A rapid review of the impact of COVID-19 on the mental health of health and social care workers: implications for psychological interventions

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Systematic Review

Keywords: COVID-19, mental health, psychology, intervention, review, frontline, staff, workers, healthcare, social care

DOI: https://doi.org/10.21203/rs.3.rs-62472/v1

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Abstract

Background

Health and social care workers (HSCWs) have carried a heavy burden during the COVID-19 crisis and in the challenge to control the virus have directly faced its consequences. Supporting their psychological wellbeing continues therefore to be a priority. This rapid review was carried out to identify whether there are any identifiable risk factors for adverse mental health outcomes amongst HSCWs during the COVID-19 crisis. The review also sought to identify a participant population for the trial of a digital intervention to support HSCW’s psychological wellbeing during the pandemic.

Methods

We undertook a rapid review of the literature following guidelines by the WHO and the COVID-19 Cochrane Collaboration’s recommendations. We searched across 14 databases, executing the search at two different time points. We included published observational and experimental studies that reported the psychological effects on health and care workers during the COVID-19 pandemic.

Results

The 24 studies included in this review reported data predominantly from China (18 out of 24 included studies) and most sampled urban hospital staff. Our study indicates that COVID-19 has a considerable impact on the psychological wellbeing of front line hospital staff. Results suggest that nurses may be at higher risk of adverse mental health outcomes during this pandemic, but no studies compare this group with the social care or primary care workforce. Other risk factors identified were underlying organic illness, gender (female), concern about family, fear of infection, lack of personal protective equipment (PPE) and close contact with COVID-19. Resilience was identified as a factor protecting against adverse mental health outcomes.

Conclusions

The evidence to date suggests that female nurses with close contact with COVID-19 patients may have the most to gain from psychological interventions. However, inconsistencies in findings and a lack of data outside of hospital settings, suggest that we should not exclude any groups when addressing psychological wellbeing in health and social care workers. Psychological interventions aimed at enhancing psychological resilience and utilising innovative methods to personalise treatments without excluding groups may be of benefit.

Background

Health and social care workers (HSCWs) continue play a vital role in our response to the COVID-19 pandemic. Studies from previous infectious outbreaks [1, 2] suggest that this group may be at risk of experiencing poor mental health. A burgeoning current evidence examining the psychological impact on similar groups [3, 4], suggest that this group may be at risk of experiencing poor mental health as a direct result of the COVID-19 pandemic. Compounding the concerns about these data are that HSCWs will be likely to not only be at a higher risk for experiencing mental health (MH) problems during the pandemic, but also in its aftermath. [1] This population furthermore exhibits high rates of pre-existing mental health disorders. [5] Although evidence based psychological interventions are available for this population [6], there is a paucity of evidence about interventions for the MH of HSCWs during pandemics. Recent calls to action mandated the need to provide high quality data on the psychological impacts of the COVID-19 pandemic. [7, 8] This pandemic has rapidly changed the functioning of society at many levels which suggests that this data is not only needed swiftly, but also with caution and scientific rigour. [7, 8]

These data are needed in order to equip HSCWs to do their job effectively – high levels of stress and anxiety have been shown to decrease staff morale, increase absenteeism, lower levels of work satisfaction and quality of care. [2, 9] It is therefore a priority to understand the psychological needs of our HSCWs in order to provide them with the appropriate tools to mitigate the negative effects of dealing with the COVID-19 pandemic.

While HSCWs have been identified as vulnerable to the negative psychological impact from the current pandemic, they do not form a homogeneous population. It may therefore be appropriate to identify particularly vulnerable groups within the larger population of HSCWs and target psychological support to them. This review seeks to understand whether any group of HSCWs could be confidently
excluded from psychological support interventions because they are deemed to be at a low risk. Holmes et. al. [8] have warned that a one-size-fits-all approach to supporting HSCWs might not be effective. This, together with the lack of evidence around tailoring psychological interventions during pandemics [5], highlights the importance of identifying vulnerable groups, to ensure appropriately personalised interventions are made available.

The nature of the COVID-19 pandemic has brought lockdown and social distancing to many areas and countries around the world. In such circumstances, many existing services and activities have shifted rapidly to online modes of delivery. In this context, digital methods of service delivery offer advantages such as minimising person-to-person contact. Thus, the findings from this review will be used by the authors to develop and test a digital intervention to support the psychological wellbeing of HSCWs. The findings from the review, as well as allowing us to define our participant population, have relevance for others looking to support HSCWs psychological wellbeing during the COVID-19 pandemic.

Aims of the Review

The first aim of this review was to identify the psychological impact of the COVID-19 pandemic on the health and social care professions, more specifically to identify which sub-groups are most vulnerable to psychological distress and to identify the risk and protective factors associated with this population’s mental health.

The second aim was to provide the evidence needed to develop and test a digital intervention to support the psychological wellbeing of HSCWs. In particular, the evidence from the review will highlight whether there are any groups of HSCWs that should be specifically targeted with the digital intervention and specific risk factors that need addressing.

Whilst previous reviews synthesised the psychological impact of earlier viral outbreaks together with that of COVID-19, it cannot be assumed that findings will remain similar and applicable to digital health interventions – especially due to the global rapid uptake of digital technologies over the last decade. This review, looking exclusively at the psychological impact of the COVID-19 pandemic on HSCWs will therefore contribute to informing where digital psychological interventions could be focussed in an effort to enhance efficacy. [8] Rapid but robust gathering of evidence to inform health decision-makers is vital and in circumstances such as these, the WHO recommends rapid reviews. [10]

Methods

Search strategy

Planning, conducting and reporting of this study was based on the guidelines for rapid reviews [11], set by the WHO [10] and the recent COVID-19 Cochrane Collaboration’s recommendations. [12]

Data Sources and Searches

Two authors (CoM & RP) searched across a broad range of databases to capture research from potentially relevant fields, including health, mental health and health management. Within the OVID platform of databases Medline, EMBase, HMIC and PsychInfo were searched. Within the EbscoHost platform of databases, CINAHL, Medline, APA PsychInfo, Business Source Elite, Health Source and Academic Search Complete were searched. Beyond the OVID and EbscoHost platforms, SCOPUS, the King’s Fund Library, Social Care Online, PROSPERO and Google Advanced were also searched, making 16 databases searched (14 unique databases and two having been searched twice on separate platforms).

Owing to the rapidly changing landscape of the COVID-19 pandemic, and in an effort to include as many eligible papers as possible, the search strategy was executed on 23 April 2020 and again two weeks later on 6 May 2020 using a combination of subject headings and keyword searching (see Appendix). The bibliographical database was created with EndNote X7™.

Search criteria

The design of the search criteria was intended to draw together research both for this rapid review, and to contribute to the design of a digital mental health intervention to enhance the psychological well-being of HSCWs. The design of the search criteria is discussed in
Types of participants

Participants were restricted to health and social care workers during the COVID-19 pandemic.

Types of studies included

Published observational and experimental studies that reported the psychological effects on health and care workers during the COVID-19 pandemic were included. The study designs included quantitative and qualitative primary studies. Studies relating to previous pandemics and epidemics (such as SARS, MERS, H1N1, H5N1, Zika, Ebola, West Nile Fever) were excluded as these results have been reported elsewhere. [3] Reviews, theses, position papers, protocol papers, and studies published in languages other than English were excluded.

Screening and selection of studies

Searches were screened according to the selection criteria by JDK. The full text of potentially relevant papers was retrieved for closer examination. The reviewer erred on the side of inclusion where there was any doubt, to ensure no potentially relevant papers were missed. The inclusion criteria were then applied against full text versions of the papers (where available) independently by JDK and HL. Disagreements regarding eligibility of studies were resolved by discussion and consensus. Where the two reviewers were still uncertain about inclusion, the other reviewers (RP, CoM) were asked to provide input to reach consensus.

Data Extraction and Quality Assessment

Relevant data were extracted into structured tables including country, setting, population, study design, number of participants, mental health conditions and their measurement tools and main study results. Where available, we extracted risk factors and protective factors. HL, LE and JDK extracted all the data while JDK checked for accuracy and completeness. JDK and HL assessed the quality of cross-sectional studies with the Joanna Briggs Institute tool [13] and JDK assessed their risk of bias using the Evidence Partners [14] appraisal tool. JDK assessed the risk of bias for the longitudinal study with the Critical Appraisal Skills Programme (CASP) appraisal tool [15] and the uncontrolled before-after study with the ROBINS – I. [16] SAM utilised Joanna Briggs Institute tool to assess the qualitative studies [17] and the Mixed methods appraisal tool (MMAT) [18] to assess mixed methods studies.

Data Synthesis and Analysis

Current best practice guided the tabulated and narrative synthesis of the results. [19, 20] The studies’ outcomes were categorised according to the psychological impact of COVID-19 on HSCWs of:

1. general psychological impacts
2. the risk factors associated with adverse mental health outcomes
3. the protective factors against adverse mental health outcomes

Previous studies’ logical syntheses [2] were adapted by organising the risk and protective factors into psychosocial, occupational, sociodemographic and environmental categories. The GRADE method from the Cochrane Collaboration [21] was used to assess the quality of evidence of outcomes included in this rapid review.

Patient and public involvement

Some members of the author team are frontline healthcare staff during the COVID-19 pandemic and contributed to the design of the review.
Results

Search Results

The 677 records of interest were found from the two searches (429 in search 1 and 529 in search 2). After 148 duplicates were removed, 529 records were screened. Of these, 82 full texts of potentially relevant studies were assessed for eligibility (see figure 1). Twenty-four published studies met the inclusion criteria for the rapid review.

Study Characteristics

The 24 studies included in this review consisted of 18 cross-sectional, 2 mixed methods, 2 qualitative, 1 longitudinal and 1 uncontrolled before-after study. The total number of participants in these studies was 13,731. In the cross-sectional studies, participant numbers ranged between 59 and 2,299. Eighteen of the studies were from China, of which 8 were based in Wuhan, where the COVID-19 outbreak began. The rest were from America (1), Israel (1), UK (1), Singapore (1), Pakistan (1), multicentre - Singapore & India (1), Global (1).

Several validated measures were used to assess anxiety, depression, insomnia, stress and burnout. Table 1 provides an overview of the included studies.

Risk of bias assessment

The quality of the cross-sectional studies was fair, with 16 studies scoring 6 or higher on the JBI appraisal tool and eleven scoring 7 or higher (a score of 7 and above is an indicator of study quality). The majority of the studies indicated a low risk of bias when assessed with the Evidence Partners’ appraisal tool. The uncontrolled before-after study indicated a high risk of bias. The qualitative studies indicated a good level of quality (JBI scores of 9 & 10 respectively) while mixed methods studies showed varied quality. In the cross-sectional studies, the most common problem affecting study quality was failure to deal with confounding factors. Failure to locate the researcher culturally or theoretically affected the qualitative papers, whilst the two mixed methods papers’ study quality was affected by lack of explicitly articulated research questions. A summary of the risk of bias and quality assessments are provided in Table 2.

Psychological Toll on Healthcare Workers

Of the 24 studies included, 22 directly assessed the psychological toll on healthcare workers and all found levels of anxiety, depression, insomnia, distress or Obsessive Compulsive Disorder (OCD) symptoms.[22-43]

Psychological symptoms were assessed using various validated measures as outlined in Table 3 – the summary of included studies. The most common outcomes assessed were sleep, anxiety and depression. The prevalence of depressive symptoms varied greatly, ranging between 8.9% [36] to 50.4%. [30] These findings indicate marked differences in the presentation of psychological symptoms according to country. The prevalence of anxiety in cross-sectional studies ranged between 14.5% [36] to 44.6%. [30] Sleep was also assessed in several studies. Lai et al [30] found the prevalence of sleep disturbances to be 34%, whilst another, nationwide survey in China found that HCWs had significantly worse sleep than the general population.[28]

Risk factors associated with adverse mental health outcomes

Table 3 provides the GRADE evidence profile of the certainty of evidence for the risk factors associated with adverse MH outcomes during the COVID-19 pandemic identified through the review. These risk factors can be grouped into the four thematic areas of i) occupational, ii) psychosocial, iii) occupational and iv) environmental.

Occupational factors

**Medical HCWs:** Two studies showed that medical HCWs (nurses and doctors) had significantly higher levels of MH risk in comparison to non-medical HCWs.[32, 43] Zhang et al.[43] found that medical HCWs had significantly higher levels of insomnia, anxiety, depression, somatization and OCD symptoms in comparison to non-medical HCWs. This was also reflected in a large study in Fujian province,
China, in which medical staff had significantly higher anxiety than admin staff.[32] In contrast, Tan et al.[36] found that in a population of 470 HCWs in Singapore, the prevalence of anxiety was significantly higher among non-medical HCWs than medical.

**Healthcare groups:** In three studies nurses were found to be at risk of worse MH outcomes than doctors [23, 25, 30]. One large study in China found nurses were at significant risk of more severe depression and anxiety than doctors.[30] Another found that nurses had significantly higher financial concerns than doctors and felt significantly more anxious on the ward when compared with other groups. There was no significant difference between professionals regarding stopping work or work overload.[23] A mixed method paper also showed that nurses had a higher rate of depressive symptoms than doctors. Whilst this was a small sample size, it echoes the findings from larger studies.[25]

With regard to other HCWs, there were two studies which assessed dentists and other dental workers and found them to be at risk of anxiety and elevated distress. Neither study found any difference based on gender or educational level.[22, 34] There were no studies comparing dental workers to other HCWs. We did not find any studies that focussed on the primary care workforce or that assessed social care workers.

With regard to seniority, one paper found that having an intermediate technical title was associated with more severe MH symptoms.[30]

**Frontline staff/Direct contact with COVID-19:** Four high-quality studies found being in a ‘frontline’ position or having direct contact with COVID-19 patients was associated with higher levels of psychological distress.[29, 30, 32, 38] Increased direct exposure to COVID-19 patients increased the mental health risks in health care workers in one study in Wuhan.[29] This finding is backed by Lai et al.[30], who found that being a frontline worker was independently associated with more severe depression, anxiety and insomnia scores. In addition, a cross sectional survey of staff in a paediatric centre found that contact with COVID-19 patients was independently associated with increased risk of sleep disturbance.[38] Lu et al.[32] found that medical HCWs in direct contact with COVID-19 patients had almost twice the risk of anxiety and depression than non-medical staff with low risk of contact with COVID-19.

There were conflicting results found in two studies. A study in a cancer hospital in Wuhan found burnout frequency to be lower in frontline staff.[39] The authors identified confounding factors which may have led to this result, but it is of interest as it is one of the only studies that assessed HCWs outside of the acute general medicine setting. Li et al.[44], also found that frontline nurses had significantly lower levels of vicarious trauma scores than non-frontline workers and the general population.

**Personal protective equipment (PPE):** PPE concerns were the most common theme brought up voluntarily in free-text feedback in a study by Chung & Yeung[27], and a survey in Pakistan revealed that 80% of participants expected provision of PPE.[37] H.Cai et al.[23] also found that PPE was protective when adequate, but a risk factor for stress when inadequate. This finding appears to be bolstered by a qualitative study of frontline nurses in Wuhan, which found that physical health and safety was one of their primary needs. This study also reported PPE as a protective factor.[42]

**Heavy Workload:** Longer working time per week was found to be a risk factor in a study by Mo et al.[33] This, together with increased work intensity or patient load per hour, were themes in a mixed methods study of 37 staff of a clinic in Beijing[25] and a qualitative study of nurses in China[35], also suggesting heavy workload as a risk factor.

Psycosocial Factors

**Fear of infection:** A fear of infection was a highlighted in a qualitative study by Cao et al., (2020)[25], and brought up as a theme in free-text feedback in a cross sectional survey by Chung & Yeung.[27] Ahmed et al.[22] found that 87% of dentists surveyed described a fear of being infected with COVID-19 from either a patient or a co-worker.

**Concern about family:** This was brought up as one of the main stress factors in a study by H.Cai et al.[23], particularly amongst staff in the 31-40 year age-group. Knowing that their family was safe was also the greatest stress reliever[23], whilst fear of infecting family was identified in 79.7% of 222 participants in a study in Pakistan.[37] It was also a theme highlighted in the qualitative data.[25, 35]

**Being an only child:** This was independently associated with sleep disturbance in paediatric HCWs in Wuhan.[38] Being an only child was also found to be significantly associated with stress by Mo et al.[33]

Sociodemographic Factors
Younger Age: One Chinese web-based survey which included the general population and HCWs, showed that younger people had significantly higher anxiety and depression scores.[28]

H. Cai et al.[23] suggested that age was more complex. They found that all age groups had concerns, but that the focus of their anxieties were different (for example: older staff were more likely to be anxious due to exhaustion from long hours and lack of PPE while younger staff were more likely to worry about their families).

Gender: Women were found to be at higher risk for depression, anxiety and insomnia by Lai et al.[30] This was also found to be an independent risk factor for anxiety in another large nationwide Chinese study.[43] However, a global survey of dentists found no differences based on gender.[22]

Underlying Illness: We found two studies which identified that having an underlying organic illness as an independent risk factor for poor psychological outcomes. A study of dentists in Israel found an increase in psychological distress in those with background illnesses as well as an increased fear of contracting COVID-19 and higher subjective overload.[34] In medical HCWs in China, organic illness was found to be an independent risk factor for insomnia, anxiety, OCD, somatising symptoms and depression in medical HCWs.[43]

There was also a significant association between physical symptoms and poor psychological outcomes in a large multicentre study based in India and Singapore. It is unclear if this represented somatization or organic illness and the authors suggest the relationship between physical symptoms and psychological aspects was bi-directional.[26]

Environmental Factors

Point in pandemic curve: One longitudinal study carried out in China in a surgical department, found that anxiety and depression scores during the ‘outbreak’ period were significantly higher when compared to a similar group assessed after the outbreak period.[41] This was a small sample of 120 and only assessed surgical staff, but this longitudinal data was supported by a qualitative study in China which suggested that anxiety peaks at the start of the outbreak and reduces with time.[35]

Geography: Living in a rural area was only assessed by one study which showed that it was an independent risk factor for insomnia and anxiety in medical HCWs.[43] This may reflect a need to further investigate the effect of rurality on psychological wellbeing during this pandemic.

Protective factors against adverse mental health outcomes

The review identified protective factors against adverse mental health outcomes during COVID-19. Table 4 provides the GRADE evidence profile of the certainty of evidence for this. The protective factors can be grouped into the three thematic areas of: i) occupational, ii) psychosocial and iii) environmental.

Occupational Factors

Experience: W. Cai et al[24] found that previous experience in a public health emergency (PHE) was protective against adverse mental health outcomes. Staff that had no previous experience were also more likely to have low rates of resilience, and social support.

Training: A small cohort study of 27 surgeons, who were given pre and post training surveys, suggested that training alleviates psychological stress.[45] Good hospital guidance was identified to relief stress in a study by H.Cai et al[23], and increasing self-knowledge was a coping strategy deployed by staff. Dissemination of knowledge was also mentioned in a qualitative study by Yin & Zeng[42]; participants described subjective stress reduction after their seniors explained relevant knowledge to them.

Adequate PPE: As mentioned above, PPE was found to be a protective factor when adequate and a risk factor for poor mental health outcomes when deemed to be inadequate.[23, 42]

Psychosocial Factors

Resilience: One study assessed self-efficacy in dental staff and found that it was a protective factor.[34] Self-efficacy was also found to improve sleep quality by Xiao et al[40], whilst W.Cai et al[24] measured resilience using a validated measure and found it to be a protective factor against adverse MH outcomes.
Being in a committed relationship: This was found to be protective by Shacham et al.[34] This was not directly assessed in other studies.

Safety of family: This had the biggest impact in reducing stress in a cross-sectional study by H. Cai et al.[23] This was also not assessed in other studies.

Environmental Factors

Support: Support and recognition from the health care team, government and community was identified as a protective theme in several studies. Social support, measured using the Social Support Rate Scale (SSRS) was found to indirectly affect sleep by directly reducing anxiety and stress and increasing self-efficacy.[40]

Team support was identified as a protective factor in a qualitative study by Sun et al.[35] Good hospital guidance was also identified as a stress reliever by H. Cai et al.[23], who found that HCWs expected recognition from the hospital authorities. This was echoed in a qualitative study of nurses in Wuhan where the desire for community concern was a strong need and tightly linked to the need for PPE and knowledge.[42]

‘To be honest, I was very apprehensive before coming to the infectious department as support staff, but on the first day here, the head nurse personally explained relevant knowledge such as disinfection and quarantine, and that helped me calm down a lot.”

“I hope that our society and government pay more attention to lack of personal protective equipment”[42]

Discussion

As a communicable disease and now a global public health emergency (PHE), COVID-19 places a unique challenge on our health and social care workforce that will disrupt not just their usual workplace duties but also their social context.[46] As we adjust to new ways of living and working, HSCWs are likely to continue to face challenges ahead. Our review confirms that the psychological impact of COVID-19 on health care workers is considerable, with significant levels of anxiety, depression, insomnia and distress. Studies revealed a prevalence of depressive symptoms between 8.9% – 50.4% and anxiety rates between 14.5% - 44.6%.[30, 36] This is in keeping with other reviews and findings from previous viral outbreaks.[3, 4, 47] The majority of studies published to date come from China, particularly Wuhan - the epicentre of COVID-19. There is minimal evidence published to date on the psychological impact on HCWs in Europe or the US, which have been highly impacted by the pandemic. The studies included in this review were predominantly concerned with hospital settings – we found no studies relating to social care staff or primary care staff. This is a concern, as we have increasing evidence that a large proportion of Western deaths are happening in the community and specifically in care homes.[48]

Our review aimed to identify whether there were any groups particularly vulnerable to poor mental health outcomes during COVID-19. We found some evidence that nurses may be at a higher risk than doctors.[23, 25, 30] This is similar to findings which take into account previous viral outbreaks.[3] Confounding factors were not robustly addressed however, and there were no studies that compared nurses with the primary care workforce or social care workers. There was some evidence that clinical HCWs may be at higher risk of psychological distress than non-clinical HCWs[32, 43], but this was not absolute. Tan et al[36] found a higher prevalence of anxiety among non-medical HCWs in Singapore. Chew et al[26] also revealed that in data from India and Singapore, there was an overall lower prevalence of anxiety and depression than similar cross-sectional data from China.[26, 27, 30, 36] This suggests that different contexts and countries may reveal different findings. It is possible that being at different points in their respective countries outbreak curve may have played a part, as there was evidence that this may be influential.[41] Tan et al[36] postulated that the medical HCWs in Singapore had experienced SARS outbreak in the past and were well prepared both psychologically and in their infection control measures. What we can deduce is that context is likely to play a role, not just cadre or role of healthcare worker. It also highlights the importance of reviewing the evidence as more data emerges from other countries.

Several risk factors emerged, many in keeping with what has been found in other reviews.[3, 4] Those with the strongest evidence were inadequate PPE[23, 27, 37, 42], fear of infection[22, 25, 27] and heavy workload.[25, 33, 35] Consistent with prior outbreak data[3, 47], there was also good evidence that close contact with COVID-19 cases was a predictor of higher levels of anxiety, depression and insomnia[29, 30, 32, 38], although two studies appeared to show conflicting results.[39, 44] There was some evidence that being female[22, 30, 43] or younger in age [23, 28, 31] may be risk factors. Although other risk factors were also identified, their certainty of evidence was deemed to be low.
The majority of cross-sectional studies focussed on measuring adverse MH outcomes which explains the lack of quantitative data on protective factors or coping mechanisms. Of the studies that did assess this, there were protective factors which were associated with adaptive psychological outcomes. Experience of prior infectious disease outbreaks and training were protective against poor mental health outcomes.[23, 24, 42, 45] Adequate PPE was a protective factor when adequate and a risk factor when inadequate.[23, 27, 42] There was good evidence that resilience (measured by self-efficacy or resilience scales) was protective against poor mental health outcomes.[24, 34, 40] This is of importance when assessing how to positively contribute to reducing the psychological burden on our health and social care staff. Community support was important in a number of studies, referring to social support as well as recognition and support from the healthcare team, government and wider community.[23, 35, 40, 42, 49] Other adaptive behaviours emerged from qualitative data, including gratitude and the ability to find purpose and growth from the situation.[35] The paucity of empirical studies investigating the mental health of social care and primary care staff during the COVID-19 pandemic should be rectified. With the majority of studies taking place in China, where ageing in place rather than residential care is the norm[50], it is unsurprising that none investigated care homes, where it is estimated around 40-50% of all deaths related to COVID-19 occur in Europe and the US.[48] With the majority of studies taking place in urban hospital settings, and particularly in Wuhan – the epicentre of the outbreak – the generalizability of findings to other settings may be limited, particularly as countries pass through different points in the outbreak curve. What this review does highlight is the considerable psychological impact that COVID-19 has played so far on health care workers and, therefore, adds to the recent calls to take notice of this important issue.[8] However, evidence also suggests that, although predictors for psychological distress exist, these are not absolute and context may play an important role on the manifestation of adverse MH outcomes.

**Strengths and limitations**

This rapid review has synthesized and discussed the current literature on the psychological impact of the COVID-19 pandemic on health and social care workers. A major limitation was that no empirical studies investigating this impact on social care workers could be found – limiting generalisability to the population reviewed. However, to our knowledge, this is the first review investigating this population group in the context of COVID-19, without including prior viral outbreaks in its analysis and synthesis. We see this as a strength as this outbreak is different, and worth assessing in its own right. It has affected every country across the globe and disrupted everyday living in a way no other outbreak has in living memory [8]. A major strength of our review as that it endeavoured for greater inclusion during the rapidly changing COVID-19 landscape by completing two runs of the search strategy spaced two weeks apart. Whilst we adhered to high methodological standards by assessing study quality and risk of bias, together with using the GRADE approach to evaluate the certainty evidence and following best practice principles [19, 20] to present a narrative and tabulated synthesis, our review remains a rapid one with further clear limitations: The majority of the studies included in this review were from China and our selection criteria did not include studies from low-income countries or studies in languages other than English - limiting the generalizability of our findings.

**Conclusions**

This rapid review confirms that front line healthcare workers are at risk of significant psychological distress as a direct result of the COVID-19 pandemic. Published studies suggest that symptoms of anxiety, depression, insomnia, distress and OCD are found within the healthcare workforce. However, most studies draw only from work in secondary care and none in the primary care or social care setting. Published studies so far are predominantly from China (18 out of 24 included studies) and most of those sampled hospital staff in Wuhan - the epicentre. Findings in this review suggest that different contexts and countries may reveal different findings and we recommend more research in primary care and social care settings and to monitor rapidly emerging evidence from across the world.

Although risk factors did emerge that were in keeping with evidence from other infectious disease outbreaks, our findings were not absolute. This review suggests that nurses may be at higher risk of adverse MH outcomes during this pandemic, but there were no studies comparing them with social care workers or the primary care workforce. Other risk factors that recurred in the data were lack of PPE, close contact with COVID-19, being female and underlying organic illness. Inconsistencies in findings and lack of data on staff outside hospital settings, suggest that targeting a specific group within health and social care staff with psychological interventions may be misplaced – as both presence of psychological distress and risk factors are spread across the healthcare workforce, rather than associated with particular sub-groups.

Current data also suggest that interventions that bolster psychological resilience may be of benefit as this was found to protect against adverse mental health outcomes. It would also appear from our findings that if we are to equip HSCWs during this pandemic then
adequate PPE may be protective not just against infection but also against adverse mental health outcomes. We postulate that strengthening psychological resilience in a personalised approach may be effective in protecting our health and social care workers from adverse mental health outcomes.

**Abbreviations**

**CD-RISC:** Connor-Davidson Resilience Scale  
**CES-D:** Centre for Epidemiologic Studies Depression Scale (CES-D)  
**COVID-19:** Coronavirus disease 2019  
**DASS-21:** Depression, Anxiety and Stress Scale  
**GAD-7:** Generalised Anxiety Disorder Questionnaire  
**GRADE:** The Grades of Recommendation, Assessment, Development and Evaluation Working Group  
**GSES:** Generalised self-efficacy scale  
**HAM-A:** Hamilton Anxiety Rating Scale  
**HAM-D:** Hamilton Depression Rating Scale  
**HCWs:** healthcare workers  
**HSCWs:** health and social care workers  
**IES-R:** Impact of Event Scale  
**ISI:** Insomnia Severity Index  
**MBI:** Maslach Burnout Inventory (MBI)  
**MH:** mental health  
**PHE:** Public Health Emergency  
**PHQ-4:** Patient Health Questionnaire-4  
**PHQ-9:** Patient Health Questionnaire  
**PPE:** personal protective equipment  
**PSQI:** Pittsburgh Sleep Quality Index  
**SAS:** Zung Self-Rating Anxiety Scale  
**SASR:** the Stanford Acute Stress Reaction questionnaire  
**SCL-20:** Symptom checklist depression scale  
**SCL-90:** The Symptom Checklist-90-R  
**SDS:** Zung Self-Rating Depression Scale  
**SF-36:** Short Form Health Survey (SF-36)  
**SOS:** Stress Overload Scale  
**SSRS:** Social Support Rating Scale
WHO: World Health Organisation

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

The datasets during and/or analysed during the current study available from the corresponding author on reasonable request

Competing interests

The authors declare that they have no competing interests

Funding

This project is funded by the Chief Science Office of the Scottish Government: RAPID RESEARCH IN COVID-19 PROGRAMME REF: COV/UHI/Portfolio. The funding sources had no role in the design or conduct of the study nor in the collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

Authors' contributions

JDK, SAM and HL had the idea for the study. JDK, RP, CoM designed the search strategy. JDK, HL, LE screened abstracts and full texts. JDK, HL, LE, SAM, acquired data, and assessed risk of bias in studies. All authors interpreted the data analysis. JDK and HL wrote the manuscript, with revisions from all authors. The corresponding author attests that all listed authors meet authorship criteria.

Acknowledgements

Thank you to Abbie Oman (University of Aberdeen) for critically reviewing our manuscript.

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Tables

Table 1: Study Characteristics

| Study Characteristics | Value 1 | Value 2 | Value 3 |
|------------------------|---------|---------|---------|
| Parameter 1            | 10      | 20      | 30      |
| Parameter 2            | 40      | 50      | 60      |
| Parameter 3            | 70      | 80      | 90      |
| Author | Design | Country | Participants | Measures |
|--------|--------|---------|--------------|----------|
| Ahmed et al., (2020) (1) | Cross-sectional | Global | n=650 | Validated questionnaire: 22 closed-ended questions divided into two sections. (Fear & Clinical practices) |
| Balakumar et al., (2020) (2) | Uncontrolled before and after study. | UK | n=27 (Surgeons) | Pre- and post-training surveys |
| H.Cai et al., (2020) (3) | Cross-sectional | China Hunan | n=534 (Frontline medical workers) | Five-section questionnaire |
| W.Cai et al., (2020) (4) | Cross-sectional | China Jiangsu Province | n=1521 (147 experienced in public health emergencies (PHE)) | SCL-90, CD-RISC, SSRS |
| Cao et al., (2020) (5) | Mixed methods | China Beijing | n=37 (16 Doctors, 19 Nurses, and 2 Technicians within a COVID-19 clinic) | PHQ-9, MBI, Qualitative interviews |
| Chew et al., (2020) (6) | Cross-sectional | Singapore & India | n=906 (480 HCW’s from a Singapore Hospital) | DASS-21, IES-R, Symptom questionnaire |
| Chung & Yeung, (2020) (7) | Cross-sectional | China Hong Kong | n=69 (HCWs: 69/8418 full-time hospital staff) | PHQ-9 |
| Huang & Zhao, (2020) (8) | Cross-sectional | China Nationwide | n=603 (31.1% HCWs) | Web-based survey, invited via social media. PSQI, GAD, CES-D |
| Kang et al., (2020) (9) | Cross-sectional | China Wuhan | n=994 (Doctors and Nurses) | PHQ-9, GAD-7, ISI, IES-R |
| Lai et al., (2020) (10) | Cross-sectional | China (Nationwide but 60% from Wuhan) | n=1257 (Nurses and Doctors in 34 hospitals/fever clinics) | PHQ-9, GAD, ISI, IES-R |
| Li et al., (2020) (11) | Cross-sectional | China Wuhan | n=740 (214 general population and 526 Nurses) | Vicarious Trauma Questionnaire (Chinese version) |
| Liang, Chen, Zheng, & Li, (2020) (12) | Cross-sectional | China Guangdong Province | n=59 (23 Doctors and 36 Nurses from COVID-19 department and 21 HCWs from other departments) | SDS, SAS |
| Lu, Wang, Lin & Li, (2020) (13) | Cross-sectional | China Fujian | n=2299 (2042 Medical and 257 admin staff) | NRS, HAMA, HAMD |
| Mo et al., (2020) (14) | Cross-sectional | China Wuhan | n=180 (Nurses from Guangxi supporting COVID-19 in Wuhan) | SOS, SAS |
| Shacham et al., (2020) (15) | Cross-sectional | Israel | n=338 (Dental hygienists and Dentists) | Demands Scale—Short Version, GSES, Kessler K6 |
| Sun et al., (2020) (16) | Qualitative | China Henan (One hospital) | n=20 (Nurses/17 Female) | Semi-structured interviews |
| Tan et al., (2020) (17) | Cross-sectional | Singapore (Two tertiary hospitals) | n=470 (HCWs - medical and non-medical) | DASS-21, IES-R |
| Urooj et al., (2020) (18) | Mixed Method | Pakistan | n=222 (134 without COVID-19 patients and 150 female) | Doctors fears and expectations |
| Reference | Study Type | Country | Location | Sample Size | Measures Description |
|-----------|------------|---------|----------|-------------|-----------------------|
| Wang et al., (2020) (19) | Cross-sectional | China | Wuhan | n=123 (HCWs in a Paediatric centre) | PSQI, SAS, SDS |
| Wu et al., (2020) (20) | Cross-sectional | China | Wuhan | n=190 (Hubai cancer hospital - all from oncology 1:1 ratio frontline vs usual wards) | MBI |
| Xiao et al., (2020) (21) | Cross-sectional | China | Wuhan | n=180 (54% Nurses and 45.6% Doctors from a respiratory medicine/fever clinic) | SAS, GSES, SASR, PSQI, SSRS |
| Xu, Xu, Wang & Wang, (2020) (22) | Longitudinal | China | Shanghai | n= 120 (Surgical staff. One hospital split into two groups of 60 Grp 1 - Jan-Feb (outbreak period) Grp 2 - March (non-outbreak)) | Anxiety scale, Depression score, Dream anxiety score, SF-36 scale |
| Yin & Zeng, (2020) (23) | Qualitative – in-depth interviews | China | Wuhan | n= 10 (Nurses at the front-line; having cared for COVID-19 patients >1 week) | ISI, SCL-90-R, PHQ-4, Chinese versions |
| Zhang et al., (2020) (24) | Cross-sectional | China | Nationwide | n=2182 (927 Medical HCWs; 680 Doctors and 247 Nurses, 1255 non-medical HCWs) | ISI, SCL-90-R, PHQ-4, Chinese versions |

Measures Description

**Depression:** CES-D: Centre for Epidemiologic Studies Depression Scale, HAM-D: Hamilton Depression Rating Scale, PHQ-9: Patient Health Questionnaire, SCL-20: Symptom checklist depression scale, SDS: Zung Self-Rating Depression Scale,

**Anxiety:** GAD-7: Generalised Anxiety Disorder Questionnaire, HAM-A: Hamilton Anxiety Rating Scale, SAS: Zung Self-Rating Anxiety Scale

**Stress:** SOS: Stress Overload Scale

**Depression & Anxiety:** DASS-21: Depression, Anxiety and Stress Scale, PHQ-4: Patient Health Questionnaire-4,

**Sleep:** PSQI: Pittsburgh Sleep Quality Index, ISI: Insomnia Severity Index

**Others:** CD-RISC: Connor-Davidson Resilience Scale, Demands Scale—Short Version, Dream anxiety score, GSES: Generalised self-efficacy scale, IES-R: Impact of Event Scale, Kessler K6 Distress Scale, MBI: Maslach Burnout Inventory, SASR: the Stanford Acute Stress Reaction questionnaire, SCL-90: The Symptom Checklist-90-R, SF-36: Short Form Health Survey, SSRS: Social Support Rating Scale, Vicarious Trauma Questionnaire

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Table 2: Risk of bias and quality assessment summary
| Author | Participants and setting described in detail, including similarity of controls | Criteria for inclusion clearly defined and exposures similarly measured | Exposure measured in valid and reliable way | Objective, standard criteria used for measurement of condition | Confounding factors identified | Strategies to deal with confounding factors stated | Outcomes measured in valid and reliable way | Appropriate statistical analysis used? | JBI Score (1) | Risk of Bias (2) |
|--------|-----------------------------------------------------------------------------|------------------------------------------------|---------------------------------|-------------------------------------------------|--------------------------------|---------------------------------|---------------------------------|----------------|-------------|----------------|
| 1 Ahmed et al., 2020 (3) | + | + | + | - | + | ? | + | 6 | Low |
| 2 Balakumar et al., 2020 (4) | | | | | | | | | | Mixed methods appraisal tool (MMAT) used (Hong et al., 2018) S1-2 not addressed satisfactory: Low quality evidence |
| 3 H. Cai et al., 2020 (6) | + | - | + | + | + | + | + | 6 | Low |
| 4 W. Cai et al., 2020 (7) | + | + | + | + | + | - | + | 7 | Low |
| 5 Cao et al., 2020 (8) | | | | | | | | | | Mixed methods appraisal tool (MMAT) used (Hong et al., 2018) S1-2 not addressed satisfactory: Low quality evidence |
| 6 Chew et al., 2020 (9) | + | + | + | + | + | + | + | 8 | Low |
| 7 Chung & Yeung, 2020 (10) | + | - | + | + | - | - | - | 3 | High |
| 8 Huang & Zhao, 2020 (11) | + | + | + | + | + | - | + | 7 | Low |
| 9 Kang et al., 2020 (12) | + | + | + | + | + | + | - | 7 | Low |
| 10 Lai et al., 2020 (13) | + | + | + | + | + | - | + | 7 | Low |
| 11 Li et al., 2020 (14) | + | - | + | + | + | - | + | 7 | Low |
| 12 Liang et al., 2020 (15) | - | - | + | + | - | - | + | 4 | High |
| 13 Lu et al., 2020 (16) | + | + | + | + | + | - | + | 7 | Low |
| 14 Mo et al., 2020 (17) | + | - | + | + | + | - | + | 6 | Minor |
| 15 Shacham et al., 2020 (18) | + | + | + | + | - | + | 7 | Low |
| 16 Sun et al., 2020 (19) | Joanna Briggs Institute tool to assess qualitative studies used – 10 item tool(20): High quality evidence |
| 17 Tan et al., 2020 (21) | + | + | + | + | - | + | + | 7 | Low |
| 18 Urooj et al., 2020 (22) | Joanna Briggs Institute tool to assess qualitative studies used – 10 item tool(20): High quality evidence |
| 19 S. Wang et al., 2020 (24) | + | + | + | + | - | + | + | 7 | Low |
| 20 Wu et al., 2020 (25) | + | - | + | + | + | - | + | 6 | Minor |
| 21 Xiao et al., 2020 (26) | + | - | + | + | + | - | + | 6 | Minor |
| 22 Xu et al., 2020 (27) | Assessed with Critical Appraisal Skills Programme appraisal tool(27) |
| 23 Yin & Zeng, 2020 (24) | Joanna Briggs Institute tool to assess qualitative studies used – 10 item tool (20): High quality evidence |
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Figure 1
Prisma Flow Diagram

Supplementary Files

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