



Psychological distress in healthcare workers during COVID-19 pandemic: A systematic review

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ABSTRACT

Objectives: Healthcare workers serving during the COVID-19 pandemic may have been exposed to high work overload, which may have had an impact on their physical, mental, and social health. The aim of this study was to assess the risk factors associated with psychological distress among healthcare workers serving during the COVID-19 pandemic from January 2020 to December 2022. **Methods:** A systematic review was conducted based on the 2020 PRISMA statement. Articles were searched in the Pubmed, Scopus, Web of Science, CINAHL, and PsycINFO databases. **Results:** A total of 59 articles were included in this systematic review. It was observed that the prevalence of psychological distress during the COVID-19 pandemic was high. Female sex, being a nurse, being young, living alone/being single, and having a chronic disease or psychiatric disorder history are the main risk factors at the personal level. Other occupational and pandemic-related factors such as having many years of work experience, the presence of COVID-19 symptoms and contact history, not enough sleep, having lower family support and limited social relationships, fear of infecting friends and family, having a reduced perception of protection by personal protective equipment, working on the frontline, and having longer service duration were found to be factors influencing the development of psychological distress during the COVID-19 pandemic. **Conclusions:** There are personal, interpersonal, and organizational risk factors that can lead to the occurrence of psychological distress among healthcare staff working during the COVID-19 pandemic.

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1. Introduction

The severe acute respiratory syndrome type 2 coronavirus (SARS-CoV-2) causing COVID-19 was first identified in Wuhan, a city in the northeastern part of the Republic of China. On 11 March 2020, the World Health Organisation (WHO) declared the spread of this virus a pandemic outbreak. As of 7 November 2022, more than 629 million infections and more than 6 million deaths had been reported worldwide (World Health Organization, 2022).

Among the different measures to combat the pandemic were home confinement and teleworking (Lang & Hofer-Fischanger, 2022). However, healthcare workers remained on the frontline fighting the progression of the virus by treating cases of SARS-CoV-2 infections that appeared as the pandemic unfolded, in addition to other pathologies that occur in healthcare centers on a daily basis (Soubelet-Fagoaga et al., 2022). This meant that healthcare professionals were exposed to high levels of stress and work overload, which translated in effects on their physical, mental, and social health. In addition, the uncertainty of the progression of the pandemic, misinformation on social networks, and different levels of severity of the disease, among others, caused further alterations in the mental well-being of healthcare workers (Trogolo et al., 2022).

In recent decades, stress has been widely studied and considered as a common occupational problem. This condition is much more consistently reported among healthcare professionals, given

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the demands and obligations that are persistently placed on them. Most notably, during the pandemic, this group of workers was affected as a consequence of a shortage of healthcare professionals and when some of them became ill, the rest had to take on responsibility for more patients (Zamir et al., 2022).

Putting an end to the pandemic and reducing its impact in the short, medium, and long term are among current global priorities (Agarwal et al., 2022). Much of the responsibility for these goals rests with the different health systems globally; this, incidentally, produces much more anxiety and stress for healthcare workers. These consequences are further triggered by burnout syndrome and the fear of getting infected by this virus; and of infecting their relatives when working in high-risk areas such as hospitals (Jun et al., 2020; Liu et al., 2020).

According to WHO (2022), health is understood as a state of complete physical, mental, and social well-being, and not merely by the absence of diseases or pathologies. This is why an assessment of the stress experienced by healthcare professionals in the current context of the pandemic is of utmost importance, as well as the determination of the possible risk factors causing psychological distress (PD).

One of the main consequences of the increase in PD among healthcare professionals is the deterioration of their mental health, which in turn leads to higher levels of stress, depression, and anxiety. This will ultimately have a negative direct impact on the healthcare professional and an indirect effect on the patient.

The present study was carried out with the aim of assessing the appearance of symptoms related to psychological distress in healthcare workers (nurses, doctors, and other frontline physicians) during the COVID-19 pandemic, addressing the different psychopathological results obtained in the included studies by means of a systematic review. In addition, the objective is to evaluate the risk factors that may lead to the appearance of symptoms related to psychosocial stress among healthcare workers at individual, interpersonal, and organizational levels.

2. Methods

2.1. Study design

A systematic review was conducted following the guidelines of the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) statement (Moher et al., 2009). For this purpose, the authors relied on a protocol for the development of this systematic review, which was registered in the International Prospective Register for Systematic Reviews (PROSPERO) with identification code CRD42022344270.

2.2. Databases and search strategy

The search was carried out in the Pubmed, Scopus, Web of Science, CINAHL (Cumulative Index to Nursing and Allied Health

Literature), and PsycINFO electronic databases on the basis of the keywords that the research question yielded following the PICOT strategy (Table 1).

Following these keywords, the Medical Subject Headings (MeSH) thesaurus was consulted, yielding the descriptors Health Personnel, Psychological Distress, Risk Factors, and COVID-19. In order to enlarge the scope of the search, synonymous terms were used to complete the search based on the Medical Subject Headings (MeSH) descriptors (Table 2), linked by the Boolean operators AND and OR.

Table 3 shows the search strategy used, carried out up to 04 December 2022, for each of the databases mentioned above during the search process.

2.3. Selection criteria

The following criteria were used for the selection of articles:
Inclusion criteria:

- Original articles published in English, Spanish, French, or Portuguese.
- Type: original articles and meta-analyses.
- Data collection must have taken place during the COVID-19 pandemic (30 January 2020 to present)
- Articles measuring any of the following values and/or effects: level of psychological distress, level of burnout, level of depression, level of stress and level of anxiety, number of cases of professionals with depression, stress and/or anxiety, comparison of levels of psychological distress before vs during the COVID-19 pandemic, and comparison according to country/type of profession/service.

Exclusion criteria:

- Studies in a language other than English, Spanish, French, or Portuguese.
- Studies of low scientific-technical quality after applying the quality assessment tool.
- Articles that did not answer the research question and were not related to the objective of the review.
- Data not collected during the COVID-19 pandemic (by 30 January 2020) or where the date of collection was unclear or not explicit.
- Typology: opinion articles, editorials and letters to the editor, systematic reviews, short communication papers, and case reports.

2.4. Data collection and extraction

Two authors independently carried out the search for articles, eliminated duplicate studies, and selected articles for inclusion after reading the abstract and title according to the previously established inclusion criteria. Citations from each search in the five databases were downloaded from Mendeley and identified duplicates were removed. Subsequently, the same two authors reviewed

Table 1
PICOT format: keywords.

Population	Healthcare professionals
Intervention	Assessing psychological distress
Comparison	Identifying risk factors
Outcome	Level of burnout, stress, and anxiety; number of cases of people with depression; comparison of levels before vs. during the COVID-19 pandemic and comparison according to type of profession/service; differences between frontline and second-line professionals.
Time	During the COVID-19 pandemic
Research question	What factors influence psychological distress in healthcare workers during the COVID-19 pandemic?

Table 2
Terms used in the search.

MeSH	Terms
Health personnel	Healthcare professionals or Healthcare workers or Healthcare providers or Physician or Nurse* or Doctor*
Psychological Distress	Psychological impact or Psychological Distress
Risk Factors	Risk Factors or Factors Associated
COVID-19	COVID-19

Table 3
Search strategy used in each database.

Database	Search strategy	Results
Pubmed	((Healthcare professionals [Title/Abstract] OR Healthcare workers [Title/Abstract] OR Healthcare providers [Title/Abstract] OR Physician [Title/Abstract] OR Nurse*[Title/Abstract] OR Doctor*[Title/Abstract]) AND (Psychological impact[Title/Abstract] OR Psychological Distress[Title/Abstract])) AND (Risk Factors[Title/Abstract] OR Factors Associated[Title/Abstract] AND (COVID-19[Title/Abstract]))	155
Scopus	(TITLE-ABS-KEY ("healthcare professionals" OR "healthcare workers" OR "healthcare providers" OR physician OR nurse* OR doctor*) AND TITLE-ABS-KEY ("psychological impact" OR "psychological distress") AND TITLE-ABS-KEY ("risk factors" OR "factors associated")) AND TITLE-ABS-KEY (covid-19))	235
Web of Science	TOPIC: "healthcare professionals" OR "healthcare workers" OR "healthcare providers" OR physician OR nurse* OR doctor* AND "psychological impact" OR "psychological distress" AND "risk factors" OR "factors associated" AND "COVID-19"	390
CINAHL	AB (healthcare professionals or healthcare workers or healthcare providers or physician or nurse or doctor) AND AB (psychological impact or psychological distress) AND AB (risk factors or factors associated) AND AB (COVID-19)	55
PsycInfo	tiab(healthcare professionals OR healthcare workers OR healthcare providers OR physician OR nurse OR doctor) AND tiab (psychological impact OR psychological distress) AND tiab(risk factors OR factors associated) AND tiab(COVID-19)	122
Search date: 04 Dec. 2022	Total	957

the full text of the studies and made the decision to include or exclude articles by consensus. The authors collected specific information (studies, context, main aim, type of study design, population, methods used, and main outcomes) and studies were rejected according to the exclusion criteria. Discrepancies were resolved by a third author.

2.5. Assessment of methodological quality

Two authors independently determined the methodological quality of the selected studies using the Joanna Briggs Institute (JBI) critical appraisal tools for non-randomized studies (Jordan et al., 2019), and a third author re-assessed their quality for verification purposes. This allowed assessing the methodological quality of the studies and determining the extent to which a study had avoided or minimized the risks of bias in its design, conduct, and/or analysis. Three different versions were used: one for quantitative cross-sectional studies (Moola et al., 2020) (8 items), a second one for qualitative studies (Lockwood et al., 2015) (10 items), and a third one for case-control or cohort studies (9 items) (Moola et al., 2020), setting the cut-off point at 6 or more positive responses in each study for acceptance for inclusion in this review (see [Supplementary Material](#)).

3. Results

According to the scientific literature verified for the present study in English, Spanish, French, or Portuguese, the initial search strategies identified a total of 957 references, which were screened according to the topic of this review. A total of 59 studies were included ([Fig. 1](#)): 56 quantitative cross-sectional studies; 1 case-control study; 1 cohort study; and 1 qualitative study.

3.1. Factors related to psychological distress at the individual level

Among the risk factors that may increase the likelihood of developing PD among healthcare workers (HCWs) during the COVID-19 pandemic, factors at the individual level have been highlighted such as female sex (Alfai et al., 2022; Altwaijri et al., 2022; Aragonès et al., 2022; Collantoni et al., 2021; Fattori et al., 2021; Gonzalez Mendez et al., 2022; Hammami et al., 2021; Ishikawa et al., 2021; Jang et al., 2021; Leira-Sanmartín et al., 2021; Li et al., 2020; Ruiz-Frutos et al., 2022; Stubbs et al., 2021; Taşdelen et al., 2022; Titi et al., 2022; Voth et al., 2022; Xiaoming et al., 2020), being younger (Altwaijri et al., 2022; Del Piccolo et al., 2021; Fattori et al., 2021; Ishikawa et al., 2021; Shahrour &

Dardas, 2020; Titi et al., 2022), working as a nurse (Almalki et al., 2021; Collantoni et al., 2021; Ghimire et al., 2022; Gonzalez Mendez et al., 2022), having a chronic disease or psychiatric disorder history (Almalki et al., 2021; Aragonès et al., 2022; Gonzalez Mendez et al., 2022; Taşdelen et al., 2022), years of experience (Stubbs et al., 2021; N. Wang et al., 2021; X. Xiao et al., 2020), presence of COVID-19 symptoms (Altwaijri et al., 2022; Gómez-Salgado et al., 2020; Juan et al., 2020; Nie et al., 2020), contact history (Altwaijri et al., 2022; Fattori et al., 2021; Gómez-Salgado et al., 2020; Ide et al., 2021; Jang et al., 2021; Lasalvia et al., 2021; Leira-Sanmartín et al., 2021; Morioka et al., 2022; Ruiz-Frutos et al., 2022; Titi et al., 2022), insufficient sleep (Collantoni et al., 2021; Leira-Sanmartín et al., 2021; H. Wang et al., 2020; Xia et al., 2021), and more.

3.2. Factors related to psychological distress at the interpersonal and/or relational level

At the interpersonal level, factors such as living alone/being single (Ishikawa et al., 2021; Xiaoming et al., 2020), lower family support (Del Piccolo et al., 2021; Nie et al., 2020), fear of infecting friends and relatives (Altwaijri et al., 2022; Galehdar et al., 2020; Hawari et al., 2021; Laurent et al., 2022; Nie et al., 2020), limited social relationships (Leira-Sanmartín et al., 2021; Peccoraro et al., 2022; Y. Xiao et al., 2022; Zeng et al., 2021), and more have been described.

3.3. Factors related to psychological distress at the organisational level

Finally, at the organizational level, factors such as reduced perception of protection by personal protective equipment (Del Piccolo et al., 2021; Galehdar et al., 2020; Hammami et al., 2021; Ide et al., 2021; Migisha et al., 2021; Nie et al., 2020; Nielsen et al., 2022; Zeng et al., 2021), gaps in information on the pandemic (Galehdar et al., 2020; Hawari et al., 2021; Xiaoming et al., 2020), working on the frontline (Altwaijri et al., 2022; Aragonès et al., 2022; Binnie et al., 2021; Fattori et al., 2021; Lee et al., 2022; Martínez-Ponce et al., 2022; Migisha et al., 2021; Morioka et al., 2022; Nie et al., 2020; Shahsavarinia et al., 2022; Taşdelen et al., 2022; N. Wang et al., 2021; Zeng et al., 2021), and longer service duration (Alqutub et al., 2021; Gonzalez Mendez et al., 2022; He et al., 2022; Menon et al., 2022; Titi et al., 2022; Voth et al., 2022) have been identified.

The included studies were assessed with the JBI critical appraisal tool, where both cross-sectional and longitudinal observational

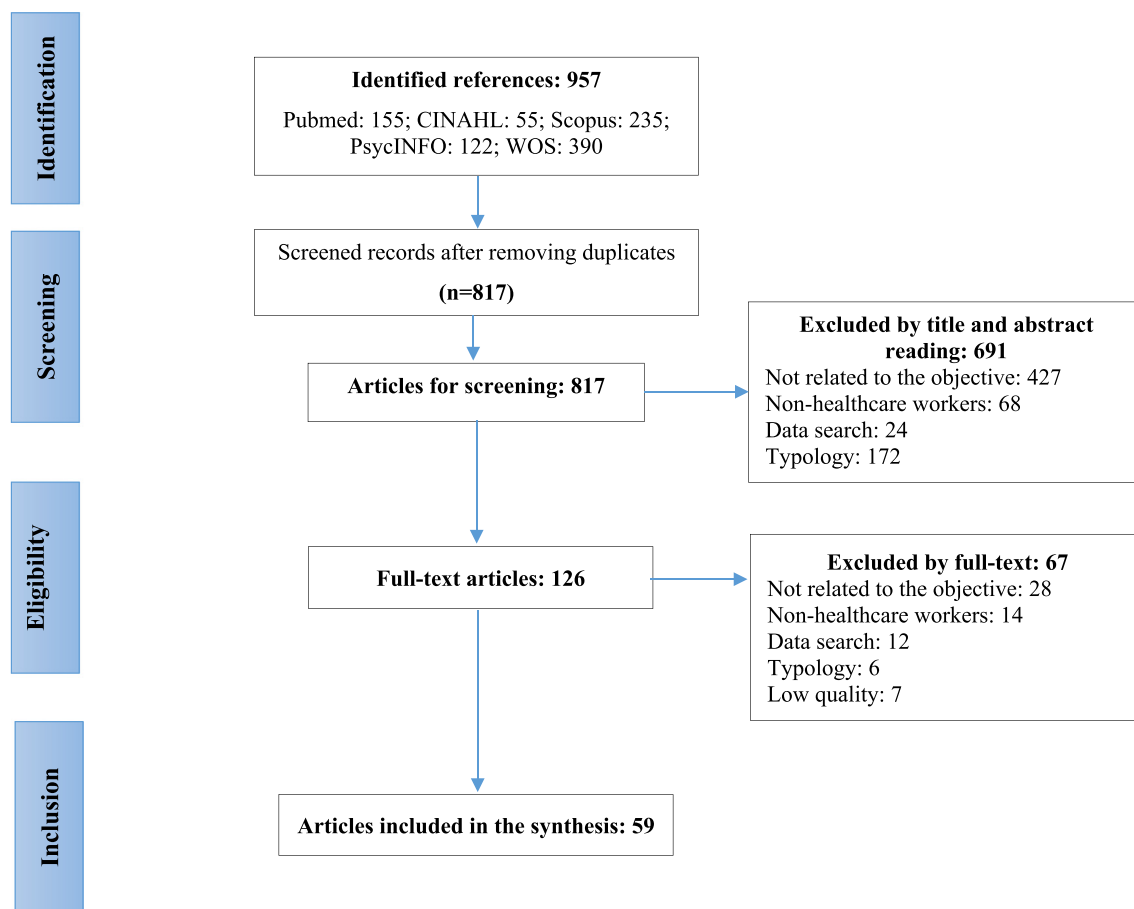


Fig. 1. Search results (PRISMA Flowchart).

studies, as well as qualitative, cohort, and case-control studies, obtained medium–high scores.

Table 4 is based on the Iberoamerican Cochrane Centre Handbook (Higgins et al., 2019) and shows the characteristics of each of the studies included in this review. They have been categorized by authors, country, design and objective, participants, instrument, and main outcomes. In addition, the results of the JBI critical appraisal tool have been added.

4. Discussion

The aim of this systematic review was to assess the occurrence of psychosocial stress-related symptoms in healthcare workers during the COVID-19 pandemic and to determine the risk factors predisposing to the development of these psychopathological symptoms.

First, the wide variability in the prevalence of psychological distress and stress in healthcare workers (HCWs), ranging from 13.82% (Ghimire et al., 2022) to 92.6% (Vancampfort & Mugisha, 2022) may be due to the variability of the samples and the time period in which the data were collected.

In this sense, one of the main factors predisposing to PD could be female sex (Alfai et al., 2022; Altwaijri et al., 2022; Aragonès et al., 2022; Collantoni et al., 2021; Fattori et al., 2021; Gonzalez Mendez et al., 2022; Hammami et al., 2021; Ishikawa et al., 2021; Jang et al., 2021; Leira-Sanmartín et al., 2021; Li et al., 2020; Ruiz-Frutos et al., 2022; Stubbs et al., 2021; Tasdelen et al., 2022; Titi et al., 2022; Voth et al., 2022; Xiaoming et al., 2020). As Aragonès et al. (2022) stated, this could be justified by the fact

that males find it more difficult to recognize PD, as well as by biological, social, and demographic factors. In addition, another factor, working as a nurse, has also been associated with higher PD (Almalki et al., 2021; Collantoni et al., 2021; Ghimire et al., 2022; Gonzalez Mendez et al., 2022). Given that this is still an eminently female profession, the results highlight the importance of addressing females' mental health and the relevance of planning psychological interventions, given that they are a higher risk group.

The age factor has shown more discrepancies among the authors. In most studies, being young was a risk factor for PD (Altwaijri et al., 2022; Del Piccolo et al., 2021; Fattori et al., 2021; Ishikawa et al., 2021; Shahrour & Dardas, 2020; Titi et al., 2022). However, in the studies by Alqutub et al. (2021) and Shahsavarinia et al. (2022), opposite results have been found. These inconsistencies could be related to work and personal circumstances, different assessment methods, and different year groupings. This reason could also explain that the more years of work experience HCWs have, the higher the presence of PD (Stubbs et al., 2021; N. Wang et al., 2021; X. Xiao et al., 2020). According to H. Wang et al. (2020), greater work experience was associated with greater PD symptomatology, and those participants who had 10 or more years of work experience as HCW had greater PD compared to those with only 3 years of experience in their professional career.

Depression and anxiety were also found to be the main symptoms accompanying psychosocial stress generated by the COVID-19 pandemic. According to Hong et al. (2021), depressive and anxiety symptoms topped the list of PD-related symptoms in a group of 4,692 nurses in China, accounting for 8.1% and 9.4%, respectively. On the other hand, in the study by Xiaoming et al. (2020), it was

Table 4
Characteristics of the studies included in the systematic review.

Study	Context	Study objective	Type of study	Participants	Methods	Main findings	Quality
Gómez-Salgado et al., 2020	Spain	To describe the levels of psychological distress and SOC of HCWs during the COVID-19 crisis, the relationship between both variables, and the health status of the participants.	Cross-sectional study	1,459 HCWs	- GHQ-12. - SOC-13.	The results showed that 80.6% of the healthcare professionals had psychological distress and the mean score in the SOC-13 scale was 62.8 points (SD = 12.02). Both psychological distress and SOC were related to the presence of COVID-19 symptoms as well as to contact history.	6/8
Galehdar et al., 2020	Iran	To explore nurses' experiences of psychological distress during care of patients with COVID-19.	Qualitative study	20 nurses	Semi-structured interviews (method proposed by Lundman and Graneheim).	11 categories: death anxiety, anxiety due to the nature of the disease, anxiety caused by corpse burial, fear of infecting the family, distress about time wasting, emotional distress of delivering bad news, fear of being contaminated, the emergence of obsessive thoughts, the bad feeling of wearing personal protective equipment, conflict between fear and conscience, and the public ignorance of preventive measures.	6/8
Juan et al., 2020	China	To provide important insights into the psychological issues that could be used to inform, design, and benchmark psychological crisis measures in the context of the COVID-19 pandemic.	Cross-sectional study	456 doctors and nurses (hospital)	- PHQ-9 and PHQ-15. - GAD-7. - IES-15. - Yale-Brown Obsessive-Compulsive Scale.	43.2% had stress reaction syndrome. The highest prevalence of psychological distress was obsessive compulsive symptoms (37.5%), followed by somatization symptoms (33.3%), anxiety symptoms (31.6%), and depression symptoms (29.6%).	8/8
Li et al., 2020	China	To determine the predictors of acute stress, depression and anxiety symptoms and investigate the sources of acute stress among the women HWs.	Cross-sectional study	4,369 HCWs (hospital)	- PHQ-9. - GAD-7. - IES-R.	It was found that women with more children were more likely to feel family members and friends' avoidance after post hoc multiple comparisons (≥ 2 children: 23.6% vs one child: 21.0% vs no child: 17.5%, $p = 0.002$). Those who worked in isolation wards did not show more feel of exposure (isolation wards: 40.1% vs other departments: 39.6%, $p = 0.800$).	8/8
Nie et al., 2020	China	To portray the prevalence and associated factors of psychological distress among frontline nurses during COVID-19 outbreak.	Cross-sectional study	263 nurses (frontline vs COVID-19, Emergency department)	- GHQ-12. - Perceived Social Support Scale. - Simplified Coping Style Scale. - IES-R.	25.1% showed psychological distress. Working in the Emergency department, concern for family, being treated differently, negative coping style, and COVID-19-related stress symptom were positively related to psychological distress. Perceived greater social support and effective precautionary measures were negatively associated with psychological distress.	8/8
Shahrour & Dardas, 2020	Jordan	To establish the prevalence of acute stress disorder and predictors of psychological distress among Jordanian nurses.	Cross-sectional study	448 nurses (hospital)	- SASRQ. - Trauma Coping Self-Efficacy Scale. - BSI-18.	64% were experiencing ASD due to the COVID-19 pandemic and thus were at risk for PTSD predisposition. More than one-third of nurses (41%) were also suffering significant psychological distress. Age, ASD, and coping self-efficacy significantly predicted psychological distress.	8/8
H. Wang et al., 2020	China	To assess the psychological effects of the COVID-19 on medical staff and the general public.	Cross-sectional study	1,093 HCWs (hospital)	- SDS, - PSS-10, - IES-R	The medical staff showed higher PSS-10 scores (16.81 ± 4.87) and IES-R scores (22.40 ± 12.12) compared to members of the general population PSS-10 (14.80 ± 5.60) and IES-R scores (17.89 ± 13.08). However, there was no statistically significant difference between the SDS scores of medical staff (44.52 ± 12.36) and the general public (43.08 ± 11.42).	6/8
X. Xiao et al., 2020	China	To examine the prevalence of stress, anxiety and depression of HCW in China during the COVID-19 epidemic, and to determine the risk factors predicting psychological morbidities that can be used as psychological intervention targets.	Cross-sectional study	958 HCWs and Non-HCWs	- Perceived Stress Scale (PSS-14).- Hospital Anxiety/Depression scale (HAD)	55.1% of respondents had higher psychological stress than that of HCW during SARS. 54.2% and 58% of participants had symptoms of anxiety and depression. Stress levels of HCW were different regarding job titles and years of work experience.	8/8
Xiaoming et al., 2020	China	To investigate the psychological status of hospital workers and provide references for psychological crisis intervention in the future.	Cross-sectional study	8,817 HCWs (hospital)	Stress and support scales.	The prevalence of depression, anxiety, and somatic symptoms in hospital workers was 30.2%, 20.7%, and 46.2%, respectively. Being female, single, Tujia minority,	8/8

(continued on next page)

Table 4 (continued)

Study	Context	Study objective	Type of study	Participants	Methods	Main findings	Quality
Almalki et al., 2021	Kingdom of Saudi Arabia	To estimate the prevalence of depression, anxiety, and stress among healthcare workers in Saudi Arabia, and to identify the factors associated with these psychological disorders.	Cross-sectional study	501 HCWs	DASS-21	educational background of junior or below, designated or county hospital, need for psychological assistance before or during the epidemic, unconfident about defeating COVID-19, ignorance about the epidemic, willingness of attending parties, and poor self-rated health condition were independent factors associated with high-level depression, somatic symptoms, and SSI among hospital workers. The estimated prevalence rates of depression, anxiety, and stress were 54.69, 60.88, and 41.92%, respectively. The multivariate analysis revealed that healthcare workers with chronic diseases, nurses, and healthcare workers from the southern region were more likely to suffer from depression and stress.	8/8
Alqutub et al., 2021	Kingdom of Saudi Arabia	To assess the determinants and severity of psychological distress among frontline Ministry of Health workers within Saudi Arabia during the rapid acceleration phase of the COVID-19 epidemic.	Cross-sectional study	2,094 FHCW	K10	Factors associated with severe psychological distress in multiple regression analyses were male gender ($p < 0.001$), working for >45 hours/week ($p = 0.009$), age of >40 years ($p = 0.038$), years of experience for more than seven years ($p = 0.048$), and using psychological services ($p < 0.001$). The prevalence of severe psychological distress was 27.3%.	6/8
Binnie et al., 2021	Canada	To examine the relationship between COVID-19 exposure and mental health in Canadian ICU HCW.	Cross-sectional study	310 HCWs (Intensive Care, hospital)	GHQ-12	Clinically-relevant psychosocial distress was identified amongst a majority of ICU HCW during the acceleration phase of the first wave of the COVID-19 pandemic, including those with minimal or no exposure to COVID-19.	8/8
Collantoni et al., 2021	Italy	To evaluate the psychological outcome among HCWs at the final stages of the first wave of the COVID-19 pandemic.	Cross-sectional study	996 FHCW (hospital)	- Risk perception. - Psychopathological variables. - Coping skills.	Compared to physicians and healthcare assistants, nurses showed higher levels of depression ($p = 0.002$), insomnia ($p < 0.001$), and generalized anxiety ($p = 0.001$). Females reported increased concerns about the possibility of infecting others ($p = 0.046$), greater anxiety ($p < 0.001$), COVID-19 related fears ($p < 0.001$), depression ($p < 0.001$), and post-traumatic distress ($p < 0.001$) than males.	8/8
Del Piccolo et al., 2021	Italy	To assess the psychological distress of HCWs working in the field of obstetrics during the COVID-19 pandemic and to identify factors associated with psychological distress at the individual, interpersonal, and organizational level.	Cross-sectional study.	503 HCWs (Obstetrics field)	- IPSICO. - GHQ-12	Just over half (51.1%; 246/481) of the GHQ-12 respondents reported a clinically significant level of psychological distress ($\text{GHQ-12} \geq 3$). Psychological distress was associated with either individual (i.e., female sex, stressful experience related to COVID-19, exhaustion, and the use of dysfunctional coping strategies), interpersonal (i.e., lower family support, limitations in interactions with colleagues), and organizational (i.e., reduced perception of protection by personal protective equipment, perceived delays on updates and gaps in information on the pandemic) factors in dealing with the pandemic.	8/8
Fattori et al., 2021	Italy	To examine the psychological wellbeing of all employees in a large University Hospital in Italy, using validated psycho- metric scales in the context of the occupational physician's health surveillance, in collaboration with the Psychiatric Unit.	Longitudinal study	550 HCWs	- GHQ-12, IES-R, and GAD-7 (first phase).- PHQ-9, DES-II, and SCL-90 (second phase) .	39% of the subjects expressed general psychological discomfort (GHQ-12), 22% post-traumatic stress symptoms (IES-R), and 21% symptoms of anxiety (GAD-7). Women, nurses, younger workers, subjects with COVID-19 working exposure and with an infected family member showed significantly higher psychological impairment compared to colleagues.	8/8
Hajure et al., 2021	Ethiopia	To assess the psychological distress related to COVID-19 among healthcare workers in Mettu town.	Cross-sectional study	127 FHCW	- DASS-21. - IES-R.	40.2% of the participants reported to have the symptoms of psychological distress. The majority of the participants reported mild psychological distress (37%) followed by moderate psychological distress (29%).	8/8

Table 4 (continued)

Study	Context	Study objective	Type of study	Participants	Methods	Main findings	Quality
Hammami et al., 2021	Tunisia	To evaluate the magnitude of different psychological outcomes among Tunisian healthcare professionals (HCPs) during the first wave of the coronavirus disease 2019 (COVID-19) pandemic, and to identify the associated factors.	Cross-sectional study	503 HCPs.	- ISI-7. - PHQ-2. - GAD-2.	Female gender was a risk factor for all psychological outcomes, whereas psychiatric history was a risk factor for both anxiety and insomnia [odds ratio (OR) = 2.86, 95% CI 1.78–4.60, $p = 0.00$ for insomnia]. Using protective equipment was associated with a lower risk for depression (OR = 0.41, 95% CI 0.27–0.62, $p = 0.00$) and anxiety.	8/8
Hawari et al., 2021	Jordan	To characterize psychological distress and factors associated with distress in HCWs working during a stringent lockdown in a country (Jordan) that had exhibited one of the lowest incidence rates of Covid-19 globally at the time of the survey.	Cross-sectional study	937 HCWs	- Patient-Reported Outcomes Measurement Information System (PROMIS). - K6.	32% suffered from high distress while 20% suffered from severe distress. Exhaustion, anxiety, depression, and sleep disturbances were reported (in past seven days) by approximately 34%, 34%, 19%, and 29% of subjects (respectively). Suffering burnout; reporting sleep-related functional problems; exhaustion; being a pharmacist (relative to a physician); working in a cancer centre; harbouring fear about virus spreading; fear that the virus threatened life; fear of alienation from family/friends; and fear of workload increases, were significantly associated with higher distress.	8/8
Hong et al., 2021	China	To assess the immediate psychological impact on frontline nurses in China.	Cross-sectional multicentre study	4,692 nurses (hospital)	- PHQ-9. - GAD-7. - PHQ-15	Of the 4,692 nurses who completed the survey, 9.4% ($n = 442$) were considered to have depressive symptoms, 8.1% ($n = 379$) represented anxiety, and 42.7% ($n = 2,005$) had somatic symptom. About 6.5% ($n = 306$) respondents had suicidal ideation.	8/8
Ide et al., 2021	Japan	To investigate the psychological effects of the COVID-19 outbreak and associated factors on hospital workers at the beginning of the outbreak with a large disease cluster on the Diamond Princess cruise ship.	Cross-sectional study	4,133 HCWs (hospital)	- GHQ-12. - IES-R. - COVID-19-stress-related questions.	High-risk HCWs, those in their 40 s, and those who had real direct contact with at least one patient infected with COVID-19 were most likely to have both general and event-related distress. Those who showed confidence in standard precaution were less likely to report general distress and event-related distress.	8/8
Ishikawa et al., 2021	Japan	To analyse the psychological status of healthcare workers in Japan and the influencing factors during the 2019 coronavirus disease pandemic.	Cross-sectional study	328 HCWs and Non-HCWs (hospital)	- GHQ-12	Overall, women, non-physicians, those living alone and younger participants were found to have significantly greater psychological distress than their counterparts.	8/8
Jang et al., 2021	South Korea	To identify the psychological impact and the factors contributing to the likely increase in emotional distress of HCWs	Cross-sectional study	99 HCWs (hospital)	- GHQ-12. - PHQ-9. - IES-R.	Emotional distress was reported by 45.3% of all participants. Female gender, managing close contacts, higher scores on PHQ-9, and a feeling that proper infection control training was not provided were associated with emotional distress in logistic regression.	8/8
Lasalvia et al., 2021	Italy	To assess the magnitude of psychological distress and associated factors among hospital staff during the COVID-19 pandemic in a large tertiary hospital located in north-east Italy.	Longitudinal study	2,195 HCWs and Non-HCWs	- IES-R. - Self-rating Anxiety Scale. - PHQ-9.	63.2% of participants reported COVID-related traumatic experiences at work and 53.8% (95% CI 51.0%–56.6%) showed symptoms of post-traumatic distress.	8/8
Leira-Sanmartín et al., 2021	Spain	To objectify the psychological impact of the COVID-19 pandemic on the workers of a tertiary hospital.	Cross-sectional study	536 HCWs and 121 non-HCWs (tertiary hospital)	GHQ-12	Inadequate sleep, poor nutritional and social interaction habits, misuse of psychotropics, female gender, COVID-19 clinical diagnosis, and losing a relative by COVID-19 were variables associated with higher probability of GHQ-12 positive screening. Significant differences between “frontline workers” and the rest were not found, nor was higher the probability of psychological distress in HCWs vs non-HCWs.	8/8
López-Atanes et al., 2021	Spain	To analyse from a gender perspective the psychological distress experienced by the medical workforce during the peak of the pandemic in Spain.	Cross-sectional study	673 HCWs and Non-HCWs (hospital)	- GHQ-28. - PSS-14.	Women and those with lower-paid positions were at risk of higher psychological distress and worse quality of life within the medical workforce during the first wave of the pandemic.	6/8

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Table 4 (continued)

Study	Context	Study objective	Type of study	Participants	Methods	Main findings	Quality
Migisha et al., 2021	Uganda	To assess the risk perception and immediate psychological state of HCWs early in the pandemic in referral hospitals involved in the management of COVID-19 patients in Uganda.	Cross-sectional study	335 HCWs	GHQ-12	One hundred and forty-four (44%) had a GHQ-12 score > 12. The most common concerns reported included fear of infection at the workplace (81%), stigma from colleagues (79%), lack of workplace support (63%), and inadequate availability of personal protective equipment (56%). In multivariable analysis, moderate (aPR = 2.2, 95% CI 1.2–4.0) and high (aPR = 3.8, 95% CI 2.0–7.0) risk perception towards COVID-19 (compared with low-risk perception) were associated with psychological distress.	8/8
Roberts et al., 2021	UK and Ireland	To quantify psychological distress experienced by emergency, anaesthetic and intensive care doctors during the acceleration phase of COVID-19 in the UK and Ireland.	Cross-sectional study	5,440 doctors (emergency, anaesthetic and intensive care, hospital)	GHQ-12	44.2% (n = 2405) of respondents scored GHQ-12 > 3, meeting the criteria for psychological distress. 57.3% (n = 3045) had never previously provided clinical care during an infectious disease outbreak but over half of respondents felt somewhat prepared (48.6%, n = 2653) or very prepared (7.6%, n = 416) to provide clinical care to patients with COVID-19.	8/8
Stubbs et al., 2021	Australia	To measure the impact of COVID-19 and potential changes over time in its impact, on the health and well-being of HCWs in an Australian COVID-19 hospital.	Cross-sectional study	433 HCWs (hospital)	K10	At the moment of the study, females were significantly more likely to be distressed than males, but not during the height of the pandemic. High distress during the height of the pandemic was more likely to be maintained by HCWs who were less physically active than usual during the height of the pandemic (OR = 5.5), by those who had low self-rated mental health before the pandemic (OR = 4.8), and by those who had 10 or more years of professional experience (OR = 3.9).	8/8
Vancappel et al., 2021	Francia	To investigate the effects of exposure to COVID-19 sanitary crisis on affective symptoms (anxiety, post-traumatic stress, burnout) among French HCWs.	Cross-sectional study	1,010 HCWs (hospital)	- Online questionnaires. - Visual analogic scales.	The majority (57.8%) of the participants presented post-traumatic symptoms. Depending on the sub-dimensions evaluated, a proportion of participants reported moderate (25.9–31.2%) to severe (17.2–40.7%) burnout symptoms.	8/8
N. Wang et al., 2021	China	To investigate the psychological impact of COVID-19 on healthcare workers in China Xi'an Center hospital.	Cross-sectional study	1,967 HCWs	GHQ-12	Work experience increased emotional stress as 23% of participants with 10 years or more of experience exhibited higher stress compared to those with fewer than 3 years of work experience (7.5%). Moreover, 33.3% of participants who worked in or were exposed to the affected areas of the pandemic experienced psychological stress.	8/8
Xia et al., 2021	China	To explore the prevalence and the predictive factors especially defensive predictors associated with posttraumatic stress and psychological distress in nurses during the COVID-19 pandemic.	Cross-sectional study	1,728 nurses (frontline)	- PTSD-5.- Self-Reporting Questionnaire (SRQ) .	The prevalence of posttraumatic stress and psychological distress in nurses throughout China between February 1, 2020 and February 13, 2020 was 39.12 and 24.36%, respectively. Insomnia, high panic intensity, and high impact of the COVID-19 pandemic were risk predictors of posttraumatic stress and psychological distress in nurses.	8/8
Zeng et al., 2021	China	To explore the influencing factors associated with self-reported psychological distress among a sample of HCWs in China in relation to COVID-19.	Cross-sectional study	712 HCWs	GHQ-12	High levels of psychological distress (GHQ-12 ≥ 3) were observed in 29.2% and logistic regression analysis showed that psychological distress was associated with low preparedness (OR = 0.91, 95% CI = 0.87–0.96), high work impact (OR = 1.11, 95% CI = 1.03–1.20), personal life impact (OR = 1.12, 95% CI = 1.07–1.17), and safety-related concerns (OR = 1.09, 95% CI = 1.02–1.16). At the 5-month assessment point, high psychological distress was less frequent (21.8%).	8/8

Table 4 (continued)

Study	Context	Study objective	Type of study	Participants	Methods	Main findings	Quality
Alfai et al., 2022	Saudi Arabia	To assess the prevalence of depression, anxiety, and stress symptoms and to address the associated risk factors among quarantined non-HCWs, quarantined HCWs, and medical staff in the Ministry of Health quarantine facility.	Cross-sectional study	301 HCWs and Non-HCWs	DASS-21	The prevalence of depression, anxiety, and stress symptoms among quarantined HCWs were 25.0%, 29.8%, and 16.9% and 20.5%, 20.5%, and 27.3% among the medical staff. The predictors of depression, anxiety, and stress symptoms among the study participants were female gender, perceived COVID-19 stigma, presence of other relatives in quarantine, comorbidities, and abnormal sleep duration.	8/8
AlKandari et al., 2022	Kuwait	To evaluate the psychological impact of the COVID-19 pandemic on healthcare workers to determine the prevalence of symptoms of depression, anxiety, and well-being, and to identify the factors associated with adverse psychological effects.	Cross-sectional study	378 HCWs (hospital)	- PHQ-9. - GAD-7. - WHO-5.	52.9% exhibited moderate or high levels of depression, and 40.5% reported moderate or high levels of anxiety. Unmarried HCWs reported more severe levels of depression; moderately severe depression (24.0% vs. 16.1%) and severe depression (12.4% vs. 6.8%). Unmarried HCWs also reported more severity of anxiety as well as lower overall wellbeing.	8/8
Altwayjri et al., 2022	Kingdom of Saudi Arabia (KSA)	To estimate the prevalence and severity of psychological distress and characterized predisposing risk factors among HCWs in KSA during the COVID-19 pandemic.	Cross-sectional study	1,985 FHCW	Saudi National Mental Health Survey questionnaire	The prevalence of psychological distress reported by HCWs in KSA was high, ranging from mild-moderate to severe in severity. Younger HCWs, women, those in contact with COVID-19 patients, and those who either had loved ones affected or who were themselves affected by COVID-19 were the most at-risk of psychological distress.	8/8
Aragonès et al., 2022	Spain	To investigate the prevalence of and associated factors for psychological distress in primary care workers during the first COVID-19 outbreak.	Cross-sectional study	2,928 HCWs (primary care)	- Connor–Davidson Resilience Scale. - PHQ-8. - PTSD-5.	Female sex (OR 1.61, 95% CI = 1.25 to 2.06), having previous mental disorders (OR 2.58, 95% CI = 2.15 to 3.10), greater occupational exposure to patients with COVID-19 (OR 2.63, 95% CI = 1.98 to 3.51), having children or dependents (OR 1.35, 95% CI = 1.04 to 1.76 and OR 1.59, 95% CI = 1.20 to 2.11, respectively), or having an administrative job (OR 2.24, 95% CI = 1.66 to 3.03) were associated with a higher risk of any current mental disorder.	8/8
Carazo et al., 2022	Canada	To measure the prevalence of psychological distress among Quebec healthcare workers (HCWs) during the second and third pandemic waves.	Case-control study	4,068 HCWs cases (+COVID-19 test) and 4152 HCWs controls (-COVID-19 test)	- K6.- PSR: questions based on Karasek and Siegrist models (value conflicts, and work-life balance)	Prevalence of high work-related psychological distress was 42%; it was associated with PSRs (mainly work-life balance, value conflicts, and high psychological demands) but not with SARS-CoV-2 infection.	7/9
Chingono et al., 2022	Zimbabwe	To investigate changes in psychological distress and anxiety among HCWs accessing the programme over 12 months across three SARS-CoV-2 waves.	Cross-sectional study	345 HCWs (hospital)	- Shona Symptom Questionnaire.	Qualitative data showed high levels of anxiety, psychosomatic symptoms and burnout related to the pandemic. Mental wellbeing was affected by financial insecurity, unmet physical health needs and inability to provide quality care within a fragile health system.	8/8
Dahka et al., 2022	Iran	To investigate the mental health and the resilience level in the nurses' population.	Cross-sectional study	432 nurses (hospital)	- GHQ-12. - CD-RISC-10.	Probable psychological distress (GHQ-12 score ≥ 15) was present in 57.2% of nurses. Among demographic and COVID-19-related variables, only educational level was significantly and negatively correlated with mental health. After controlling the variables, hierarchical regression analyses results showed that lower resilience was associated with poor mental health ($\beta = -0.49$; $P < 0.001$).	6/8
Ghimire et al., 2022	Nepal	To assess the psychological impact of this pandemic in different groups of HCWs, factors associated with it and the degree of satisfaction with the ongoing mental health support system.	Cross-sectional study	608 HCWs (hospital)	- DASS-21. - IES-R.	Out of 608 respondents, the overall prevalence of depression, anxiety, stress, and post-traumatic stress disorder (PTSD) was 20.89%. 24.18%, 13.82%, and 15.46%, respectively. Nurses had higher depression,	8/8

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Table 4 (continued)

Study	Context	Study objective	Type of study	Participants	Methods	Main findings	Quality
He et al., 2022	China	To investigate the prevalence and risk factors of somatization, depression, and anxiety among 374 frontline nurses in less severely affected areas during the initial period of the COVID-19 outbreak.	Cross-sectional study	374 frontline nurses	- PHQ-9. - SSS. - GAD-7.	anxiety, stress, and PTSD scores while FCHVs had high depression and PTSD compared to doctors. For various types of health facilities, HCWs working in provincial-level hospitals had high-stress level. The prevalence of somatization, depression, and anxiety among frontline nurses was 41.4%, 40.1%, and 37.4%, respectively. Nurses from provincial-level hospitals were less likely to report somatization (OR = 0.50; p = 0.018), depression (OR = 0.52; p = 0.024), and anxiety (OR = 0.35; p < 0.001) than those from county-level hospitals. Longer service duration was significantly associated with a higher likelihood of reporting somatization (OR = 1.06; p = 0.008) and depression (OR = 1.06; p = 0.006).	8/8
Gonzalez Mendez et al., 2022	China	To analyse the prevalence of five psychological outcomes (depression, anxiety, stress, PTSD, and suicidal ideation) among Chinese HCWs, and to measure the total possible negative psychological impact 1 year after the COVID-19 initial outbreak.	Cross-sectional study	1,263 HCWs	- DASS-21. - PC-PTSD-5. - PHQ-9. - SCSQ-20.	COVID-19 pandemic had a negative psychological impact on HCWs, which was still evident 1 year after the initial outbreak. Nurses showed higher depression and anxiety than other HCWs. Female gender, passive coping, long working hours, having a chronic disease, and experiencing violence, among other factors, were all risk factors for psychological impairment.	8/8
Laurent et al., 2022	France	To measure the prevalence of post-traumatic stress disorder in HCWs and to identify risk factors and protective factors during the epidemic in France.	Cross-sectional study	2,153 HCWs (hospital)	- GHQ-12. - PS-ICU. - Brief-COPE. - IES-R.	Risk factors for the development of PTSD were having experienced additional difficult events during the crisis, having a high level of psychological distress, a high level of perceived stress related to the workload and human resources issues, the emotional burden related to the patient and family, and stressors specific to COVID-19 during the first peak of the crisis.	8/8
Lee et al., 2022	South Africa	To examine workplace contextual factors associated with how psychological distress was experienced in a South African setting where a severe first wave was being experienced.	Cross-sectional study	154 FHCW	- GHQ-12. - Job-Related Tension Index. - Perception of Risks Associated with COVID-19. - Training-Related Questionnaire. - Questionnaire on Knowledge, Attitude, Practices, and Behaviour. DASS-21	A high degree of psychological distress (57.4% above the General Health Questionnaire cut-off value) was found, and a strong association between perceived risks associated with the presence of COVID-19 in the healthcare workplace and psychological distress (adjusted OR = 2.35, p < 0.01).	8/8
Martínez-Ponce et al., 2022	Mexico	To examine the prevalence of depression, anxiety, and stress in nurses and to analyse the factors associated with their presence during the COVID-19 pandemic.	Cross-sectional study	116 nurses (a second-level hospital)		In the stress subscale, the variables that conferred a significant association were working inside the COVID-19 area (OR: 17.05), being severely affected by the death of infected patients (OR: 4.23), and fear of entering the red zone (OR: 19.47). The need for psychological care was associated with moderate to severe depression and anxiety (OR: 7.38, OR: 9.50, respectively).	8/8
Menon et al., 2022	India	To determine the burnout levels and factors associated with the risk of psychological distress among healthcare workers (HCW) engaged in the management of COVID 19 in India.	Cross-sectional study	967 HCWs and Non-HCWs	- GHQ-5. - ICMR-NIOH Burnout questionnaire.	52.9% of the participants had the risk of psychological distress that needed further evaluation. Risk of psychological distress was significantly associated with longer hours of work.	8/8
Morioka et al., 2022	Japan and Singapore	To explore the factors contributing to the prolonged psychological distress of frontline nurses and physicians caring for COVID-19 patients in hospitals in Singapore and Japan.	Cross-sectional study	1,644 FHCW (hospital)	K10	Significant risk factors for prolonged psychological distress included being a frontline nurse, having an underlying medical condition, experiencing prejudice because they undertook COVID-19 patient care, having trouble dealing with panicked or uncooperative patients, and experiencing an outbreak of COVID-19 in the hospital.	8/8

Table 4 (continued)

Study	Context	Study objective	Type of study	Participants	Methods	Main findings	Quality
Moyo et al., 2022	Zimbabwe	To examine how COVID-19 impacts employee decision-making and performance.	Cross-sectional study	443 FHCW (private hospital)	<i>Ad hoc</i> questionnaire; Maslach's burnout inventory scale; turnover intention; employee disengagement PSS (adapted).	It was found that employees' perceived risk of COVID-19 increased their disengagement, turnover intention, burnout, and low morale. These findings shed light on how the global pandemic is affecting the cognitions and behaviours of frontline workers.	8/8
Nielsen et al., 2022	Denmark	To describe changes in distress among Danish hospital-based nurses during the early months of the COVID-19 pandemic and to examine predictors of distress and turnover intentions.	Cross-sectional study	426 nurses (hospital)	- PHQ-9. - GAD-7. - ISI-7. - PSS-10.	Nurses with brief work experience reported higher increase in distress. Feeling unsafe at work, having low trust in management and being anxious for relatives were associated with increased distress. Finally, feeling unsafe at work, being anxious for relatives and having low trust in management were predictors of intention to change job.	8/8
Peccorale et al., 2022	USA	To describe the course and correlates of psychological distress in frontline healthcare workers (FHCWs) during the COVID-19 pandemic in New York City (NYC).	Prospective cohort study	786 HCWs (urban hospital)	- GAD-7, - PHQ-8, - PTSD-5	16.0% FHCWs had persistent distress; 150 (19.1%) remitted distress; 35 (4.5%) new-onset distress; and 475 (60.4%) no/minimal distress. Relative to FHCWs with no/minimal distress, those with persistent distress reported greater relationship worries, pre-pandemic burnout, lower dispositional optimism, less emotional support, and feeling less valued by hospital leadership.	6/9
Ruiz-Frutos et al., 2022	Ecuador	To analyse the levels of psychological distress among healthcare workers in Ecuador during the COVID-19 pandemic.	Cross-sectional study	1,056 FHCW	- <i>Ad hoc</i> questionnaire. - GHQ-12.	66.0% of the participants manifested psychological distress, with significantly higher levels in women with symptoms of COVID-19 and previous contact with infected people or objects ($p < 0.001$).	8/8
Shahsavarinia et al., 2022	Iran	To examine the association between Post-Traumatic Stress Disorder (PTSD) related to COVID-19 in emergency staff and self-compassion and perceived social support.	Cross-sectional study	222 HCWs (emergency staff)	- PTSD-5. - MSPSS. - Self-Compassion Scale.	Age ($r = 0.17$, $P = 0.034$), self-judgment ($r = 0.36$, $P < 0.001$), isolation ($r = 0.44$, $P < 0.001$) and over-identification ($r = 0.15$, $P = 0.031$) were associated with PTSD score, and there was also a statistically significant inverse relationship between the score of the self-kindness ($r = -0.19$, $P = 0.006$) subscale and the overall score of PTSD in the emergency staff.	8/8
Titi et al., 2022	12 Arab countries	To investigate COVID-19-related psychological impact on HCWs in 12 Arab countries.	Cross-sectional study	2,879 HCWs	- DASS-21. - ISI-7.	Anxiety, depression, stress, and insomnia were reported by 48.9%, 50.6%, 41.4% and 72.1% of respondents, respectively. Lower-middle- and lower-income countries had a significantly higher prevalence of all the psychological outcomes than high-income countries. The prevalence of mental health symptoms was higher among HCWs aged 30–39 years, those who worked > 44 hours per week, and those in contact with COVID-19 cases, as well as HCWs who were not satisfied with the preventive measures. The prevalence of mental health symptoms was lower among male HCWs.	8/8
Taşdelen et al., 2022	Turkey	To investigate the psychological challenges of Turkish HCWs during the outbreak and discuss the factors that increase their burden, including stigmatisation.	Cross-sectional study	634 HCWs	DASS-21	The prevalence of moderate to severe depression, anxiety, and stress-related symptoms was 36%, 35%, and 22%, respectively. Being female, working in close contact with patients with COVID-19, and having a psychiatric disorder history were risk factors for psychological distress. HCWs who perceived other people as more dismissive had significantly higher depression and anxiety scores.	8/8

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Table 4 (continued)

Study	Context	Study objective	Type of study	Participants	Methods	Main findings	Quality
Vancampfort & Mugisha, 2022	Uganda	To explore the prevalence of psychological distress and PTSD symptoms among Ugandan mental health nurses and to investigate associations between these mental health outcomes and lifestyle factors.	Cross-sectional study	108 mental health nurses	- K-6. - PTSD-5. - SIMPAQ. - PSQI. - AUDIT-C.	92.6% had psychological distress (K-6 $\geq$ 13), 44.4% elevated PTSD symptoms (PCL- $\geq$ 41), 75.9% reported poor sleep quality (PSQI $>$ -5), and 24.4% reported harmful drinking (AUDIT-C $\geq$ 3 for women and $\geq$ 4 for men). SIMPAQ exercise correlated with K-6 ($\rho = -0.36$, $P < 0.001$) and PCL-5 ($\rho = -0.24$, $P = 0.013$), SIMPAQ walking with PCL-5 ($\rho = -0.31$, $P < 0.001$).	8/8
Voth et al., 2022	Ontario, USA	To describe distress levels reported by HCWs across care settings and factors associated with distress.	Cross-sectional study	403 HCWs	K10	Overall, 228 (74.2%) HCWs who completed the K10 reported high distress, with greater rates among hospital and long-term care HCWs. Distress was more likely to appear in HCWs identified as female, younger than 55, with lower perceived respect among their team, and who experienced greater worry about physical and mental health and managing high workloads.	8/8
Y. Xiao et al., 2022	China	To test the mediation effect of burnout in the association between role stress and psychological distress, and whether this mediation is moderated by social support.	Cross-sectional study	623 nurses (frontline hospital)	- Role Conflict, Ambiguity and Overload Scale (RCAOS). - MBI. - DASS-21. - Self-designed scale for social support.	Burnout partially mediated the positive association between role stress and psychological distress. Social support moderated the indirect effect of role stress on psychological distress via burnout, with the effect being stronger for nurses with low social support than those with high social support.	8/8
Zahirihsini et al., 2022	Canada	To evaluate the associations between a set of psychosocial stressors at work and moral injury in HCWs during the third wave of the COVID-19 pandemic in Quebec, Canada.	Cross-sectional study	572 HCWs and leaders	- OHWQ. - EMIS-M.	HCWs exposed to psychosocial stressors at work were 2.22–5.58 times more likely to experience moral injury. Low ethical culture had the strongest association (PR: 5.58, 95% CI: 1.34–23.27), followed by low reward (PR: 4.43, 95% CI: 2.14–9.16) and high emotional demands (PR: 4.32, 95% CI: 1.89–9.88).	8/8
Zhang et al., 2022	China	To perform a mental health evaluation and an early psychological intervention for HCWs during the COVID-19 epidemic.	Cross-sectional study	3,055 HCWs (paediatric intensive care units, hospital)	- IES-R. - DASS-21.	45.99% were considered to meet the clinical cut-off scores for posttraumatic stress, and the proportions of participants with mild to extremely severe symptoms of depression, anxiety and stress were 39.69%, 36.46% and 17.12%, respectively.	8/8

aPR: adjusted prevalence ratio; ASD: Acute stress disorder; AUDIT-C: Alcohol use disorder identification test-concise; Brief-COPE: Coping Orientation to Problems Experienced Inventory; BSI-18: Brief Symptom Inventory-18; CD-RISC-10: 10-item Connor-Davidson Resilience Scale; CI: confidence interval; DASS-21: Depression Anxiety and Stress Scale-21; EMIS-M: Expressions of Moral Injury Scale-Military Version; FCHVs: Female Community Health Volunteers; FHCW: Frontline healthcare workers; GAD-7: Generalized Anxiety Disorder Scale; GHQ-12/GHQ-28: General Health Questionnaire; HCWs: Healthcare workers; IES-R: Impact of Events Scale-Revised; IPSICO: 104-item survey Impatto Psicologico COVID-19 in Ostetricia; ISI-7: Insomnia Severity Index; K10/K6: Kessler Psychological Distress Scale; MSPSS: Multidimensional Perceived Social Support Scale; OHWQ: Occupational Health and Well-being Questionnaire; OR: Odds ratio; PC-PTSD-5: Primary Care PTSD Screen for DSM-5; PHQ-8/PHQ-9: Patient Health Questionnaire; PR: Prevalence ratios; PS-ICU: ICU Perceived Stressors Scale; PSS-10: Perceived Stress Scale; PSQI: Pittsburgh sleep quality index; PTSD: Post-traumatic stress disorder; SASRQOMS: Stanford Acute Stress Reaction Questionnaire; SCSQ-20: Simplified Coping Style Questionnaire; SIMPAQ: Simple physical activity questionnaire; SOC-13: Sense of coherence scale; SSS: Somatic Self-Rating Scale.

observed that in a group of 8,817 HCWs in a hospital in China, the prevalence of depression and anxiety was 30.3% and 20.7%, respectively. This is consistent with the meta-analysis and systematic review conducted by [Abdulla et al. \(2021\)](#), which examined depression and anxiety in relation to the COVID-19 pandemic among HCWs in India. In this study, it was found that these symptoms developed mainly due to concerns about personal and family contagion and lack of protective equipment generated by the sudden outbreak of SARS-CoV-2, as has been also shown for PD ([Del Piccolo et al., 2021](#); [Galehdar et al., 2020](#); [Hammami et al., 2021](#); [Ide et al., 2021](#); [Migisha et al., 2021](#); [Nie et al., 2020](#); [Nielsen et al., 2022](#); [Zeng et al., 2021](#)).

All these stress-related symptoms were further exacerbated by variables other than the high workload generated by the COVID-19 pandemic, including fear of self or family infection ([Altwaijri et al., 2022](#); [Galehdar et al., 2020](#); [Hawari et al., 2021](#); [Laurent et al., 2022](#); [Nie et al., 2020](#)), limited social relationships ([Leira-Sanmartín et al., 2021](#); [Peccoraro et al., 2022](#); [Y. Xiao et al., 2022](#); [Zeng et al., 2021](#)), and lower family support ([Del Piccolo et al., 2021](#); [Nie et al., 2020](#)). Another variable that generated a higher occurrence of work-related stress in healthcare workers was work experience. Perhaps, in this area, the two most influential factors could be working on the frontline ([Altwaijri et al., 2022](#); [Aragonès et al., 2022](#); [Binnie et al., 2021](#); [Fattori et al., 2021](#); [Lee et al., 2022](#); [Martínez-Ponce et al., 2022](#); [Migisha et al., 2021](#); [Morioka et al., 2022](#); [Nie et al., 2020](#); [Shahsavarinia et al., 2022](#); [Taşdelen et al., 2022](#); [N. Wang et al., 2021](#); [Zeng et al., 2021](#)) and longer service duration ([Alqutub et al., 2021](#); [Gonzalez Mendez et al., 2022](#); [He et al., 2022](#); [Menon et al., 2022](#); [Titi et al., 2022](#); [Voth et al., 2022](#)). These factors increase the likelihood of contagion ([Altwaijri et al., 2022](#); [Fattori et al., 2021](#); [Gómez-Salgado et al., 2020](#); [Ide et al., 2021](#); [Jang et al., 2021](#); [Lasalvia et al., 2021](#); [Leira-Sanmartín et al., 2021](#); [Morioka et al., 2022](#); [Ruiz-Frutos et al., 2022](#); [Titi et al., 2022](#)) and of subjects having a sleep deficit ([Collantoni et al., 2021](#); [Leira-Sanmartín et al., 2021](#); [H. Wang et al., 2020](#); [Xia et al., 2021](#)), especially in those with excessive workload.

5. Limitations

Among the limitations found in this study, the heterogeneity observed in the different studies included stands out, as they applied different scales and cut-off points for data processing, thus making comparison difficult. Although a specific period of time was considered (during the COVID-19 pandemic), there were different predisposing factors to stress when comparing the beginning of the pandemic and later stages, and the samples were not comparable due to the period of the study and the characteristics of the context (work or social characteristics, measures adopted by each country, etc.). In addition, the languages considered for the selection of articles can also be added as a limitation, as they limited the number of articles to those written in English, Spanish, French, and Portuguese, which in turn reduced the number of studies included. Finally, it is worth noting that many of the risk factors for psychological distress are highly interrelated and could be confounded with one another. For example, being female and being a nurse are strongly related, in comparison to other HCWs (e.g., physicians). This fact makes it necessary to conduct studies that assess levels of psychological distress prior to the COVID-19 pandemic versus during the COVID-19 pandemic, as future lines of research, to find out whether the variability in the relationship with psychological distress is actually explained by one of these risk factors.

6. Conclusions

The COVID-19 pandemic continues to be a major health problem that the whole world is still fighting, although to a large extent already overcoming. Regarding the different problems generated by this SARS-CoV-2 outbreak, one of the main issues in the area of health is related to the psychosocial distress that HCWs could develop.

In the present study, it became evident that mental health has been affected during this pandemic process and that the appearance of PD is a problem that has frequently occurred among HCWs. The main factors for developing PD were female sex, belonging to the nursing staff, being young, living alone/being single, having a chronic disease or psychiatric disorder history, having many years of experience, the presence of COVID-19 symptoms and contact history, not enough sleep, having lower family support and limited social relationships, fear of infecting friends and family, having reduced perception of protection by personal protective equipment, working on the frontline, and having longer service duration.

In conclusion, the direct or indirect psychosocial impact that the COVID-19 pandemic has had on healthcare workers is evident. It has affected their mental health and, sometimes, even influenced their physical well-being. It is therefore recommended to prioritize the mental health of healthcare workers by effectively addressing their current and future needs for better performance.

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analyzed during this study are included in this published article [and its [supplementary information files](#)].

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CRediT authorship contribution statement

Cristian Arturo Arias-Ulloa: Conceptualization, Data curation, Writing – original draft, Methodology, Software, Formal analysis, Investigation, Writing – review & editing, Methodology, Project administration, Resources, Visualization. **Juan Gómez-Salgado:** Conceptualization, Writing – original draft, Supervision, Investigation, Resources, Software, Project administration, Methodology, Validation, Writing – review & editing, Visualization, Formal analysis. **Kenny Escobar-Segovia:** Conceptualization, Writing – original draft, Investigation, Resources, Validation, Formal analysis, Methodology, Writing – review & editing, Visualization. **Juan Jesús García-Iglesias:** Conceptualization, Writing – original draft, Investigation, Visualization, Validation, Software, Formal analysis, Data curation, Methodology, Writing – review & editing, Supervision, Resources. **Javier Fagundo-Rivera:** Conceptualization, Investigation, Writing – original draft, Validation, Resources, Visualization, Formal analysis, Methodology, Writing – review & editing, Supervision. **Carlos Ruiz-Frutos:** Conceptualization, Methodology, Writing – original draft, Resources, Data curation, Formal analysis, Investigation, Supervision, Visualization, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jsr.2023.07.016>.

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