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# Impact of COVID-19 pandemic on nurses' burnout and related factors: A rapid systematic review

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## ABSTRACT

**Aim:** This study aimed to investigate the effect of COVID-19 pandemic on nurses' burnout and related factors.  
**Background:** Nurses at the frontlines in every field of the health system and composed most of the health service industry closely experience all negative events during the pandemic.  
**Methods:** This study is a rapid systematic review.  
**Results:** A total of 751 studies were selected, of which 13 studies were compatible with the inclusion criteria. The sample size ranged from 107 to 12,596. The studies determined that nurses' burnout levels were generally moderate level and above during the COVID-19 pandemic. Sociodemographic, occupational, psychological, and COVID-19-related factors affected this burnout.  
**Conclusion:** The results of this review may use to make implications that would ease the effect of the pandemic on nurses and develop strategies to protect nurses from burnout in similar possible situations. The protocol information is included here for blind peer review.  
**Prospero registration number (ID):** CRD42021244849.  
**Registration and protocol:** Prior to undertaking the review, we registered the protocol in the International Prospective Register of Systematic Reviews (PROSPERO). The registration number is CRD42021244849. Available from: [https://www.crd.york.ac.uk/prospero/display\\_record.php?ID=CRD42021244849](https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42021244849). The changes made during the review process were registered in PROSPERO with an update.

## Introduction

The new severe acute respiratory syndrome *coronavirus 2* (SARS-CoV-2) causing acute atypical respiratory illness emerged with the diagnosis of the first case in Wuhan, China, in December 2019, and spread throughout the world in a very short time. The World Health Organization (WHO) declared this epidemic as the coronavirus disease (COVID-19) pandemic in March 11, 2020.

Increased measures against the infection in the health system, high number of cases, and deaths lead to changes in the working conditions. Some countries experienced difficulties in providing sufficient protective equipment and tests (Cipriano et al., 2020). Moreover, a shortage of 6 million nurses in the world was seen in early 2020. Nurses at the frontlines in every field of the health system and composed 59 % of the health service industry closely experienced all negative events during the pandemic (World Health Organization, 2020). According to the CDC

report, as of July 16, 2020, 100,570 cases of COVID-19 and 641 deaths due to COVID-19 were reported among healthcare professionals in the United States (Hughes et al., 2020). Although the exact number is not known, it was estimated that many nurses lost their lives because of COVID-19 (Catton, 2020). Nurses continued to work in challenging and sometimes dangerous situations while trying to cope with the loss of their colleagues due to the infection (Catton, 2020). They felt sad and helpless because of the loss of their patients, and the thought of infecting their families also worried them (Cipriano et al., 2020). This pandemic seriously affected the health and well-being of many nurses (Catton, 2020). Nurses, who continued to work despite all negative conditions and infection risks, faced problems such as insufficient personal protective equipment, excessive work load, increased number of deaths, shifts that did not let them rest, fear of getting infected with COVID-19, and burnout (Bielicki et al., 2020; Cipriano et al., 2020; González-Gil et al., 2021).

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Burnout, which was first identified by Freudenberg in 1974, was studied with emotional fatigue, personal accomplishment, and depersonalization subdimensions by Maslach in 1981 (Freudenberg, 1974; Maslach and Jackson, 1981). Maslach and Jackson (1981) stated that, especially in occupational groups, serving people and exposure to chronic stress can be emotionally exhausting and can create a risk of burnout (Maslach and Jackson, 1981). Among the healthcare professionals, nurses experienced the highest burnout rates. Previous studies showed that nurses' burnout were associated with factors such as high workload, insufficient personnel, shifts longer than 12 h, low program flexibility, time pressure, role conflict, low autonomy, negative doctor–nurse relationship, weak manager support, negative team relationship, and job insecurity (Dall'Orta et al., 2020). Many systematic review studies have investigated nurses' burnout levels and related factors before the COVID-19 pandemic (De la Fuente-Solana et al., 2019; Gómez-Urquiza et al., 2020; Woo et al., 2020). Although some studies reported on mental health that also covered other disciplines during the pandemic, no systematic reviews were found that included only nurses and explained their burnout and related factors (Muller et al., 2020; Santabárbara et al., 2021).

This rapid systematic review aimed to determine the effect of the COVID-19 pandemic on nurses' burnout and related factors based on the studies carried out during the pandemic. Considering these objectives, this study sought answers to the following questions: Does the COVID-19 pandemic have an effect on nurses' burnout? What are the related factors?

## Methods

The Preferred Reporting Items for Systematic reviews and Meta-analyses (PRISMA) checklist was used as writing and reporting guideline (Page et al., 2021). The PRISMA flow diagram was created. The scanning of the related publications was carried out retrospectively in the form of an electronic search of databases.

This section describes the design of the study, inclusion/exclusion criteria, screening strategy, evaluation, and reporting stages.

### Design of the study

This study was a rapid systematic review that investigated the effect of the COVID-19 pandemic on nurses' burnout and related factors.

### Eligibility criteria

Studies were selected according to the criteria of the Population, Intervention, Comparator, Outcome(s) of interest, and Study design (PICOS framework) (Joanna Briggs Institute, 2014). They are detailed as follows:

- Type of population: Nurses working during the COVID-19 pandemic, without any restriction on age or ethnicity.
- Type of intervention: COVID-19 pandemic.
- Type of comparators: No restrictions were imposed on the types of comparators.
- Type of outcome measurements: Burnout levels and related factors.
- Type of study(s): Controlled clinical trials randomized controlled trials, descriptive and cross-sectional trials, cohort trials, and case-control trials.

Studies explaining burnout and related factors using a measurement tool, on the COVID-19 pandemic carried out and published in 2020–2021, published in English are included. Studies including healthcare professionals other than nurses are excluded.

### Research strategy

Keywords were created based on the research quest. For the keywords in English, the Medical Subject Headings (MeSH) were used. The electronic databases CINAHL Complete, Cochrane Library, Medline, PubMed, ScienceDirect, and Web of Science were searched using the keywords “COVID-19 AND burnout AND nurses” for relevant studies. The databases were reviewed respectively between April 1 and April 30, 2021, using the same keyword group without another limitation.

### Study selection

The study selection process was based on the PRISMA flow diagram. The selection process consisted of three steps. These steps included the evaluation of the title, abstract, and full texts of the study. The studies were first evaluated by the two independent authors (G.H, O.K.S), who performed database searching, in terms of the suitability of the study title. The studies that did not meet the title inclusion criteria were eliminated at this step. At the next step, the two authors (O.K.S, G.H), who performed database searching, evaluated the abstracts according to the inclusion criteria. Any disagreement was resolved through discussion with the third investigator (N.C). A consensus was reached among the authors as a result of the evaluation. The studies whose abstracts met the inclusion criteria were saved through EndNote (EndNote X9) program, and their full texts were downloaded. The scanning process was reported in a PRISMA flow diagram. The flow diagram of the selection of the studies is shown in Fig. 1.

### Data extraction and management

We employed the PICO approach. Two authors (G.H, O.K.S) independently extracted data from the full text of the eligible trials. The extracted data comprised of first author's name, year of publication, country, study-type, time of data collection, sample size, aim of the research inclusion and exclusion criteria, participants, burnout measurement tool and results on burnout and related factors. A consensus was reached among the authors as a result of the evaluation. Another author (N.C) independently rechecked the extracted data for its accuracy and completeness.

### Coding method

The coding table of the studies included in this systematic review comprised the authors and publishing year of the studies, type, country, time of data collection, participants, burnout measurement tool, burnout level, and related factors. The syntheses of related factors were grouped under four themes, sociodemographic, work-related, psychological, and COVID-19-related factors.

### Quality assessment

Critical analysis tools published by the Joanna Briggs Institute (JBI) were used for the quality assessment of the studies. For the assessment of cross-sectional studies and cohort studies, the 8-item and 11-item control lists were used, respectively (Moola et al., 2020). For the studies included in the review, every item in those lists was evaluated with the answers “yes, no, uncertain, and inapplicable” by two independent researchers (O.K.S, G.H). Table 1 shows the results of the assessment.

### Synthesis method and analysis

The data were analyzed using the narrative synthesis based on the determined themes. As the characteristics of the studies investigated in this rapid systematic review were different from each other, the results were presented using the narrative method. Finally, the data were summarized using simple rates.

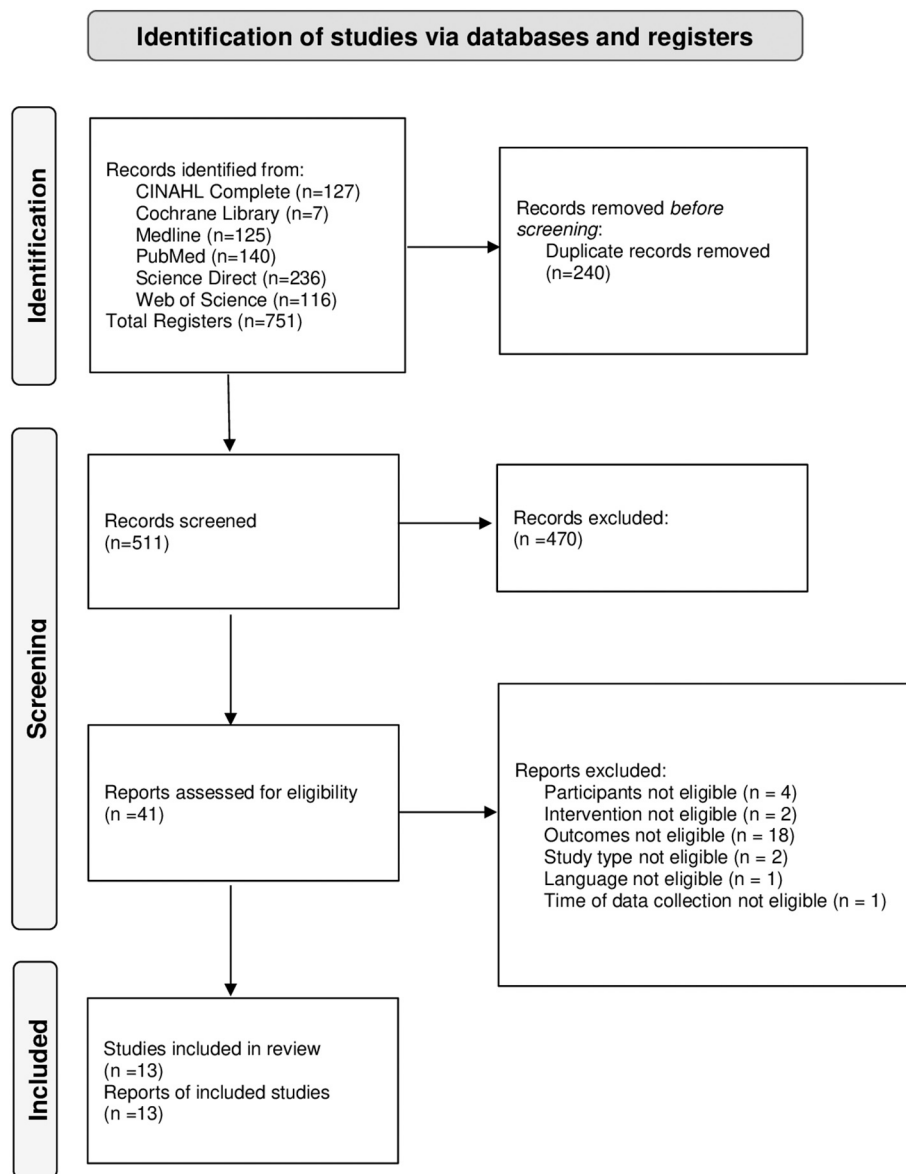


Fig. 1. Flow diagram of the selection studies.

## Results

### Scan results

A total of 751 studies were obtained in the scanning performed in 6 databases with the help of keywords. Of the 751 studies, 240 were eliminated due to duplication. After eliminating the duplications, the titles and abstracts of the studies were evaluated and 470 records that were not compatible with the inclusion criteria were excluded. The texts of the remaining 41 studies were analyzed and 28 studies that had no eligible participants ( $n = 4$ ), intervention ( $n = 2$ ), outcomes ( $n = 18$ ), study type ( $n = 2$ ), a study that included December 2019 at the time of data collection ( $n = 1$ ) and were published in a language other than English ( $n = 1$ ) were excluded. The full texts of the remaining 13 studies were examined by 2 independent researchers in terms of suitability and quality. These studies were evaluated with the help of critical analysis tools published by the JBI (Moola et al., 2020).

### Study characteristics

Of the 13 studies included in this systematic review, 7 were cross-sectional studies; 3 were descriptive, cross-sectional studies; 1 was a descriptive, cross-sectional, correlational study; one was a web-based questionnaire study; and 1 was a cohort observational questionnaire study (Aydin Sayilan et al., 2020; Bruyneel et al., 2021; Chen et al., 2021; Gonçalves et al., 2021; Hoseinabadi et al., 2020; Hu et al., 2020; Jose et al., 2020; Kamali et al., 2020; Manzano García and Ayala Calvo, 2021; Murat et al., 2021; Soto-Rubio et al., 2020; Vitale et al., 2020; Zhang et al., 2020). The populations of the assessed studies were composed of nurses working during the COVID-19 pandemic. The sample size ranged from 107 to 12,596. As a burnout data collection tool, nine studies used the Maslach Burnout Inventory (MBI), two used the Spanish Burnout Inventory, one used the Copenhagen Burnout Inventory, and one used the Oldenburg Burnout Inventory. The characteristics of the studies included in the systematic review and study results are demonstrated in Table 1.

**Table 1**  
Studies included in the review.

Authors, publishing year	Country	Study type	Time of data collection	Quality assessment	Participants	Burnout measurement tool	Results on burnout and related factors
Aydin Sayilan et al., 2020	Turkey	Descriptive and cross-sectional study	May 10–20, 2020	75 %	267 Nurses	Maslach Burnout Inventory	<p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>• Burnout was experienced at a moderate level in the emotional exhaustion subdimension, at a high level in the depersonalization subdimension, and also at a high level in the personal accomplishment subdimension.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>• Emotional exhaustion was higher in male nurses, and personal accomplishment was lower in female nurses.</li> <li>• Emotional exhaustion and depersonalization were higher in single nurses than married nurses.</li> </ul> <p><i>Psychological factors:</i></p> <ul style="list-style-type: none"> <li>• Burnout level increased with insomnia.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>• Emotional exhaustion and personal accomplishment were at a high level in nurses providing service for patients diagnosed with COVID-19.</li> </ul>
Bruyneel et al., 2021	Belgium	Web-based questionnaire	April 21–May 4, 2020	75 %	1135 Intensive care unit nurses	Maslach Burnout Inventory	<p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>• Burnout risk prevalence was 68 %.</li> <li>• Of the participants, 29 % were at risk of depersonalization, 31 % were at risk of a decrease in personal accomplishment, and 38 % were at risk of emotional exhaustion.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>• Male nurses had a higher risk of depersonalization than female nurses.</li> <li>• The risk of depersonalization increased in those having no offspring.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>• Senior nurses had a lower risk of depersonalization (protective factor).</li> <li>• Nurse–patient rate above 1:2 increased the risk of emotional exhaustion and depersonalization.</li> <li>• Insufficient personal protective equipment increased emotional exhaustion and depersonalization.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>• Increased number of deaths due to COVID-19 in the unit increased the risk of depersonalization.</li> <li>• Those reporting that their perceived workload was higher during the COVID-19 pandemic had</li> </ul>

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Table 1 (continued)

Authors, publishing year	Country	Study type	Time of data collection	Quality assessment	Participants	Burnout measurement tool	Results on burnout and related factors
Chen et al., 2021	China and Taiwan	Cross-sectional study	April 2020	87.5 %	12,596 Nurses	Maslach Burnout Inventory	<p>a higher risk of burnout (in all dimensions).</p> <ul style="list-style-type: none"> <li>• Nurses reporting having COVID-19 symptoms without making a test had a higher risk of emotional exhaustion than those who were asymptomatic.</li> <li>• No significant relationship was found between the number of patients diagnosed with COVID-19 in the service throughout the last week and burnout.</li> </ul> <p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>• Emotional exhaustion and depersonalization were at a moderate level, and personal accomplishment was at a high level.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>• Emotional exhaustion was more common in female nurses, and depersonalization was more common in male nurses.</li> <li>• Being female affected the level of personal accomplishment.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>• Emotional exhaustion and depersonalization were higher in those working at pandemic hospitals, COVID-19 units, and critical care units (i.e., intensive care, pulmonary medicine, infectious disease, and emergency departments).</li> <li>• Not providing care to diagnose with COVID-19 affected the level of personal accomplishment.</li> <li>• Effects of COVID-19 did not reduce the level of personal accomplishment.</li> </ul>
Gonçalves et al., 2021	Portuguese	Cross-sectional study	June 20–November 1, 2020	87.5 %	153 Palliative care nurses	Copenhagen Burnout Inventory	<p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>• Of the participants, 46 % had a high level of personal burnout, 44 % had a high level of work-related burnout, and 22 % had a high level of patient-related burnout.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>• Burnout levels related to patients were higher in males.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>• Those with no proficiency in palliative care had higher personal, work-related, and patient-related burnout levels compared with those proficient in palliative care (post-graduate/PhD).</li> <li>• Nurses working in home palliative care teams had lower personal, work-related, and patient-related burnout levels compared with those working in hospital support palliative teams and palliative care units.</li> </ul>

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Table 1 (continued)

Authors, publishing year	Country	Study type	Time of data collection	Quality assessment	Participants	Burnout measurement tool	Results on burnout and related factors
Hoseinabadi et al., 2020	Iran	Cross-sectional study	March 10–April 3, 2020	100 %	245 Nurses (group that was exposed): 151 nurses who had experience in providing care for patients with COVID-19 infection or who were suspected to have the COVID-19 infection; group that was not exposed: 94 nurses who had no experience in providing care for patients with COVID-19 infection or who were suspected to have the COVID-19 infection	Oldenburg Burnout Inventory	<p><i>Psychological factors:</i></p> <ul style="list-style-type: none"> <li>Nurses perceiving their own health as not good or bad had higher personal, work-related, and patient-related burnout levels compared with those perceiving their own health as good and very good.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>Nurses replaced from palliative care to the COVID-19 unit had higher levels of personal, work-related, and patient-related burnout.</li> </ul> <p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>Burnout was significantly higher in the group that was exposed (<math>p &lt; 0.006</math>).</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>No significant relationship was found between variables such as age, gender, marital status, education level, and COVID-19-related burnout (<math>p &gt; 0.05</math>).</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>A significant relationship was found between the type of employment and COVID-19-related burnout (<math>p = 0.047</math>).</li> <li>There was no significant relationship between work experience and COVID-19-related burnout (<math>p = 0.608</math>).</li> </ul> <p><i>Psychological factors:</i></p> <ul style="list-style-type: none"> <li>No significant relationship was found between family and friend support and COVID-19-related burnout (<math>p = 0.668</math>).</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>A significant relationship was found between having experience in providing care for patients with COVID-19 infection or suspected of having COVID-19 infection and COVID-19-related burnout (<math>p = 0.006</math>).</li> <li>A significant relationship was found between COVID-19-related work stress and COVID-19-related burnout (<math>p &lt; 0.001</math>).</li> <li>A significant relationship was found between the hospital resources for COVID-19 treatment and COVID-19-related burnout (<math>p = 0.047</math>).</li> <li>No significant relationship was found between fear of COVID-19 infection and COVID-19-related burnout (<math>p = 0.128</math>).</li> </ul>
Hu et al., 2020	China			75 %	2014 nurses		

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Table 1 (continued)

Authors, publishing year	Country	Study type	Time of data collection	Quality assessment	Participants	Burnout measurement tool	Results on burnout and related factors
		Cross-sectional, descriptive, cross-sectional study	February 13–24, 2020			Maslach Burnout Inventory	<p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>• Participants had moderate level burnout.</li> <li>• Participants had a moderate and high level of work-related burnout; 60.5 % in emotional exhaustion, 42.3 % in depersonalization, and 60.6 % in the personal accomplishment dimension.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>• Males had higher levels of depersonalization, and females had higher levels of emotional exhaustion.</li> <li>• The age factor affected depersonalization and personal accomplishment.</li> <li>• All the groups, except for those who were married, had a higher level of depersonalization and a lower level of personal accomplishment.</li> <li>• Those without offspring had lower personal accomplishment.</li> <li>• Those with an undergraduate degree and higher degrees had higher emotional exhaustion levels.</li> <li>• Those with a junior level of occupational title had higher levels of emotional exhaustion and depersonalization, lower levels of personal accomplishment.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>• Clinical experience affected depersonalization and personal accomplishment.</li> <li>• Average working hours/shifts affected the depersonalization subdimension.</li> <li>• Those working in Wuhan had higher levels of emotional exhaustion and depersonalization and lower levels of personal accomplishment.</li> <li>• Those assigned to Wuhan willingly or unwillingly by their hospitals had higher emotional exhaustion and lower personal accomplishment than those who voluntarily opted.</li> <li>• Those whose main position in their workplace was bedside nurse had lower personal accomplishment than those who were the head nurse or nurse manager.</li> <li>• Those who were the head nurse or nurse managers at the hospital in Wuhan had higher levels of depersonalization.</li> <li>• Those whose working unit changed had higher depersonalization and lower personal accomplishment, and those whose working unit did not change had higher emotional exhaustion.</li> <li>• Emotional exhaustion had a positive correlation with skin lesions due to personal protective equipment.</li> </ul>

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Table 1 (continued)

Authors, publishing year	Country	Study type	Time of data collection	Quality assessment	Participants	Burnout measurement tool	Results on burnout and related factors
							<p><i>Psychological factors:</i></p> <ul style="list-style-type: none"> <li>• Self-efficacy, resilience, and intra-family and extra-family social support had a negative correlation with emotional exhaustion and a positive correlation with personal accomplishment.</li> <li>• Resilience and intra-family and extra-family social support had a negative correlation with depersonalization.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>• Those not educated on providing care to patients with infectious diseases had higher emotional exhaustion and lower personal accomplishment.</li> <li>• Those not experienced in providing care to patients with infectious diseases had higher emotional exhaustion.</li> <li>• Duration of working at the frontline during the COVID-19 pandemic affected emotional exhaustion and personal accomplishment.</li> <li>• Those not confident in providing care for patients diagnosed with COVID-19 had higher emotional exhaustion and depersonalization and lower personal accomplishment.</li> <li>• Those not confident in self-protection had higher emotional exhaustion and depersonalization and lower personal accomplishment.</li> <li>• Emotional exhaustion and depersonalization were higher, and personal accomplishment was lower in those unsure of the assessment of work safety while caring for patients diagnosed with COVID-19.</li> <li>• Emotional exhaustion and depersonalization were higher, and personal accomplishment was lower in those who did not believe that their family, colleagues, and hospital were ready to cope with the COVID-19 pandemic.</li> <li>• Emotional exhaustion and depersonalization were higher, and personal accomplishment was lower in those not willing to work at the frontline during the COVID-19 pandemic.</li> </ul>
Jose et al., 2020	North India	Descriptive, cross-sectional study	August 2020	87.5 %	120 Emergency service nurses (tertiary health center)	Maslach Burnout Inventory	<p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>• Nurses experienced a moderate level and a high level of burnout in terms of emotional exhaustion and depersonalization, mild and moderate levels of burnout in terms of personal accomplishment.</li> <li>• Of the participants, 54 % had high emotional exhaustion and 43 % had high depersonalization, while 12.5 % had low personal accomplishment.</li> </ul>

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Table 1 (continued)

Authors, publishing year	Country	Study type	Time of data collection	Quality assessment	Participants	Burnout measurement tool	Results on burnout and related factors
							<p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>• Most of the nurses below 30 years (62 %) had moderate and high levels of depersonalization.</li> <li>• Personal accomplishment was higher in 33 % of the female participants and 41 % of the nurses living with family or in groups.</li> </ul> <p><i>Psychological factors:</i></p> <ul style="list-style-type: none"> <li>• A negative correlation was found between resilience and emotional exhaustion and low personal accomplishment.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>• Emotional exhaustion was higher in nurses afraid of infecting their family members, confident in self-protection, and felt that the safety against COVID-19 in the workplace was insufficient.</li> </ul> <p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>• Burnout risk prevalence was 64.6 %.</li> <li>• Approximately 64 % of the participants had emotional exhaustion, and 53 % had depersonalization.</li> <li>• Rate of personal accomplishment was above 97 %.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>• Age and marital status had a significant relationship with emotional exhaustion (<math>p &lt; 0.05</math>).</li> <li>• Moderate and high levels of emotional exhaustion were more common in those &lt;25 years.</li> <li>• Married nurses had a high level of emotional exhaustion.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>• A positive correlation was found between work experiences &lt;10 years and emotional exhaustion.</li> <li>• Work experience was correlated with depersonalization (<math>p = 0.036</math>).</li> <li>• Hospital service correlated with emotional exhaustion and depersonalization (<math>p = 0.044</math>, <math>p = 0.009</math>).</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>• The number of deaths observed by nurses during the COVID-19 pandemic and the total number of shifts since the beginning of COVID-19 in Shiraz had a positive correlation with emotional exhaustion.</li> <li>• The number of deaths observed by nurses during the COVID-19 pandemic was correlated with depersonalization (<math>p = 0.026</math>).</li> </ul>
Kamali et al., 2020	Iran	Cross-sectional study	April 2020	75 %	261 Nurses	Maslach Burnout Inventory	<p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>• Age and marital status had a significant relationship with emotional exhaustion (<math>p &lt; 0.05</math>).</li> <li>• Moderate and high levels of emotional exhaustion were more common in those &lt;25 years.</li> <li>• Married nurses had a high level of emotional exhaustion.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>• A positive correlation was found between work experiences &lt;10 years and emotional exhaustion.</li> <li>• Work experience was correlated with depersonalization (<math>p = 0.036</math>).</li> <li>• Hospital service correlated with emotional exhaustion and depersonalization (<math>p = 0.044</math>, <math>p = 0.009</math>).</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>• The number of deaths observed by nurses during the COVID-19 pandemic and the total number of shifts since the beginning of COVID-19 in Shiraz had a positive correlation with emotional exhaustion.</li> <li>• The number of deaths observed by nurses during the COVID-19 pandemic was correlated with depersonalization (<math>p = 0.026</math>).</li> </ul>

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Table 1 (continued)

Authors, publishing year	Country	Study type	Time of data collection	Quality assessment	Participants	Burnout measurement tool	Results on burnout and related factors
Manzano García and Ayala Calvo, 2021	North Spain	Cross-sectional study	April 2020 (Last two weeks of month)	75 %	771 Nurses	Spanish Burnout Inventory (CESQT)	<p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>The burnout level was high.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>Age had a positive correlation with burnout. Burnout increased with age.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>Work experience had a positive correlation with burnout. Burnout increased with work experience.</li> <li>Work overload had a positive correlation with burnout. Burnout increased with work overload.</li> <li>Material resources and human resources had a negative correlation with burnout. Burnout increased as resources decreased.</li> </ul> <p><i>Psychological factors:</i></p> <ul style="list-style-type: none"> <li>Social support had a negative correlation with burnout.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>Perceived COVID-19 threat had a positive correlation with burnout.</li> </ul>
Murat et al., 2021	Turkey	Descriptive, cross-sectional study	May–July 2020	75 %	705 Nurses	Maslach Burnout Inventory	<p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>Burnout was at a high level.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>Male nurses had higher levels of emotional exhaustion.</li> <li>Emotional exhaustion and depersonalization were higher in nurses with an undergraduate degree and nurses with 1–10 years of experience.</li> <li>Personal accomplishment was lower in those who completed high school and had 21 years and more of work experience.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>Emotional exhaustion and depersonalization levels were higher in nurses working at the state hospital.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>Emotional exhaustion and depersonalization levels were higher in those who did not want to work voluntarily.</li> <li>Emotional exhaustion and depersonalization levels were higher in nurses who were COVID-19 positive.</li> <li>Personal accomplishment was lower in those who hesitated about patient care during the pandemic.</li> </ul>
Soto-Rubio et al., 2020	Spain	Cross-sectional study	March–April 2020	75 %	125 Nurses		

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Table 1 (continued)

Authors, publishing year	Country	Study type	Time of data collection	Quality assessment	Participants	Burnout measurement tool	Results on burnout and related factors
						Spanish Burnout Inventory (CESQT)	<p><i>Psychological factors:</i></p> <ul style="list-style-type: none"> <li>Emotional work, interpersonal conflict, and role conflict were the positive predictors of burnout.</li> <li>The emotional repair was a negative predictor of burnout.</li> <li>High emotional attention increased the predictive power of interpersonal conflict on burnout.</li> <li>High emotional repair reduced the predictive power of interpersonal conflict and role conflict on burnout.</li> </ul> <p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>The burnout level was high.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>Female nurses were more exposed to emotional exhaustion compared with male nurses.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>Emotional exhaustion was significantly higher in female nurses with 0–10 years of work experience than male nurses with the same duration of work experience.</li> <li>Depersonalization was higher in male nurses with 11–20 years of work experience.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>Emotional exhaustion was significantly higher in female nurses working at the intensive care unit before the COVID-19 pandemic or was transferred during emergency health situations compared with male nurses.</li> </ul>
Vitale et al., 2020	Italy	Cohort observational questionnaire study	March 25–April 25, 2020	72.7 %	291 Intensive care nurses	Maslach Burnout Inventory	<p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>The burnout level was high.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>Female nurses were more exposed to emotional exhaustion compared with male nurses.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>Emotional exhaustion was significantly higher in female nurses with 0–10 years of work experience than male nurses with the same duration of work experience.</li> <li>Depersonalization was higher in male nurses with 11–20 years of work experience.</li> </ul> <p><i>COVID-19-related factors:</i></p> <ul style="list-style-type: none"> <li>Emotional exhaustion was significantly higher in female nurses working at the intensive care unit before the COVID-19 pandemic or was transferred during emergency health situations compared with male nurses.</li> </ul>
Zhang et al., 2020	China	Cross-sectional study	March 10–14, 2020	62.5 %	107 Nurses	Maslach Burnout Inventory	<p><i>Burnout level:</i></p> <ul style="list-style-type: none"> <li>Of the participants, 78.5 % had a mild level of emotional exhaustion and 92.5 % had a mild level of depersonalization.</li> <li>Of the participants, 48.6 % experienced a low level of personal accomplishment.</li> </ul> <p><i>Sociodemographic factors:</i></p> <ul style="list-style-type: none"> <li>Emotional exhaustion was higher and personal accomplishment was lower in younger individuals (below 30 years).</li> <li>Personal accomplishment was lower in those who completed college compared with those with an undergraduate degree and higher.</li> </ul> <p><i>Work-related factors:</i></p> <ul style="list-style-type: none"> <li>Emotional exhaustion was higher and personal accomplishment was</li> </ul>

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Table 1 (continued)

Authors, publishing year	Country	Study type	Time of data collection	Quality assessment	Participants	Burnout measurement tool	Results on burnout and related factors
							<p>lower in those with less work experience (8 years and lower). COVID-19-related factors:</p> <ul style="list-style-type: none"> <li>Emotional exhaustion and depersonalization were higher in those with long working hours in the COVID-19 quarantine units (20 hours and more).</li> </ul>

Study quality

Critical analysis tools published by the Joanna Briggs Institute were used for the quality assessment of the studies. Two independent researchers evaluated the full texts of the studies in terms of quality. The quality assessment of the 12 studies included in the systematic review was carried out using the “JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies.” Fig. 2 shows the score distribution. The cohort study was assessed using the “JBI Critical Appraisal Checklist for Cohort Studies,” and 8 of the 11 items were evaluated with an answer “yes”. The general quality scores of the studies were 62.5 %–100 %.

Outcome measures

Table 1 demonstrates an outline of the outcomes in every study reviewed. Furthermore, the outcomes were synthesized thematically and presented in a narrative form.

Primary outcomes

Burnout levels

Of the studies included, the burnout prevalence was found to be 68 % and 64.6 % in two studies conducted in Belgium and Iran, respectively (Bruyneel et al., 2021; Kamali et al., 2020). The burnout levels were found to be high in four of the five studies and moderate in one (Hoseinabadi et al., 2020; Hu et al., 2020; Manzano García and Ayala Calvo, 2021; Murat et al., 2021; Vitale et al., 2020). A study conducted using the Copenhagen Burnout Inventory found that of the nurses working in palliative care (n = 153), 46 % had high levels of personal burnout, 44 % had high levels of work-related burnout, and 22 % had high levels of patient-related burnout (Gonçalves et al., 2021). In the seven studies that used the MBI, burnout was evaluated in terms of emotional exhaustion, depersonalization, and personal accomplishment subdimensions (Aydin Sayilan et al., 2020; Bruyneel et al., 2021; Chen

et al., 2021; Hu et al., 2020; Jose et al., 2020; Kamali et al., 2020; Zhang et al., 2020). According to the results of these assessments:

- In the emotional exhaustion subdimension, more than half of the participants had moderate and high levels of emotional exhaustion in five studies, and 78.5 % of the participants in one of the studies had a mild level of emotional exhaustion (Aydin Sayilan et al., 2020; Chen et al., 2021; Hu et al., 2020; Jose et al., 2020; Kamali et al., 2020; Zhang et al., 2020).
- In the depersonalization subdimension, participants of two studies had a high level of depersonalization, >42 % of the participants in three studies had a moderate and high level of depersonalization, and >92.5 % of the participants in one of the studies had a mild level of depersonalization (Aydin Sayilan et al., 2020; Chen et al., 2021; Hu et al., 2020; Jose et al., 2020; Kamali et al., 2020; Zhang et al., 2020).
- In the personal accomplishment subdimension, burnout related to the lack of personal accomplishment was at moderate and high levels in three studies and at mild and moderate levels in three other studies (Aydin Sayilan et al., 2020; Chen et al., 2021; Hu et al., 2020; Jose et al., 2020; Kamali et al., 2020; Zhang et al., 2020). In the study by Kamali et al. (2020), >97 % of the participants had high levels of personal accomplishment (Kamali et al., 2020).
- In a study of the nurses, 38 % had high levels of emotional exhaustion, 29 % had high levels of depersonalization-related burnout, and 31 % had high levels of burnout related to the lack of personal accomplishment (Bruyneel et al., 2021).

Secondary outcomes

Factors related to burnout

Sociodemographic factors. The sociodemographic factors related to the burnout of the studies included in the review were age, gender, education level, marital status, having children, and occupational title.

The factors associated with burnout in the studies assessed were as follows: age in five studies, gender in eight studies, education level in three studies, marital status in two studies, offspring in two studies, and occupational title in one study (Aydin Sayilan et al., 2020; Bruyneel et al., 2021; Chen et al., 2021; Gonçalves et al., 2021; Hu et al., 2020; Jose et al., 2020; Kamali et al., 2020; Manzano García and Ayala Calvo, 2021; Murat et al., 2021; Vitale et al., 2020; Zhang et al., 2020).

Age younger than 30 years, female sex in the emotional exhaustion subdimension, male sex in the depersonalization subdimension, undergraduate and postgraduate education degrees in the emotional exhaustion and depersonalization subdimensions, high school/college education degrees in the personal accomplishment subdimension, marital status in depersonalization and personal accomplishment subdimensions, no offspring in the depersonalization and personal accomplishment subdimensions, and junior level occupational title in all three of subdimensions were associated with a high level of burnout (Aydin

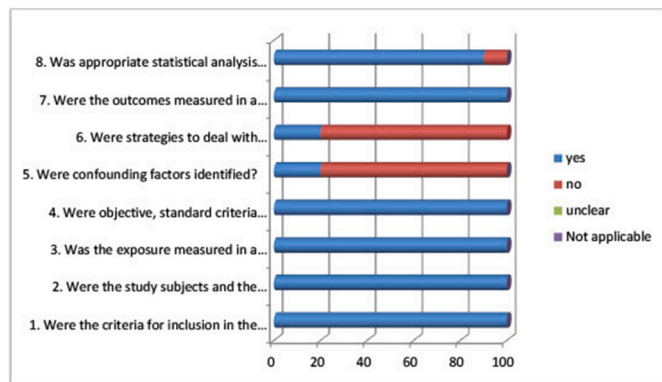


Fig. 2. Score distribution of studies assessed with the “JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies” for each field (n=12).

Sayilan et al., 2020; Bruyneel et al., 2021; Chen et al., 2021; Gonçalves et al., 2021; Hu et al., 2020; Jose et al., 2020; Murat et al., 2021; Vitale et al., 2020; Zhang et al., 2020).

In the study of Hoseinabadi et al. (2020), no significant relationship was found between burnout and variables such as age, gender, marital status, and education level (Hoseinabadi et al., 2020).

**Work-related factors.** The relationship with factors, such as insufficient personal protective equipment, average working hours/shift, work overload, nurse–patient rate, type of hospital, material and human resources, employment type, position at the hospital, unit at which they work, type of assignment (voluntariness), senior/work experience, and transfer status, was evaluated under this theme.

According to the results of the studies, insufficient personal protective equipment and skin lesions due to insufficient personal protective equipment, insufficient material and human resources, work overload, nurse–patient rate over 1:2, working at a state hospital, type of employment, average working hours/shift, bedside or manager position, nonvoluntary assignment, changes or no changes in the units at which they work, and the unit at which they work affected burnout and the subdimensions (Bruyneel et al., 2021; Gonçalves et al., 2021; Hoseinabadi et al., 2020; Hu et al., 2020; Kamali et al., 2020; Manzano García and Ayala Calvo, 2021; Murat et al., 2021).

Three of the five studies that showed work experience was correlated with burnout found that emotional exhaustion was higher in those with work experience <10 years (Hu et al., 2020; Kamali et al., 2020; Manzano García and Ayala Calvo, 2021; Vitale et al., 2020; Zhang et al., 2020). Another study found that male nurses with 11–20 years of experience had higher depersonalization (Vitale et al., 2020). Yet another study found that being senior decreased the risk of depersonalization and also was a protective factor (Bruyneel et al., 2021).

**Psychological factors.** Insomnia, those perceiving their own health as not good/bad, interpersonal conflict, role conflict, and emotional conflict, had a positive correlation with burnout (Aydin Sayilan et al., 2020; Gonçalves et al., 2021; Soto-Rubio et al., 2020). On the contrary, self-efficacy, resilience, social support, and emotional repair were among the factors having a negative correlation with burnout (Hu et al., 2020; Jose et al., 2020; Manzano García and Ayala Calvo, 2021; Soto-Rubio et al., 2020).

**COVID-19-related factors.** Considering the studies included in this review, burnout and its subdimensions were affected by the following factors: working at a hospital, unit, and critical care unit that was assigned for treating COVID-19; long working hours at the COVID-19 quarantine units; total number of shifts since the beginning of COVID-19; number of deaths observed due to COVID-19; high perceived work load; reporting to have symptoms without making a COVID-19 test; shifting to COVID-19 units from palliative care units; COVID-19-related work stress; hospital resources for COVID-19 treatment; not educated on providing care for virus-infected patients; lack of experience on providing care for virus-infected patients; duration of working experience as a frontline nurse and not confident in protecting own self; unsure about job security during providing care to patients diagnosed with COVID-19; not believing that their families, friends, and hospital are ready to cope with COVID-19; not having self-confidence in providing care for patients diagnosed with COVID-19; not willing to work in the frontline; having fear of infecting family members; feeling that security against COVID-19 at workplace is insufficient; perceiving COVID-19 threat; and positive COVID-19 test results (Bruyneel et al., 2021; Chen et al., 2021; Gonçalves et al., 2021; Hoseinabadi et al., 2020; Hu et al., 2020; Jose et al., 2020; Kamali et al., 2020; Manzano García and Ayala Calvo, 2021; Murat et al., 2021; Zhang et al., 2020).

Providing care for patients diagnosed with COVID-19 was found to be associated with burnout, and not providing care for patients

diagnosed with COVID-19 affected personal accomplishment (Hoseinabadi et al., 2020). However, the effects of COVID-19 did not reduce nurses' personal accomplishment, and personal accomplishment was high in nurses providing care for patients diagnosed with COVID-19 (Aydin Sayilan et al., 2020; Chen et al., 2021).

A rapid systematic review was conducted to determine nurses' burnout and related factors during the COVID-19 pandemic and 13 studies were included in this review. These studies presented the evidence of sociodemographic, psychological, occupational, and COVID-19-related factors regarding nurses' burnout.

## Discussion

Most of the studies used the MBI tool to evaluate burnout. MBI is one of the most common tools and the gold standard to measure burnout among staff, based on self-reporting using a Likert scale (Cortina-Rodríguez and Afanador, 2020; Ferry et al., 2020). Moreover, the prevalence of nurses' burnout was investigated according to the three dimensions of MBI: emotional exhaustion, depersonalization, and lack of personal accomplishment.

According to the MBI, burnout in nurses was significantly common during the COVID-19 pandemic. Nurses experienced a high level of emotional exhaustion (64 %–38 %), moderate- and high-level depersonalization (53 %–29 %), and a lower level of lack of personal accomplishment (60.6 %–12.5 %). These burnout levels were even higher than those of the nurses working in very stressful environments such as palliative care. The prevalence of emotional exhaustion, lack of personal accomplishment, and depersonalization were 19.5 %, 9.3 %, and 8.2 %, respectively (Parola et al., 2017). A meta-analysis study that collected data from 49 countries found that the overall prevalence of burnout symptoms among nurses was 11.23 % (Woo et al., 2020). Nurses working during the COVID-19 pandemic had higher emotional exhaustion levels but lower depersonalization and personal accomplishment compared with those of mental health nurses, nurses at the primary health services, nurses at the oncology services, paediatric nurses, and emergency room nurses (Cañadas-De la Fuente et al., 2018; López-López et al., 2019; Pradas-Hernández et al., 2018; Zarei et al., 2019). Nurses experience difficulty in their daily emotions because they are in the high-risk groups during the COVID-19 pandemic, in close contact with patients diagnosed with COVID-19, and are afraid of the outcomes of the disease. Negative emotions of patients, colleagues, and family members triggered similar emotions in nurses and may have affected the perceived stress among them, making them more vulnerable against emotional exhaustion. Additionally, higher workloads and longer working hours during the COVID-19 pandemic caused emotional exhaustion by increasing work-related stress among nurses. On the other hand, nurses experienced depersonalization and lack of personal accomplishment during the COVID-19 pandemic. However, this result was not higher than nurses working in other stressful clinics (Pradas-Hernández et al., 2018). This may have resulted from the empathy and positive emotions nurses developed for patients diagnosed with COVID-19 in a situation like a pandemic that affected the lives of all individuals. The pandemic may trigger compassionate behaviors among nurses that connect them with patients on a deeper level.

Various factors increased nurses' burnout during the COVID-19 pandemic. As a result of this review, gender was observed to be a controversial subject because some previous studies showed that because there are studies showing that emotional exhaustion is high in both females and males. Moreover, studies have shown that males have higher levels of depersonalization, while females have lower personal accomplishment. After being exposed to stressful events, females had a higher possibility to be traumatized compared with males (De Stefano et al., 2018; Jones et al., 2020; Olf et al., 2007). A meta-analysis that included 57 studies found that male nurses had a higher level of burnout compared with female nurses (Cañadas-De la Fuente et al., 2018). Moderator variables (age, job satisfaction, position, clinical experience,

and so forth) should be considered to obtain more valid results related to the role of gender in nurses' burnout. During the COVID-19 pandemic, emotional exhaustion and depersonalization were higher and personal accomplishment was lower in nurses younger than 30 years. Studies determined that single nurses experienced higher levels of emotional exhaustion and depersonalization, and nurses with no children had higher depersonalization and lower personal accomplishment. This may have resulted from the fact that young nurses have less experience in coping with global events such as pandemics.

Nurses' burnout was also affected by psychological factors. Nurses also experienced other psychological health problems, such as depression, anxiety, psychological distress, sleep disorders, and insomnia, during the COVID-19 pandemic (Kisely et al., 2020; Luo et al., 2020; Salari et al., 2020). The analyses of this study determined that insomnia and perceiving own health as bad had a positive correlation with burnout, while psychological resilience had a negative correlation with emotional exhaustion. Moreover, emotional fatigue, interpersonal conflict, and role conflict were positive predictors of burnout. Nurses struggle with psychological problems more often than other health professionals and this situation is more difficult for them (Pappa et al., 2020; Parola et al., 2017). Nurses providing primary care for patients diagnosed with COVID-19 can be more concerned and stressed (Rana et al., 2020). A study on 1153 Italian healthcare professionals found that those directly involved with patients diagnosed with COVID-19 experienced higher levels of stress, somatic symptoms, and burnout (Barello et al., 2020). This stress led to burnout, which negatively affected the quality of the health services nurses provided for the patients. According to the analyses, reduced intra-family and extra-family social support was associated with nurses' increased burnout during the COVID-19 pandemic. Especially family and social support were essential weapons for nurses to confront the psychological distress experienced during epidemic outbreaks (Chan and Huak, 2004). Psychological support that health professionals received during and after the pandemic significantly may affected their coping skills against the negative effects of the pandemic (Mymin Kahn et al., 2016).

Three of the five studies that showed work experience was correlated with burnout found that emotional exhaustion was higher in those with <10 years of experience (Hu et al., 2020; Kamali et al., 2020; Manzano García and Ayala Calvo, 2021; Vitale et al., 2020; Zhang et al., 2020). The literature associated work experience and years of working with burnout (Wan et al., 2020). These results suggest that younger nurses with less experience are more vulnerable to coping with difficulties they encounter during emergency health situations compared with more experienced nurses.

Further, many factors related to COVID-19 increased nurses' burnout; however, the effects of COVID-19 did not reduce nurses' success, and personal accomplishment was higher in those providing care for patients diagnosed with COVID-19. A higher level of personal accomplishment was an influential factor for growth, and this may be a two-way street where higher posttraumatic growth also influenced lower burnout and needed to be studied further. Also, previous experience of dealing with pandemics, such as SARS, may have increased posttraumatic growth for this population. According to Cai et al. (2020), nurses with no previous public health emergency treatment experience had worse mental health and resilience (Cai et al., 2020).

This rapid systematic review had some limitations. First of all, most of the studies were of moderate quality, and studies that included nurses only were selected. Therefore, it was only possible to clearly distinguish related factors specific to nurses.

## Conclusion

Nurses experienced high levels of burnout during the COVID-19 pandemic, and various sociodemographic, occupational, psychological, and COVID-19-related factors affected this burnout. Nurses experienced significant difficulties during the COVID-19 pandemic worldwide.

Measures, such as early supportive interventions for high-risk nurses, immediate access to mental health services, predetermined resting times, social support, and sufficient personal protective equipment for the security of all nurses, should be taken to reduce the negative effect of the COVID-19 pandemic on nurses' mental health. Reducing the negative effects of the COVID-19 pandemic on nurses' burnout and healing practices for their mental health need urgent attention. Governments, health institutions, and policy-makers should act to better prepare nurses against the COVID-19 pandemic and other possible emergency health situations.

This systematic review investigated nurses' burnout and related factors during the COVID-19 pandemic. Even in different cultures and working conditions, factors leading to burnout in nurses were similar. Factors affecting burnout related to the pandemic were also determined. The results of this review may use to make implications that would ease the effect of the pandemic on nurses and develop strategies to protect nurses from burnout in similar possible situations.

## Ethical approval

Ethical approval was not required as it was a systematic review study.

## CRedit authorship contribution statement

Study design: NC, GH, OKS.

Data collection: GH, OKS.

Data analysis: GH, NC, OKS.

Study supervision: NC.

Manuscript writing: GH, OKS, NC.

Critical revisions for important intellectual content: NC, GH, OKS.

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## Declaration of competing interest

The authors report no actual or potential conflicts of interest.

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