J. Multidiscip. Res. Healthcare. Vol. 8, No. 1 (2021), pp.1–15

CHITKARA

Journal of Multidisciplinary Research in Healthcare

Journal homepage: https://jmrh.chitkara.edu.in/

The Adverse Effect of COVID-19 towards UK Healthcare Workers Mental Health: Critical Review of the Literature

Boby Leeladhara[1] and Biju Mathew[2*]

[1]*RMN&RN Adult, HGRC Health care group, Sutherland Lodge GP Surgery, Chelmsford, CM2 7PY*
[2]*Faculty of health sciences, Anglia Ruskin University, Chelmsford, England, CM1 1SQ*

[*]biju.mathew@aru.ac.uk (Corresponding Author)

ARTICLE INFORMATION

Keywords:
Mental health, HealthCare workers, Psychological issues, Covid 19

DOI: 10.15415/jmrh.2021.81001

ABSTRACT

Background: The pandemic changed healthcare priorities all over the world, resulting in increased pressure on healthcare workers. Studies conducted in other countries reveal a significant mental health burden of the pandemic on healthcare workers. However, only a few studies have focused on UK healthcare workers, which can demonstrate variations in healthcare systems from one country to another.

Purpose: To examine the mental health impacts of COVID-19 on frontline UK healthcare workers and point to interventions to mitigate and minimise mental health problems caused by the pandemic.

Methods: This review article used an interpretivist philosophy and an inductive approach. Electronic bibliographic databases were searched using relevant search terms. Primary studies published between 2020 and 2021 were selected. Only studies conducted in the United Kingdom were considered for inclusion.

Results: Ten studies were retrieved and critiqued. It was discovered that anxiety, depression, and Post Traumatic Stress Disorder were the most reported mental health issues among frontline UK healthcare workers during the pandemic. Healthcare workers who experienced moral injury, the situation where moral dilemmas make healthcare workers feel incompetent, were at higher risk of developing the above mental health issues. These mental health issues had a negative impact on the healthcare workers' work performance. This was predominantly due to the burnout, stress, and low motivation. The health workers in UK preferred psychosocial support as the most favourable Mental Health support intervention. However, there were reported disparities in the provision and access of the mental health support intervention at various regions within UK health care system.

Conclusions: It was concluded that the COVID-19 pandemic had a significant mental health burden on frontline UK healthcare workers.

1. Introduction

The Coronavirus pandemic caused significant mental health concerns among workers in various sectors of the economy and the general population (Rajkumar, 2020; Bansal & Pathak, 2020; Yan *et al.*, 2021). Healthcare workers have been adversely affected mentally by the pandemic due to the anxiety of being exposed to the virus while caring for COVID-19 patients (Muller *et al.*, 2020). Because the work involves direct contact with patients that have Covid-19, healthcare workers have been at a greater risk of mental illness, such as post-traumatic stress disorder (PTSD), anxiety, and depression (Kowal *et al.*, 2020). Limited attention has been paid to the effects of the pandemic on the frontline healthcare workers. Therefore, the Mental Health (MH) needs of healthcare workers have been neglected, yet healthcare workers are the frontline handlers of the virus who experience the anxiety of contracting the virus and taking the infection home to their families (Asnakew *et al.*, 2021).

The MH effects of the COVID-19 pandemic are mostly neglected, although their consequences can be quite costly. Evidence suggests that healthcare workers directly involved in diagnosing and treating Coronavirus patients have a greater risk of MH problems (Muller *et al.*, 2020). Due to the rising number of confirmed deaths due to the infection, media coverage, inadequate personal protective equipment, lack of vaccines, infection vulnerability, quarantine, and lack of sufficient support in the healthcare facilities, healthcare workers are likely to experience MH issues (Muller *et al.*,

ISSN No.: 2393-8536 (Print) ISSN No.: 2393-8544 (Online) Registration No. : CHAENG/2014/57978

2020). According to Bansal & Pathak (2020), employees' mental well-being has a direct influence on organisational performance. Employees need to remain engaged and committed in the workplace, which is impossible when they are experiencing mental health problems. Bhui *et al.* (2016) point out that accomplishing organisational task can be challenging if the workplace environment negatively impacts the mental wellbeing of employees. However, with good mental and physical health, workers become motivated and encouraged to engage in the health provider's decision-making and stay focussed on attaining its goals and objectives (Bhui *et al.*, 2016). Similarly, during the pandemic, the activity and mental wellbeing of healthcare workers need to be provided with right equipment and effective infection control measures.

1.1. Background

This background research reviewed previous studies regarding the mental health impacts of COVID-19 on healthcare workers, potential risks factors associated with COVID-19-related MH problems, their interventions, and their potential risk factors in the healthcare community. Depression, anxiety, and stress were the major COVID-19-related MH issues linked to the frontline healthcare workers. These MH problems are also linked to potential risk factors, including low quality patient care, decreased morale of healthcare workers, work absenteeism, suicidal thoughts, and deaths among healthcare workers. The reviewed literature also mentioned interventions for MIs and their potential risks, including social support and contact and mindfulness practices**.**

Scholars including Muller *et al.* (2020), Asnakew *et al.* (2021), Khanal *et al.* (2020), and Mrklas *et al.* (2020) have examined the adverse effects of the pandemic on the mental well-being of healthcare workers. Although these previous studies differed in design, they all had similar findings; they identified mental health issues, such as stress, depression, anxiety, and insomnia in the healthcare community during the pandemic. For instance, a web-based cross-sectional survey by Khanal *et al.* (2020) of 475 healthcare workers engaged in the pandemic response identified insomnia, anxiety, and depression. Through a multivariable logistic regression analysis, which is used to determine the predictors of outcomes, Khanal *et al.* (2020) findings showed that 33.9 per cent of the respondents had insomnia symptoms, 37.5 per cent reported depression symptoms, and 41.9 per cent of the workers had feelings of anxiety. In general, Khanal *et al.* (2020) findings suggested that healthcare workers experiencing stigma, those who reported insufficient precautionary services at the healthcare facilities, and those with mental health history were at higher risks of exposure to mental illness. Though different from Khanal *et al.* (2020) study design, Muller *et al.* (2020) systematic review also identified similar COVID-19 mental health issues on healthcare workers pointed by Khanal *et al.* (2020), including distress, depression, anxiety, and sleeping problems. As reported in most studies analysed by Muller *et al.* (2020), mental health issues like depression, anxiety, sleep problems, and stress correlated with exposure to the Coronavirus disease and worry about being infected and infecting others. These MH issues resulted from higher resilience to social contact and support and decreased interest in professional guidance.

Frontline healthcare workers developed MH issues due to anxieties related to fear of infection while in contact with infected patients. Similar to Muller *et al.* (2020) and Khanal *et al.* (2020) findings, studies by Asnakew *et al.* (2021) and Mrklas *et al.* (2020) found that MH issues such as depression, anxiety, and stress have been imposed on healthcare workers during the pandemic. Asnakew *et al.* (2021) research was an institutional-based cross-sectional analysis that examined the adverse effects of the pandemic on healthcare workers, which employed a sample size of 419 workers drawn from the Ethiopian population. Through descriptive statistics, multivariate and bivariate logistic regressions, they affirmed that 63.7 per cent, 64.7 per cent, and 58.2 per cent of the respondents reported stress, anxiety, and depression symptoms, respectively. The reported rates in this study insinuate that the pandemic considerably exposed frontline healthcare workers to mental health issues. Asnakew *et al.* (2021) study further revealed that participants who had previously tested positive for COVID-19 were more likely to have a MH problem. The research also recognised the higher magnitude of MH issues in frontline healthcare workers during the COVID-19 pandemic, thus emphasising the need to continuously promote the mental wellbeing of the workers in the COVID-19 period (Asnakew *et al.*, 2021). On the other hand, Mrklas *et al.* (2020) research was an Alberta-based online cross-sectional study that assessed depression, stress, and anxiety among workers, including healthcare workers, during the pandemic. Unlike existing literature such as Kowal *et al.* (2020) that view healthcare workers as the most adversely affected professional category regarding mental wellbeing, Mrklas *et al.* (2020) findings showed that students and retired healthcare professionals, including physicians and nurses, reported a significantly higher prevalence of MH issues than healthcare workers at the beginning of the pandemic. However, during the pandemic, Mrklas *et al.* (2020) findings affirmed a significantly higher prevalence of depression, stress, and anxiety symptoms among healthcare workers than other workers. Therefore, it can be concluded that healthcare workers felt more exposed

to the pandemic because they directly handled COVID-19 patients under circumstances of limited resources, such as insufficient PPEs, thus exacerbating their mental health issues. Therefore, it is imperative to perform a critical review of the risk factors of mental illness among healthcare workers during the pandemic at this stage.

Some studies have reported the risks associated with mental illness among healthcare workers during the pandemic. For example, Rahman & Plummer (2020) analysed six case studies of nurses who committed suicide during the pandemic; they discovered that fear of infection, quarantine, and self-isolation were risk factors. In contrast, Lai *et al.* (2020) reported that some of the risk factors for developing depression, anxiety, and insomnia among healthcare workers during the pandemic included being a woman, working in a secondary hospital, and having an intermediate technical title, compared to healthcare workers with junior and senior technical titles. Lai *et al.* (2020) did not offer insights into why women healthcare workers were more affected than their male counterparts. However, Zhang *et al.* (2020) discovered that female nurses were at higher risk of depression and anxiety because women tend to develop consistent worries about getting infected, especially when there is no adequate supply of PPEs. The researchers also discovered that other risk factors for healthcare workers' mental health issues during the pandemic include living in rural areas, being a frontline healthcare worker, and poor health status (Zhang *et al.*, 2020). Overall, understanding all the risk factors associated with negative MH outcomes among healthcare workers during the pandemic can potentially help formulate effective preventive and treatment interventions.

The negative effects of the pandemic on the mental wellbeing of healthcare workers extend directly to various organisational aspects like undermining the performance of healthcare organisations. According to De Kock *et al.* (2021), higher anxiety and stress levels among these professionals have been affirmed to increase work absenteeism, lower quality of care, poor work satisfaction, and a decrease in the workers' morale. In addition, some cases of nurses committing suicide due to MH issues aggravated by the pandemic have been reported in England, India, Italy, and Mexico (Rahman & Plummer, 2020). Another consequence of adverse mental health outcomes that have been reported in prior research include moral injury, which occurs when moral dilemmas make healthcare workers feel incompetent, and it is commonly associated with changing healthcare priorities and increased distress among nurses (Čartolovni *et al.*, 2021; Hines *et al.*, 2021). Therefore, it can be concluded that the adverse mental health outcomes related to the Pandemic were also associated with negative work performance outcomes among healthcare workers.

1.2. Research Problem

The sustainability of healthcare services during the pandemic depends on the ability to maintain the safety of frontline healthcare workers (Remuzzi & Remuzzi, 2020). Therefore, it is important to comprehend the MH risks and impacts experienced by nursing and medical staff and point out appropriate interventions to mitigate the adverse effects. Some reviews have been conducted investigating the negative mental health effects of COVID-19 in frontline healthcare workers from different parts of the globe (Tan *et al.*, 2020; Lai *et al.*, 2020). For instance, Lai *et al.* (2020) study conducted in China during the pandemic showed that, of the 1257 surveyed participants (frontline healthcare workers), 8.1 per cent experienced stress, 28.8 per cent reported anxiety characteristics, and 16.5 per cent experienced depression. Lai *et al.* (2020) findings suggested that 53.8 per cent of the respondents were experiencing mental illness. Another Singapore-based research conducted by Tan *et al.* (2020) regarding the mental health impacts of Coronavirus on the frontline healthcare community showed, of the 470 participants, 7.7 per cent reported PTSD, 6.6 per cent experienced stress, 8.9 per cent reported depression, and 14.5 per cent confirmed anxiety. The above background evidence suggests adverse impacts of Coronavirus on the mental wellbeing of frontline healthcare workers, including increased stress, anxiety, and depression. However, preliminary backgrounds study evidence that there is a scarcity of similar studies from the United Kingdom. Hence it is required to conduct a detailed critical literature review to explore this topic further in the UK perspective. This critical narrative synthesis aims to examine the mental health impacts of the pandemic on frontline healthcare workers and interventions to minimise the negative mental health issues caused by the pandemic.

1.3. Study Objectives

The present study examines the mental health impact of the pandemic on frontline UK healthcare workers. The following objectives are addressed:

1. To examine the general MH issues experienced by the healthcare workers during the pandemic.
2. To analyse potential risks to healthcare workers and healthcare organisations linked to mental health impacts of the pandemic.
3. To examine the need for interventions against MH problems and risks associated with the pandemic on healthcare workers.

1.4. Research Questions

The following research questions (RQs) will guide the current study:

1. What are the negative MH effects of the pandemic on frontline healthcare workers?
2. How do the negative MH impacts of the pandemic on healthcare workers affect their performance and potential to contain the pandemic?
3. What are the most appropriate intervention strategies towards mitigating adverse mental health effects caused by the pandemic on healthcare workers?

1.5. Significance of the Study

The study aims to offer comprehensive information regarding the adverse effects of the pandemic on healthcare workers and identify interventions that can help mitigate them. The findings will help healthcare managers offer mental health services to frontline healthcare workers in the fight against COVID-19. By gaining an enhanced understanding of the MH impacts of the pandemic on healthcare workers, the study will also identify strategies to mitigate the adverse effects of the pandemic on frontline mental health staff.

2. Methodology

The current study entailed a critical analysis of previous literature on a social subject: the adverse mental health impacts of the COVID-19 pandemic among UK healthcare workers. Therefore, the current study adopted an interpretive philosophy in criticising existing literature on the study subject. Interpretive argues that knowledge and its construction are subjective because they are culturally and historically situated based on people's lived experiences and their understanding of them (Ryan, 2018). An interpretive paradigm was suitable because the MH experiences of healthcare workers are subjective. Healthcare workers experienced different mental health problems during the pandemic, ranging from depression and anxiety to PTSD (Kowal *et al.*, 2020). This paradigm empowered the researcher as a social actor to appreciate that healthcare workers were differently vulnerable to mental health issues during the pandemic.

2.1. Methods

According to Basias & Pollalis (2018), qualitative data offers a deeper understanding of concepts, experiences, and thoughts that cannot be explained using statistical and numerical data analysis. Therefore, the current study adopted a qualitative method since it entailed an examination of healthcare workers' mental health experiences during the pandemic, which could best be described qualitatively. Data from existing qualitative and quantitative literature was qualitatively described and employed in assessing the adverse impacts of COVID-19 on healthcare workers' mental wellbeing.

2.2. Literature Review Data Collection Methods

This review used only primary studies, including peer-reviewed journals and published articles, in gathering information about the mental health problems caused by the pandemic on the frontline healthcare community. The studies highlighted information regarding the adverse mental health effects of COVID-19 on healthcare workers, the potential risks associated with such effects, and interventions developed so far to mitigate the negative mental health impacts brought by the pandemic. The information developed additional and new perspectives on the research phenomenon and pointed to knowledge gaps that initiated the current investigation.

2.3. Search Strategy

This study employed four major databases in retrieving secondary sources of information, including PubMed Public Health, and Elsevier Journal. These databases contain published and high-quality information sources; hence, the data obtained was credible. Most published articles in these databases are freely available and easy to search through the Internet. The keywords included *'mental'* or *'psychological issues'* or *'psychiatric problems'* or *'mental wellbeing,'* and *'Corona'* or *'COVID-19'* or *'novel Coronavirus,'* and *'Healthcare workers'* or *'practitioners'* or *'providers'* or *'professionals'* or *'Nursing'* or *'Doctors'* or *'Medical staff'*. A PICO framework was utilised to maintain the quality and accuracy of the web search was retained despite the use and interchange of search words and phrases (Eriksen & Frandsen, 2018). This process is shown in Table 1.

Table 1: The use of PICO framework.

PICO Element	Keywords combined/Interchanged
P- Problem, patient, or population.	Healthcare workers OR Medical/ Nursing staff OR Healthcare providers/practitioners/professionals.
I- Examined condition or intervention.	COVID-19/Coronavirus mental health issues (Psychological problems).
C- Compared condition such as a different intervention.	Personal protective equipment (PPE) OR Appropriate training.
O- Outcome(s).	Minimised mental health problems OR Improved psychological well-being of healthcare workers.

2.4. Inclusion/exclusion Criteria

The study considered qualitative, quantitative, and mixed-method studies in examining the adverse MH effects of

the pandemic on the frontline healthcare community and interventions against the mental health impacts to the current date. Date restrictions were imposed to include primary research studies conducted between 2020 and 2021. Articles considered were only those originally printed and published in English. Only studies that appropriately and consistently touched on topics similar to the research questions and objectives were considered in the current study. Only articles conducted in the context of the UK were screened using their abstracts and titles, but non-UK studies were also reviewed in the literature review section. Table 2 is a summary of the inclusion/exclusion criteria used to select data sources.

Table 2: Inclusion/Exclusion Criteria.

Inclusion Criteria	**Exclusion Criteria**
Quantitative, qualitative, and mixed-methods studies.	Studies published earlier than January 2020.
Studies whose manuscripts were originally printed in English.	Studies whose manuscripts were originally printed in Chinese, French, or Germany.
Peer-reviewed journals and published articles.	Grey and unpublished data sources.
Studies investigating COVID-19 Mental health effects among healthcare workers.	Studies investigating general populations other than healthcare workers.
Primary Research studies published between 2020 and 2021 .	Studies that did not consistently and appropriately report on the study phenomenon.
Studies that appropriately and consistently reported on the adverse mental health effects of COVID-19 on healthcare workers and interventions geared towards the psychological impacts.	

Table 3: Flow chart of articles selected in the study.

No	Author Names (Year of Publication)/ Country of Origin	Purpose	Study Variables	Study Design	Study Setting
1	Al-Ghunaim *et al.* (2021)/United Kingdom	To investigate the professional and personal effects of Covid-19 on UK surgeons.	N/A	Mixed methods (descriptive statistics and qualitative survey of 141 surgeons)	Surgical departments in the UK NHS
2	Billings *et al.* (2021)/United Kingdom	To assess the perceptions and views of UK social and healthcare workers about psychosocial support during the pandemic.	N/A	A qualitative study utilising 25 interviews of frontline workers	Health and social care settings across the UK
3	Choudhury *et al.* (2020)/ United Kingdom	To highlight the mental wellbeing of healthcare workers during the pandemic.	Depression,stress levels; anxiety; burnout; preparedness	Descriptive survey of 106 frontline healthcare workers	A tertiary cardiac centre in the North West of England
4	Denning *et al.* (2021)/United Kingdom	To examine predictors of burnout, anxiety, and depression among healthcare workers during the pandemic.	Burnout; depression; anxiety	Cross-sectional survey study	Three countries: United Kingdom, Singapore, Poland
5	Dykes *et al.* (2021)/ United Kingdom	To establish the prevalence of depression, anxiety, and PTSD among ICU healthcare workers in the UK.	Depression; anxiety; PTSD	Cross-sectional survey study of 131 respondents	Countess of Chester Hospital (UK)

6	Gilleen *et al.* (2021)/ United Kingdom	To assess the risk and protective factors associated with adverse mental health outcomes among healthcare workers in the UK	Anxiety; depression; PTSD; stress; work-related factors; job roles; Covid-19 risk perception	Cross-sectional survey study of 2773 healthcare workers	NHS Research and Development departments were contacted to disseminate the survey to healthcare workers
7	Greenberg *et al.*/ United Kingdom	To identify probable MH disorders affecting healthcare workers working in nine English ICU facilities.	Depression; anxiety; alcohol use; well-being	Cross-sectional survey study of 291 doctors, 344 nurses, and 74 other healthcare staff	Nine NHS hospitals with ICU facilities
8	Hummel *et al.* (2021)/United Kingdom	To compare mental health between healthcare workers and non-medical professionals in eight European countries	Depression; anxiety; coping strategies; stressors	Cross-sectional survey study of 609 healthcare workers	Eight European countries, including the UK.
9	Lamb *et al.* (2021)/ United Kingdom	To investigate the prevalence of and risk factors associated with mental health disorders among healthcare workers in the UK.	Presence of common mental health disorders (CMDs); anxiety; depression; PTSD; Suicidal ideation; alcohol use; moral injury	A cross-sectional cohort study of 4378 healthcare workers and non-medical professionals	London-based NHS Trusts
10	Wanigasooriya *et al.* (2020)/United Kingdom	To evaluate the prevalence of anxiety, depression, and PTSD among healthcare workers in the UK during the pandemic.	Depression, anxiety, and PTSD	A cross-sectional survey study of 2638 healthcare workers	All hospital healthcare workers in the West Midlands, UK

3. Results

There are ten UK based primary research articles were predominantly qualified for the critical appraisal. Thematic analysis was used to observe patterns within sources considered for the review. The results were grouped based on information, including adverse MH effects of the Coronavirus pandemic on healthcare workers and the potential risk factors linked to COVID-19-related MH problems, The reviewer analysed the outcomes and compared them to previous studies, making conclusions based on the research questions followed:

Table 4: Findings of Each Study/Data extraction table.

Author Names (Year of Publication)	**Findings**
Al-Ghunaim *et al.* (2021)	Four themes emerged from the thematic analysis, whereby one of them was the psychological distress surgeons underwent during the pandemic.
Billings *et al.* (2021)	Interviewees valued psychosocial support, but they expressed some challenges, such as being burdensome and disparities in provision and access
Choudhury *et al.* (2020)	Surveyed workers had mild depression and mild anxiety. 84% reported they were scared of contracting COVID-19. Increased levels of stress were also reported. Risk of burnout was also prevalent.
Denning *et al.* (2021)	They discovered that the COVID-19 pandemic posed a significant burnout, anxiety, and depression burden among frontline workers in the UK, Poland, and Singapore. Of the three countries, UK's healthcare workers had the least burnout. UK was second in anxiety and depression scores.
Dykes *et al.* (2021)	About 30% of the respondents reported extreme or severe impact of COVID-19 pandemic on their mental wellbeing.

Gilleen *et al.* (2021)	The Pandemic had a significant impact on the mental health of healthcare workers. Several risk factors were identified namely being female, being frontline, insufficient protective equipment, and workplace preparation.
Greenberg *et al.* (2021)	Substantial rates of depression, anxiety, and thoughts of self-harm were discovered among healthcare workers
Hummel *et al.* (2021)	Participants from UK and France reported experiencing severe depression, anxiety, and stress more than those from other countries.
Lamb *et al.* (2021)	Substantial rates of CMDs and PSTD. Lowers rates of depression, anxiety, and alcohol use
Wanigasooriya *et al.* (2020)	Substantial rates of anxiety, depression, and PTSD were reported among the surveyed participants

Al-Ghunaim *et al.* (2021) discovered that 85% of the participants reported being negatively affected by the pandemic, whereas one of the themes was adverse MH outcomes among the surgeons. The remaining three themes explained why the pandemic might have affected the mental well-being of surgeons. They include changing and challenging work environments, resulting in fear and anxiety. Overall, the methodological approach used in Al-Ghunaim *et al.* (2021) study can help offer meaningful insights into the subject despite the shortcomings described above. Billings *et al.* (2021) research assessed the views of UK health and social care workers regarding psychosocial support during the pandemic. Since the study focused on the participants' perceptions, a qualitative method was appropriately that the interviewees reported positive views regarding psychosocial support. However, despite that support from friends and family members was generally considered positive, the participants expressed mixed reactions towards psychosocial support from the media and public organisations (Billings *et al.*, 2021). Another issue that emerged is that despite their positive views towards psychosocial support, they also reported disparities in provision and access.

Choudhury *et al.* (2020) used a cross-sectional survey study and measured the possible mental health issues that healthcare workers faced during the pandemic. They discovered mild depression and anxiety and increased stress levels. The research found that healthcare workers had inadequate readiness levels to handle the situation. Therefore, it can be concluded that inadequate preparedness exposed healthcare workers in the facility to a higher risk of anxiety, depression, and stress. The findings can be applied to similar healthcare settings in the UK after careful consideration of facility-wise differences and similarities. Denning *et al.* (2021) evaluated the determinants of burnout and MH among healthcare workers during the pandemic. Denning *et al.* (2021) discovered that the UK had lower burnout levels than Singapore and Poland. However, the UK emerged second of the three countries assessed (UK, Poland, and Singapore) regarding anxiety and depression levels. Additionally, Denning *et al.* (2021) considered confounding factors, which they also accounted for in their research design. For instance, they discovered that, regardless of country, job role, gender, and safety attitudes were the most significant determinants of the mental health outcomes. A cross-sectional survey study by Dykes *et al.* (2021), which assessed the prevalence of MH disorders among healthcare workers of an ICU facility. Dykes *et al.* (2021) discovered that the ICU staff had mild anxiety and depression, and suggestive PTSD. They also discovered that gender could be a significant determinant of mental health outcomes during the pandemic; however, they indicated that male healthcare professionals are probably less likely to recognise and report mental health symptoms (Dykes *et al.*, 2021). Finally, Dykes *et al.* (2021) reported that despite the high rates of MH issues during the pandemic, only 3.1% (4/131) of the participants said to have sought mental health support, hinting at possible provision and access disparities. A cross-sectional survey study by Gilleen *et al.* (2021), sought to investigate risk and protective factors associated with adverse MH outcomes among healthcare workers during the pandemic. The researchers discovered that nearly a third of the respondents reported moderate to severe depression and anxiety. Some of the factors they found were associated with the most severe mental illness symptoms include gender (being female), workplace preparedness level, training and communication, insufficient PPEs, previous psychiatric disorders diagnosis, and experience of traumatic events.

Greenberg *et al.* (2021) conducted a cross-sectional survey study and investigated the prevalence of mental disorders among ICU healthcare workers in England. Greenberg *et al.* (2021) discovered that most participants reported good well-being, but 45% met the criteria for either severe depression, problem drinking, severe anxiety, or PTSD. They also discovered that medics were more likely to report well-being than other clinicians, whereas nurses were more vulnerable to MH problems than other healthcare workers. The cross-sectional survey study conducted by Hummel *et al.* (2021) investigated MH outcomes among healthcare workers versus non-medical professionals in eight European countries, including the United Kingdom, during the pandemic. They obtained a sample of 5 medical professionals and 51 non-medical professionals from

the UK. Overall, Hummel *et al.* (2021) discovered that participants from the UK, regardless of their profession, reported severe or extremely severe depression, anxiety, and stress more often than participants from other European countries. Surprisingly, they also discovered that non-medical professionals were more vulnerable to depression and anxiety than medical professionals. The most frequently used coping strategy used by medical professionals was protective measures. Uncertainty about when the pandemic could be put under control was the most frequent source of stress/worry among medical professionals. A cross-sectional survey study conducted by Lamb *et al.* (2021) investigated the prevalence and risk factors associated with adverse MH outcomes among healthcare professionals. Lamb *et al.* (2021) discovered substantial rates of CMDs and PTSD but lower levels of anxiety, depression, and alcohol use. However, younger staff, female staff, and nurses were more vulnerable to these disorders, except alcohol use, than their counterparts. The researchers also discovered that moral injury was another significant predictor of all the mental disorders examined in their study. Wanigasooriya *et al.* (2020) cross-sectional survey study investigated the rates of PTSD, anxiety, and depression symptoms among healthcare workers in the UK during the pandemic. Wanigasooriya *et al.* (2020) discovered that the rates for PTSD, anxiety, and depression were 24.5%, 34.3%, and 31.2%, respectively. Healthcare workers with a history of mental illness were more likely to report clinically significant mental illness symptoms. Some of the protective factors they identified in their study include sufficient PPE availability, MH support, and reduced exposure to moral injury.

4. Discussion

The conclusions drawn from the analysis and findings are critically evaluated considering the literature review findings. Three themes emerged from the critical literature review are:

i. Negative MH effects of COVID-19 on healthcare workers
ii. The impact of mental ill health on healthcare workers' performance
iii. Strategies for mitigating the adverse MH effects on healthcare workers.

The current study's findings revealed that anxiety and depression were the most prevalent MH issues among UK healthcare workers during the pandemic, agreeing with prior observations by Khanal *et al.* (2020) and Muller *et al.* (2020). Although not all studies discussed the reason for depression and anxiety, some implied that healthcare workers' fear of infection could have been the top probable reason for their mental illness (Denning *et al.*, 2021; Gilleen *et al.*, 2021; Wanigasooriya *et al.*, 2020). Such findings agree with Rahman and Plummer (2020), who pointed out that most frontline healthcare workers were anxious and worried about contracting the virus in their line of duty, primarily due to inadequate PPEs. Hummel *et al.* (2021) further explained that the most significant source of anxiety among frontline healthcare workers was the uncertainty about when the pandemic will be controlled. Unlike in this literature review, insomnia and sleeping problems were reported by Khanal *et al.* (2020), who conducted their study in Nepal, and Muller *et al.* (2020), who reviewed studies conducted in various countries, including the UK. The main observation that can be drawn from the inconsistencies between this literature review and prior research is either that the prevalence of sleeping problems was low in the UK or most researchers for the reviewed studies did not choose to screen for them. Indeed, a closer look into one of the qualitative studies (Al-Ghunaim *et al.*, 2021) reviewed in this literature review revealed that UK surgeons reported poor sleep. However, since there was no other UK study supporting the issue of poor sleep, including the qualitative study by Billings *et al.* (2021), the former argument about the low prevalence of sleeping problems among UK healthcare workers holds relevance. Overall, it is imperative to confirm by undertaking a cross-sectional survey using a questionnaire that screens for insomnia and other sleep problems.

Other studies (Denning *et al.*, 2021; Dykes *et al.*, 2021; Gilleen *et al.*, 2021; Lamb *et al.*, 2021) indicated that being of the female gender exposed healthcare workers to mental illness, which supported prior findings by Lai *et al.* (2020) and Zhang *et al.* (2020). However, Dykes *et al.* (2021) expounded that these differences can be explained by the facts that male healthcare workers are less likely than their female counterparts to recognise and report MH problems. Regardless of gender, Greenberg *et al.* (2021) implied that being a nurse was another predictor of mental health outcomes among frontline healthcare workers, agreeing with Rahman and Plummer (2020), who indicated that some nurses committed suicide during the pandemic. This trend can be explained by nurses' tendency to spend more time with patients than other healthcare workers. Consequently, prolonged physical contact made them worried about contracting the virus. Therefore, it can be concluded that particular focus should be placed on providing MH support to nurses and female healthcare workers during Covid-19 and other future healthcare crises. Stress and PTSD were also commonly reported in the reviewed studies (Choudhury *et al.*, 2020; Dykes *et al.*, 2021; Greenberg *et al.*, 2021; Lamb *et al.*, 2021), agreeing with Muller *et al.* (2020), who showed that the increased levels of mental distress among healthcare workers during the pandemic implies that the burdened healthcare system could not help

providers. They also agree with De Kock *et al.* (2021), who demonstrated that the pandemic caused significant stress among healthcare workers. Though De Kock *et al.* (2021) systematic review used only one UK study out of the 24 papers that were included. Hence, it can be said that the consistency between UK studies and studies conducted in other countries (such as those reviewed by De Kock *et al.*, 2021) implies that elevated stress among healthcare workers during the pandemic was a universal occurrence. Overall, in the UK, most studies reported that PTSD was more prevalent, followed by depression and anxiety.

Burnout was the primary expression of the negative MH impacts of the pandemic on healthcare workers' workplace performance. Al-Ghunaim *et al.* (2021) and Denning *et al.* (2021) observations that frontline UK healthcare workers suffered low motivation and burnout during the pandemic is consistent with De Kock *et al.* (2021) research study, which also reported low morale and burnout. Also, Denning *et al.* (2021) noted that healthcare workers were burned out due to depression, anxiety, increased care roles, and negative safety attitudes, which is consistent with Hines *et al.* (2021) findings that burnout mainly occurs alongside depression, PTSD, and anxiety, which could also imply that it is a predictor of these mental illness. Therefore, it can be concluded that the pandemic harmed the work performance of healthcare workers. Apart from burnout, moral injury, which occurs when moral dilemmas make healthcare workers feel incompetent, has been reported as a significant predictor of mental illness among healthcare workers during the pandemic. Like Lamb *et al.* (2021) and Wanigasooriya *et al.* (2020), Hines *et al.* (2021) reported that healthcare workers who were faced with a traumatic situation and were unable to respond appropriately (moral dilemma) were more likely to develop PTSD, anxiety, and depression. Wanigasooriya *et al.* (2020) findings also agreed with Čartolovni *et al.* (2021), who noted that nurses' prolonged exposure to human suffering makes them develop false guilt for their inability to offer adequate help to the patients. Consequently, such nurses are likely to develop mental illness like PTSD, anxiety, and depression. The consistency between prior research and the current study implies that moral injury was a significant risk factor of mental illness among frontline healthcare workers. As such, it hurt the work performance of healthcare workers.

Access to social support can help healthcare workers to overcome the MH problems induced by the pandemic. Many studies, including Brooks *et al.* (2018), Fiol-DeRoque *et al.* (2021), Gold (2020), Neria (2021), Priede *et al.* (2021), and Selikowitz (2020) have assessed appropriate interventions that can be applied to mitigate the negative mental health effects among healthcare workers caused by the pandemic. While these studies share common ideas on mitigation strategies, they also provide differing opinions towards minimising adverse MH impacts caused by the pandemic. For instance, Brooks *et al.* (2018), Neria (2021), and Selikowitz (2020) advocate for social support from healthcare employers and families to minimise the risk of mental health issues among frontline healthcare workers. According to Brooks *et al.* (2018) systematic review, discrimination, isolation, and rejection are linked to negative mental health outcomes. Thus, Brooks *et al.* (2018) recommend good social support from healthcare workers' families, friends, and employers, which appeared to be good protective factors against adverse mental health impacts caused by pandemics like SARS. Although different from Brooks *et al.* (2018) study design, Neria, (2021) randomised controlled trial (RCT) also advocated for social contact and support from employers and friends as proof against mental health effects in healthcare workers during the COVID-19 pandemic. Neria, (2021) found that healthcare workers tend to be reluctant to seek mental health support from friends, employers, and family due to the fear and stigma of being stereotyped as weak. However, Neria, (2021) RCT indicates that social contact effectively improves help-seeking behaviour and reduces stigma-related perceptions among healthcare workers because interacting with members suffering from similar mental health issues, such as stress, depression, and anxiety, reduces social stigma and encourages a culture of help-seeking.

Similar to Neria, (2021) and Brooks *et al.* (2018) studies, Selikowitz (2020) systematic review also recommends general welfare support for healthcare workers as the most effective intervention against adverse MH impacts caused by Covid-19. Selikowitz, (2020) pointed out that social and general welfare support includes providing special support hotlines for healthcare workers experiencing mental health problems and organising continuous emotional response discussions. These discussions can entail creating a normalising culture for clinical staff to disclose their vulnerabilities. Hence, frontline healthcare workers can willingly seek MH services without fear of stigmatisation and allow the relevant bodies to offer essential mental health support. However, even those healthcare workers who have overcome fear and stigma still experience significant barriers to access and disparities in the provision of the programmes (Drissi *et al.*, 2021; Plasse, 2020). Due to physical contact restrictions during the pandemic, psychosocial support programmes were offered virtually (Drissi *et al.*, 2021). However, Plasse, (2020) raised concerns regarding the limited access to virtual MH intervention programmes and little or no empirical evidence supporting their effectiveness. According to Selikowitz (2020), the uptake of mental health support programmes among healthcare workers can be boosted by providing adequate information on the availability

of the programmes and promoting communication of their challenges and successes. It is imperative to devise effective social and welfare support programmes accessible to all healthcare workers to guarantee that the MH burden is addressed effectively.

Besides, cognitive behavioural therapeutic (CBT) interventions, such as mindful practices, can help frontline healthcare workers prevent and treat the pandemic-related MH issues. For example, Gold (2020) and Priede *et al.* (2021) recommend mindfulness practices as appropriate interventions against the adverse mental health effects in healthcare workers during the pandemic. According to Bäuerle *et al.* (2020), mindfulness refers to a multifaceted construct that includes non-reacting and non-judging experiences, observing, and describing facets practised while acting with awareness. These facets can be acquired through mindfulness skills and practice learning or the dispositions of individuals' personalities. Examples of mindfulness skills and practices include yoga (sitting meditation) and mindful body movements such as qigong and tai chi (Wang *et al.*, 2017). Priede *et al.* (2021) study was an RCT investigating the use of mindfulness practices in minimising COVID-19 related stress, depression, and anxiety among healthcare workers working in 36 hospitals based in Spain. As deduced from Priede *et al.* (2021) analysis, the intervention groups that utilised cognitive-behavioural strategies, such as mindfulness, displayed greater attention and merit in containing the pandemic at regional and national institutions. Priede *et al.* (2021) recommendations conquer with Gold, (2020) study, which recommends mindfulness as an appropriate intervention for healthcare workers against adverse MH issues experienced during the COVID-19 pandemic. However, unlike Priede *et al.* (2021), who analyses mindfulness interventions as a single mental illness mitigation facet, Gold (2021) views mindfulness as part of self-compassion, an intervention against mental health problems that incorporates other elements on top of mindfulness, including common humanity and self-kindness. As highlighted by Gold (2021), common humanity (a timely, healthy, nutritious diet and sleep hygiene), self-care (parameters to maintain health, such as accepting to say "no" when necessary), and meditation practices (yoga) make the most effective strategies against MH problems. Therefore, mindfulness is an appropriate and effective intervention for mental health issues caused by the pandemic among frontline healthcare workers.

Like Billings *et al.* (2021) and Wanigasooriya *et al.* (2020), Plasse (2020) and Selikowitz (2020) reported the need for continuous psychosocial support for healthcare workers during the pandemic. Also, in agreement with Dykes *et al.* (2021), limited access to MH support has also been reported in prior research by Plasse (2020), who discovered that healthcare workers did not have adequate access to telephone hotlines, online peer support, and online psychosocial programmes during the Pandemic. Limited access to and provision disparities for psychosocial support also reflect the magnitude of the pandemic's negative MH impact on healthcare workers in the UK similar to parts of the world. This observation is consistent with Gold, (2020) and Priede *et al.* (2021) observations that mindfulness practices, which are effective psychosocial interventions that can be practiced personally, would have also helped healthcare workers overcome the MH challenges induced by the pandemic. Overall, of the reviewed studies, psychosocial support, especially by family and friends, was hinted at as the most effective intervention that would have helped mitigate the adverse MH outcomes among healthcare workers. Therefore, it can be concluded that psychiatrists should ensure they engage the friends and family members of healthcare workers when providing psychosocial treatments like CBT.

In summary, the findings of the current study were largely consistent with prior research. Anxiety, depression, and PTSD were the most prevalent mental illnesses reported among UK healthcare workers during the pandemic. Some of the risk factors reported by the reviewed articles include moral injury. Burnout was also reported as a consequence of mental illness among healthcare workers, negatively affecting their workplace performance. Therefore, healthcare workers require accessible psychosocial support during the pandemic to prevent mental illness and promote their work performance.

4.1. Research Gap

The above literature analysis affirms that several studies have been conducted regarding the adverse MH impacts of the pandemic among healthcare workers around the world. However more UK-based reviews are required to help understand the study subject in the UK context. In addition, the analysis shows that most studies differ in design, making it hard to conduct meta-analyses of their results and combine their conclusions. Furthermore, previous studies offer different strategies for addressing MH issues among healthcare workers. Hence, it is hard to define the most appropriate and suitable strategy for mental wellbeing for healthcare workers. Therefore, more narrative reviews are required to harmonise the available data on the subject matter and add more information to the existing literature in the context of the UK.

5. Conclusion

This study examined the adverse MH impacts of COVID-19 on frontline healthcare workers, the potential risks associated with these COVID-19-related mental illnesses, and

interventions for the adverse MH impacts caused by the Coronavirus pandemic. As highlighted below, the current study answered all three research questions. The first research question was, "What are the negative MH effects of the Pandemic on frontline healthcare workers?" As deduced from the current study's analysis, like other COVID-19 frontline HCWs across the globe, frontline healthcare HCWs in the UK also experienced COVID-19-related MIs, including stress, anxiety, depression, and PTSD. The second Research question of the current study was, "How do the negative MH impacts of the Pandemic on HCWs affect their performance and potential to contain the pandemic?" Major negative MH consequences that affected the performance of frontline HCWs include emotional exhaustion, burnout, and moral injury. These consequences were associated with low motivation at work. Finally, the third Research question of the present research study was, "What are the most appropriate intervention strategies towards mitigating adverse MH effects caused by the Coronavirus on HCWs?" It was discovered that UK HCWs preferred psychosocial support, especially by family and friends. However, disparities in provision and access were also reported.

5.1. Implications of the Study

The current study offers essential information regarding the adverse impacts of COVID-19-related MIs and interventions for these negative MH effects. Healthcare managers, relevant authorities, and governments can use the findings in helping the HCWs to fight the Pandemic efficiently and successfully. This research proves that frontline HCWs in the UK have been working under high pressure amidst the Pandemic. Yet, relevant authorities have not given the situation adequate attention despite its high MH burden. Further, because this study provides educational information about effective strategies to deal with MIs during the COVID-19 pandemic, it clears HCWs' doubts regarding COVID-19 and offers necessary MH support to enhance protection. Nevertheless, the current study findings inform the frontline healthcare community on important ways of managing COVID-19-related MI. Thus, clinicians and medical staff can remain resilient and successfully fight the Coronavirus pandemic.

5.2. Recommendations

First, as deduced, psychosocial support was identified as an appropriate intervention for HCWs' COVID-19-related Mental Illness. Therefore, the current study recommends that the UK government, through healthcare managers, provide the necessary social support and encourage social contact among frontline HCWs, which will encourage HCWs to share their MH issues and develop a help-seeking culture, which helps resolve mental issues experienced by the group. Second, although MH (psychosocial support) is highly accepted by HCWs in the UK, its accessibility remains limited. Some studies highlighted that many HCWs could not access MH support programmes. They also reported disparities in the provision of psychological support services. Although it was not clear whether the problem intensified during the Pandemic, it is recommended that more empirical studies need to be dedicated to understanding how easily accessible and uniformly implementable programmes can be developed.

5.3. Limitations

This review is a critical literature search, and the researcher of this study was never involved directly in the primary data collection process and hence the data obtained cannot be 100 per cent certified as reliable. Therefore, the data and outcomes of this review can be negatively affected or biased in cases of incredibility and invalidity in the primary research sources used to conduct the desktop research. The current study's subject matter requires randomised trials and interviews (practical evidence) to support inferences. Furthermore, the design adopted inhibited the study's ability to develop definitive conclusions. This literature search considered only a few studies for its critical appraisal, thus reducing the heterogeneity of the study design, which implies that meta-analyses such as funnel and sensitivity plots could not be employed. Instead, only a narrative synthesis of the characteristics and themes emerging from the primary studies was utilised. There were no randomised trials; hence, future studies that will incorporate several and heterogeneous studies in analysing the adverse impacts of the COVID-19 pandemic in frontline HCWs should be considered. Only one intervention (psychosocial support) for COVID-19-related mental illness was reported, perhaps due to limited number of sources critiqued. Therefore, this research recommends that future research include different types of studies to increase the scope and gather more information regarding appropriate interventions for COVID-19-related MIs among HCWs.

6. Data Availability Statement:

All data underlying the results are available as part of the article and no additional source data are required.

7. Competing Interests

The authors have no conflict of interest to report.

8. Funding

No funding was used to support this research and the preparation of the manuscript.

9. Ethics Declaration

The authors have taken sufficient steps to make sure that the work is ethically compliant and adhering to the legal requirements

10. Use of Artificial Intelligence and Adherence to Plagiarism Policy

No artificial intelligence is used in the work. Part of this work was undertaken as part of a previous UK university continuous professional development program by the first author. If any high Turnitin similarity issues are noticed, the authors declare that it is their own work.

References

Al-Ghunaim, T., Johnson, J., Biyani, C. and O'Connor, D., (2021). Psychological and occupational impact of the COVID-19 pandemic on UK surgeons: a qualitative investigation. *BMJ Open*, *11*(4), p.e045699.

Asnakew, S., Amha, H. and Kassew, T. (2021). *Mental Health Adverse Effects of COVID-19 Pandemic on Health Care Workers in Northwest Ethiopia: A Multicentre Cross-Sectional Study*. [online] Neuropsychiatric Disease and Treatment. Available at: https://www.dovepress.com/mental-health-adverse-effects-of-covid-19-pandemic-on-health-care-work-peer-reviewed-fulltext-article-NDT.

Bansal, D. and Pathak, V., (2020). Personality as a Predictor of Occupational Stress General Health and Job Satisfaction among IT Professionals. *Defence Life Science Journal*, *5*(1), pp.25-30.

Basias, N. and Pollalis, Y., (2018). Quantitative and qualitative research in business & technology: Justifying a suitable research methodology. *Review of Integrative Business and Economics Research*, *7*, pp.91-105.

Bäuerle, A., Graf, J., Jansen, C., Musche, V., Schweda, A., Hetkamp, M., Weismüller, B., Dörrie, N., Junne, F., Teufel, M. and Skoda, E.-M. (2020). E-mental health mindfulness-based and skills-based "CoPE It" intervention to reduce psychological distress in times of COVID-19: study protocol for a bicentre longitudinal study. *BMJ Open*, *10*(8), p.e039646.

Bhui, K., Dinos, S., Galant-Miecznikowska, M., de Jongh, B. and Stansfeld, S., (2016). Perceptions of work stress causes and effective interventions in employees working in public, private and non-governmental organisations: a qualitative study. *BJPsych bulletin*, *40*(6), pp.318-325.

Billings, J., Abou Seif, N., Hegarty, S., Ondruskova, T., Soulios, E., Bloomfield, M., and Greene, T. (2021). What support do frontline workers want? A qualitative study of health and social care workers' experiences and views of psychosocial support during the COVID-19 pandemic. *PLOS ONE*, *16*(9), p.e0256454.

Brooks, S.K., Dunn, R., Amlôt, R., Rubin, G.J. and Greenberg, N. (2018). A Systematic, Thematic Review of Social and Occupational Factors Associated with Psychological Outcomes in Healthcare Employees During an Infectious Disease Outbreak. *Journal of Occupational and Environmental Medicine*, *60*(3), pp.248–257.

Čartolovni, A., Stolt, M., Scott, P. and Suhonen, R., (2021). Moral injury in healthcare professionals: A scoping review and discussion. *Nursing Ethics*, *28*(5), pp.590-602.

Cheng, A., Kessler, D., Mackinnon, R., Chang, T., Nadkarni, V., Hunt, E., Duval-Arnould, J., Lin, Y., Pusic, M. and Auerbach, M., (2017). Conducting multicenter research in healthcare simulation: Lessons learned from the INSPIRE network. *Advances in Simulation*, *2*(1).

Choudhury, T., Debski, M., Wiper, A., Abdelrahman, A., Wild, S., Chalil, S., More, R., Goode, G., Patel, B. and Abdelaziz, H., (2020). COVID-19 Pandemic: Looking After the Mental Health of Our Healthcare Workers. *Journal of Occupational & Environmental Medicine*, *62*(7), pp. e373- e376.

De Kock, J.H., Latham, H.A., Leslie, S.J., Grindle, M., Munoz, S.-A., Ellis, L., Polson, R. and O'Malley, C.M. (2021). A rapid review of the impact of COVID-19 on the mental health of healthcare workers: implications for supporting psychological well-being. *BMC Public Health*, *21*(1).

Denning, M., Goh, E., Tan, B., Kanneganti, A., Almonte, M., Scott, A., Martin, G., Clarke, J., Sounderajah, V., Markar, S., Przybylowicz, J *et al.* (2021). Determinants of burnout and other aspects of psychological well-being in healthcare workers during the Covid-19 pandemic: A multinational cross-sectional study. *PLOS ONE*, *16*(4), p.e0238666.

Department of Health and Social Care, (2020). *Record numbers of doctors and nurses working in the NHS*. [online] GOV.UK. Available at: <https://www.gov.uk/government/news/record-numbers-of-doctors-and-nurses-working-in-the-nhs>.

Drissi, N., Ouhbi, S., Marques, G., de la Torre Díez, I., Ghogho, M. and Janati Idrissi, M., 2021. A Systematic Literature Review on e-Mental Health Solutions to

Assist Health Care Workers During COVID-19. *Telemedicine and e-Health*, *27*(6), pp.594-602.

Dykes, N., Johnson, O. and Bamford, P., (2021). Assessing the psychological impact of COVID-19 on intensive care workers: A single-centre cross-sectional UK-based study. *Journal of the Intensive Care Society*, p.175114372098318.

Eckman, S., Chew, R., Sanders, H. and Furberg, R., (2020). *Collecting and using always-on location data in surveys*. [online] Surveyinsights.org. Available at: <https://surveyinsights.org/?p=13330>.

Eriksen, M. and Frandsen, T., (2018). The impact of patient, intervention, comparison, outcome (PICO) as a search strategy tool on literature search quality: a systematic review. *Journal of the Medical Library Association*, *106*(4).

Fiol-DeRoque, M., Serrano-Ripoll, M., Jiménez, R., Zamanillo-Campos, R., Yáñez-Juan, A., Bennasar-Veny, M., Leiva, A., *et al.*(2021). A Mobile Phone–Based Intervention to Reduce Mental Health Problems in Health Care Workers During the COVID-19 Pandemic (PsyCovidApp): Randomized Controlled Trial. *JMIR mHealth and uHealth*, *9*(5), p.e27039.

Frey, B., (2018). Response Rate. *The SAGE Encyclopedia of Educational Research, Measurement, and Evaluation*.

Gilleen, J., Santaolalla, A., Valdearenas, L., Salice, C. and Fusté, M., (2021). Impact of the COVID-19 pandemic on the mental health and well-being of UK healthcare workers. *BJPsych Open*, *7*(3).

Gold, J., (2020). Covid-19: adverse mental health outcomes for healthcare workers. *BMJ*, p.m1815.

Greenberg, N., Weston, D., Hall, C., Caulfield, T., Williamson, V. and Fong, K., (2021). Mental health of staff working in intensive care during Covid-19. *Occupational Medicine*, *71*(2), pp.62-67.

Hao, Q., Wang, D., Xie, M., Tang, Y., Dou, Y., Zhu, L., Wu, Y., Dai, M., Wu, H. and Wang, Q., (2021). Prevalence and Risk Factors of Mental Health Problems Among Healthcare Workers During the COVID-19 Pandemic: A Systematic Review and Meta-Analysis. *Frontiers in Psychiatry*, 12.

Hennink, M., Hutter, I. and Bailey, A., (2020). *Qualitative Research Methods*. SAGE. Hines, S., Chin, K., Glick, D. and Wickwire, E., 2021. Trends in Moral Injury, Distress, and Resilience Factors among Healthcare Workers at the Beginning of the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, *18*(2), p.488.

Holmes, E., O'Connor, R., Perry, V., Tracey, I., Wessely, S., Arseneault, L., Ballard, C., Christensen, H., Cohen Silver, R., Everall, I., Ford, T., John, A., Kabir, T., King, K., Madan, I., Michie, S., Przybylski, A., Shafran, R., Sweeney, A., Worthman, C., Yardley, L., Cowan, K., Cope, C., Hotopf, M. and Bullmore, E., (2020). Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *The Lancet Psychiatry*, *7*(6), pp.547-560.

Howards, P.,(2018). An overview of confounding. Part 1: the concept and how to address it. *Acta Obstetricia et Gynecologica Scandinavica*, *97*(4), pp.394-399.

Hummel, S., Oetjen, N., Du, J., Posenato, E., Resende de Almeida, R., Losada, R., Ribeiro, O., Frisardi, V., Hopper, L., Rashid, A., *et al.* (2021). Mental Health Among Medical Professionals During the COVID-19 Pandemic in Eight European Countries: Cross-sectional Survey Study. *Journal of Medical Internet Research*, *23*(1), p.e24983.

Johnston, K., Lakzadeh, P., Donato, B. and Szabo, S.,(2019). Methods of sample size calculation in descriptive retrospective burden of illness studies. *BMC Medical Research Methodology*, *19*(1).

Khanal, P., Devkota, N., Dahal, M., Paudel, K. and Joshi, D. (2020). Mental health impacts among health workers during COVID-19 in a low resource setting: a cross-sectional survey from Nepal. *Globalisation and Health*, *16*(1).

Kowal, M., Coll-Martín, T., Ikizer, G., Rasmussen, J., Eichel, K., Studzińska, A., Koszałkowska, K., *et al.* (2020). Who is the Most Stressed During the COVID-19 Pandemic? Data From 26 Countries and Areas. *Applied Psychology: Health and Well-Being*, *12*(4), pp.946-966.

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z. and Hu, S., 2020. Factors Associated with Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Network Open*, *3*(3), p.e203976.

Lamb, D., Gnanapragasam, S., Greenberg, N., Bhundia, R., Carr, E., Hotopf, M., Razavi, R., Raine, R., Cross, S., Dewar, A., Docherty, M., *et al.* (2021). Psychosocial impact of the COVID-19 pandemic on 4378 UK healthcare workers and ancillary staff: initial baseline data from a cohort study collected during the first wave of the pandemic. *Occupational and Environmental Medicine*, *78*(11), pp.801-808.

Long, H.A., French, D.P. and Brooks, J.M., (2020). Optimising the value of the critical appraisal skills programme (CASP) tool for quality appraisal in

qualitative evidence synthesis. *Research Methods in Medicine & Health Sciences*, *1*(1), pp.31-42.

Lu, W., Wang, H., Lin, Y. and Li, L., (2020). Psychological status of medical workforce during the COVID-19 pandemic: A cross-sectional study. *Psychiatry Research*, *288*, p.112936.

Marziniak, M., Brichetto, G., Feys, P., Meyding-Lamadé, U., Vernon, K. and Meuth, S.G. (2018). The Use of Digital and Remote Communication Technologies as a Tool for Multiple Sclerosis Management: Narrative Review. *JMIR Rehabilitation and Assistive Technologies*, *5*(1), p.e5.

Mrklas, K., Shalaby, R., Hrabok, M., Gusnowski, A., Vuong, W., Surood, S., Urichuk, L., Li, D., Li, X.-M., Greenshaw, A.J. and Agyapong, V.I.O. (2020). COVID-19 pandemic: Prevalence of Perceived Stress, Anxiety, Depression, and Obsessive-Compulsive Symptoms vary among healthcare and non-Healthcare Workers in Alberta (Preprint). *JMIR Mental Health*.

Muller, A.E., Hafstad, E.V., Himmels, J.P.W., Smedslund, G., Flottorp, S., Stensland, S.Ø., Stroobants, S., Van de Velde, S. and Vist, G.E. (2020). The mental health impact of the covid-19 pandemic on healthcare workers, and interventions to help them: A rapid systematic review. *Psychiatry Research*, 293, p.113441.

Neria, YY (2021). *The COVID-19 and Healthcare Workers: An Active Intervention*. [online] clinicaltrials.gov. Available at: https://clinicaltrials.gov/ct2/show/NCT04497415.

Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V., Papoutsi, E. and Katsaounou, P., (2020). Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, Behavior, and Immunity*, *88*, pp.901-907.

Plasse,M., (2020). Psychosocial support for providers working high-risk exposure settings during a pandemic: A critical discussion. *Nursing Inquiry*, *28*(4).

Priede, A., López-Álvarez, I., Carracedo-Sanchidrián, D. and González-Blanch, C., (2021). Mental health interventions for healthcare workers during the first wave of COVID-19 pandemic in Spain. *Revista de Psiquiatría y Salud Mental*, *14*(2), pp.83-89.

Rahi, S. (2017). Research Design and Methods: A Systematic Review of Research Paradigms, Sampling Issues and Instruments Development. *International Journal of Economics & Management Sciences*, *06*(02).

Rahman, A. and Plummer, V., (2020). COVID-19 related suicide among hospital nurses; case study evidence from worldwide media reports. *Psychiatry Research*, *291*, p.113272.

Rajkumar, R.P. (2020). COVID-19 and mental health: A review of the existing literature. *Asian Journal of Psychiatry*, *52*(102066), p.102066.

Remuzzi, A. and Remuzzi, G., (2020). COVID-19 and Italy: what next? *The Lancet*, *395*(10231), pp.1225-1228.

Ryan, G., (2018).Introduction to positivism, interpretivism and critical theory. *Nurse Researcher*, *25*(4), pp.41-49.

Sacred Heart University Library (2011). *Research Guides: Organising Academic Research Papers: Types of Research Designs*.

Selikowitz, A. (2020). *Mental health challenges for healthcare staff during the COVID-19pandemic- Management strategies*. [online] Psych Scene Hub. Available at: https://psychscenehub.com/psychinsights/mental-health-challenges-healthcare-workers-during- covid-19-pandemic-management-strategies/ .

Shankar, P., Davenport, M., Woolen, S., Carlos, R. and Maturen, K., (2018). Survey Research. *Academic Radiology*, *25*(6), pp.751-756.

Sharma, G., (2017). Pros and cons of different sampling techniques. *International Journal of Applied Research*, *3*(7), pp.749-752.

Siddiqui, I., Aurelio, M., Gupta, A., Blythe, J. and Khanji, M., (2021). COVID-19: Causes of anxiety and well-being support needs of healthcare professionals in the UK: A cross-sectional survey. *Clinical Medicine*, *21*(1), pp.66-72.

Sileyew, K.J. (2019). Research Design and Methodology. *Text Mining - Analysis,Programming and Application [Working Title]*. [online] Available at: https://www.intechopen.com/online-first/research-design-and-methodology.

Sirois, F.M. and Owens, J., (2021). Factors associated with psychological distress in healthcare workers during an infectious disease outbreak: A rapid systematic review of the evidence. *Frontiers in psychiatry*, *11*, p.1591.

Skelly, A., Dettori, J. and Brodt, E., (2012). Assessing bias: the importance of considering confounding. *Evidence-Based Spine-Care Journal*, *3*(01), pp.9-12.

Song, L. and Wang, N., (2017). The relationships between researchers and subjects in epidemiological studies. *Zhonghua liu Xing Bing xue za zhi = Zhonghua Liuxingbingxue Zazhi*, *38*(11), pp.1445-1448.

Søvold, L.E., Naslund, J.A., Kousoulis, A.A., Saxena, S., Qoronfleh, M.W., Grobler, C. and Münter, L., (2021). Prioritising the Mental Health and Well-Being of

Healthcare Workers: An Urgent Global Public Health Priority. *Frontiers in public health*, *9*.

Taherdoost, H., (2016). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. *SSRN Electronic Journal*.

Tan, B., Chew, N., Lee, G., Jing, M., Goh, Y., Yeo, L., *et al.* (2020). Psychological Impact of the COVID-19 Pandemic on Health Care Workers in Singapore. *Annals of Internal Medicine*, *173*(4), pp.317-320.

Toit, E.D. (2021). *LibGuides: Library - Information Literacy Module: 6 Search Strategies*. [online] uj.ac.za.libguides.com. Available at: https://uj.ac.za.libguides.com/c.php?g=581225&p=4011505.

Upadhyay, U. and Lipkovich, H., (2020). Using online technologies to improve diversity and inclusion in cognitive interviews with young people. *BMC Medical Research Methodology*, *20*(1).

Uphoff, E., Lombardo, C., Johnston, G., Weeks, L., Rodgers, M., Dawson, S., Seymour, C., Kousoulis, A. and Churchill, R., (2021). Mental health among healthcare workers and other vulnerable groups during the COVID-19 pandemic and other coronavirus outbreaks: A rapid systematic review. *PLOS ONE*, *16*(8), p.e0254821.

Vasileiou, K., Barnett, J., Thorpe, S. and Young, T., (2018). Characterizing and justifying sample size sufficiency in interview-based studies: systematic analysis of qualitative health research over a 15-year period. *BMC Medical Research Methodology*, *18*(1).

Wang, Y., Huang, G., Duke, G. and Yang, Y., (2017). Tai Chi, Yoga, and Qigong as Mind-Body Exercises. *Evidence-Based Complementary and Alternative Medicine*, 2017, pp.1-1.

Wanigasooriya, K., Palimar, P., Naumann, D.N., Ismail, K., Fellows, J.L., Logan, P., Thompson, C.V., Bermingham, H., Beggs, A.D. and Ismail, T. (2020). Mental health symptoms in a cohort of hospital healthcare workers following the first peak of the COVID-19 pandemic in the U.K. *BJPsych Open*, *7*(1).

Yan, J., Kim, S., Zhang, S.X., Foo, M.D., Alvarez-Risco, A., Del-Aguila-Arcentales, S. and Yáñez, J.A. (2021). Hospitality workers' COVID-19 risk perception and depression: A contingent model based on transactional theory of stress model. *International Journal of Hospitality Management*, *95*, p.102935.

Yechiam, E.and Yom-Tov, E.,(2021). Unique Internet Search Strategies of Individuals with Self-Stated Autism: Quantitative Analysis of Search Engine Users' Investigative Behaviors. *Journal of medical Internet research*, *23*(7), p.e23829.

Zhang, W., Wang, K., Yin, L., Zhao, W., Xue, Q., Peng, M., Min, B., Tian, Q., Leng, H., Du, J., Chang, H., Yang, Y., Li, W., Shangguan, F., Yan, T., Dong, H., Han, Y., Wang, Y., Cosci, F. and Wang, H., (2020). Mental Health and Psychosocial Problems of Medical Health Workers during the COVID-19 Epidemic in China. *Psychotherapy and Psychosomatics*, *89*(4), pp.242-250.

CHITKARA

Journal of Multidisciplinary Research in Healthcare

Chitkara University, Saraswati Kendra, SCO 160-161, Sector 9-C, Chandigarh, 160009, India

Volume 8, Issue 1 **October 2021** **ISSN 2393-8536**