals: Increased workload and

mental stress for military healthcare providers. *BMJ Military Health*, *167*(4), 229–233.

Zhou, A. Y., Hann, M., Panagioti, M., Patel, M., Agius, R., Van Tongeren, M., Esmail, A., & Bower, P. (2022). Cross-sectional study exploring the association between stressors and burnout in junior doctors during the COVID-19 pandemic in the United Kingdom. *Journal of Occupational Health*, *64*(1), e12311.

SUPPORTING INFORMATION

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