Mental Health Concerns of Frontline Workers During the COVID-19 Pandemic: A Scoping Review

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Abstract

Objectives: The current COVID-19 pandemic continues to have a significant impact on the mental health of frontline workers worldwide. Currently there are limited published studies addressing mental health issues in frontline workers. The objective of this scoping review is to examine the range of existing global literature on mental health issues reported in frontline workers during the COVID-19 pandemic and to understand what mitigating factors exist.

Methods: The scoping review was guided by the Levac Colquhoun and O'Brien's adapted version of Arkey and O'Malley's framework. We performed a comprehensive search of three databases, Pubmed, APA PsychINFO, and CINAHL, identifying 684 studies. In total, 16 original studies and 4 letters to editors were included in this review.

Results: Of the original studies, 13 were published in China, and the remaining 3 in Italy, Turkey, and Iraq; all letters to editors were published in China. Sources of stress reported in frontline workers across studies included direct contact with COVID-19 patients, isolation, putting loved ones at risk, facing life and death decision making with COVID-19 patients, uncertainty with COVID-19 disease control, limited personal protective equipment, time spent thinking about COVID-19, limited staff/resources/pay, burnout, and stigma. Mental health symptoms and outcomes reported in frontline workers were fear, stress, anxiety, depression, insomnia, burnout, and psychological distress.

Conclusion: Findings demonstrate the immediate need to increase mental health awareness and resources at an individual and system wide level. Mental health programs need to be catered towards each unique workplace to provide the necessary resources for frontline workers.

Keywords: mental health, frontline workers, healthcare workers, COVID-19, coronavirus, review

1. Introduction

As a result of the novel coronavirus, COVID-19, there continues to be concern over the unparalleled mental health issues that will arise across frontline workers around the world (Sritharan & Sritharan, 2020). The impact from COVID-19 is incomparable to past outbreaks, as this pandemic has taken a toll on the global population with heightened uncertainty and stress (de Girolamo et al., 2020). Although the global number of individuals infected is still increasing, it is expected that the mental health effects will impact more people and last longer than the virus itself (Kang et al., 2020).

There is an immediate need to protect the welfare of the healthcare workforce who are battling the pandemic at the frontlines. It is imperative to protect the mental wellbeing of healthcare workers who are primarily involved in caring for COVID-19 patients, to ensure the longevity of these workers and a healthy workplace (Blake, Bermingham, Johnson, & Tabner, 2020). Healthcare workers are not only at a higher risk of COVID-19 infection than others, but they also face psychological distress related to multiple factors that include isolation from loved ones to avoid potential spread of the virus, increased workload and work hours leading to burnout, shortage of protective resources in the workplace, emotional and physical exhaustion, and increased life and death decision making (Blake et al., 2020; Bansal et al., 2020; Huang & Zhao, 2020; Kang et al., 2020; Zhang et al., 2020a; Lu, Wang, Lin, & Li, 2020; Wang et

al., 2020; Wu, Styra, & Gold, 2020; Gold et al., 2020). Global data on the extent to which healthcare workers are affected mentally by COVID-19 have not been published yet, but it is clear that many of these workers around the world are tremendously impacted by the pandemic (Neto et al., 2020).

Currently, published studies on mental health and frontline workers are primarily originating from Asia and Europe, where the pandemic spread first, followed by very limited studies published in North America. It is anticipated that many studies are in progress to understand the mental health impact, which will only become more apparent in the near future and as peer-reviewed published studies emerge. All published studies are important to review to have an appropriate understanding of emerging mental health issues that will have a global impact.

We conducted a scoping review to examine existing published literature on mental health issues reported in frontline workers during the COVID-19 pandemic. This will provide better understanding on the mental health impact while informing mental health strategies to support frontline workers during and after the pandemic. This review will provide a comprehensive understanding of what current published studies have identified as priority areas of mental health over the course of the pandemic.

2. Methods

2.1 Framework

A scoping review of peer reviewed literature was conducted using Levac Colquhoun and O'Brien's adapted version of Arkey and O'Malley's framework (Levac, Colquhoun, & O'Brien, 2010) to identify articles reporting the mental health impact of COVID-19 on frontline workers during the present pandemic. This framework includes six components to guide the review which are 1) identifying research question, 2) identify relevant studies, 3) study selection, 4) charting the data, 5) collating, summarizing and reporting results and 6) consultation (Levac et al., 2010). The scoping review was reported according to Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).

2.2 Frontline Worker Definition

Frontline workers are those employed in services and functions that are deemed essential in preserving life, health, and basic functioning of society during the COVID-19 pandemic (Government of Canada, 2020). Essential work includes a broad spectrum of occupations, but primarily includes healthcare workers, first responders (ex. police, firefighting), critical infrastructure workers (ex. electricity, transportation), social workers (ex. social services), and food/medicine supplying workers (Government of Canada, 2020). For the purpose of this paper, any occupation that falls under the mentioned list above, and are considered 'essential' or 'frontline' in any published available journals are included.

2.3 Identification of the Research Question

We developed a broad research question for this scoping review asking *what does the published available literature tell us about mental health issues among frontline workers during the COVID-19 pandemic*? The emergence of mental health issues is imperative for frontline workers who are directly involved with COVID-19 patients, but also for other essential workers who may be exposed to COVID-19. Specific questions in our scoping review are:

    A) *What types of mental health concerns are commonly identified among frontline workers during the pandemic?*

    B) *What mitigating factors or methods exist to help improve the mental wellbeing of frontline workers?*

2.4 Eligibility, Information Sources, and Search

Studies published in English, in peer-reviewed journals, providing discussion or data on any frontline workers during the COVID-19 pandemic, and mental health issues experienced by frontline workers were included in the review. The search strategy included a broad selection of study designs and papers including both quantitative and qualitative studies, letters to editors, commentaries, and support papers to collect all available data given that this is a novel topic with limited original studies. Three electronic databases (Pubmed, APA PsychINFO, and CINAHL) were accessed from May 4th to May 30th, 2020 to identify studies meeting the inclusion criteria. Date of publication was restricted from January 1, 2020 to December 31, 2020 to capture the time frame of the pandemic. The databases were searched using a combination of free-text terms, provided in Supplementary Table 1, Appendix. Free-text terms were expanded and combined using boolean operators using MeSH terms and keywords. We also reviewed reference lists of included papers to ensure we did not miss any relevant original studies or literature.

2.5 Selection of Studies

Initial screening of relevant including abstracts titles were reviewed by JS and TJ independently and included in full-text review if they met all of the following criteria; 1) original mental health discussion of frontline workers during

COVID-19, 2) published in English and 3) published in peer-reviewed journals. Articles were excluded from the scoping review if they were duplicate articles already included, review articles, did not discuss the mental health impact of the present pandemic on frontline workers, lacked original data, or had no full text access. Any disagreements between two independent reviewers were resolved through consensus.

2.6 Data Charting Process and Data Items

A data charting form was created in Microsoft Excel to report the first author, year of publication, location of study, type of study, occupation of frontline workers, sample size, and mental health variables (symptoms, sources of stress, risk factors and outcomes). The data charting form was reviewed and revised as the search strategy and inclusion criteria was refined. Specific evidence in key content areas around mental health experience and outcomes among frontline workers during COVID-19 was extracted and summarized. Strengths and gaps in the current literature related to the research question were presented, followed by recommendations for future research and policies related to the protection and care of frontline workers during this pandemic.

2.7 Summarizing and Reporting of Results

Quantitative studies including prospective, and cross-sectional studies discussing mental health impact among frontline workers during COVID-19 were categorized into the following areas; 1) risk factors (demographic and occupational) and sources of stress, 2) symptoms and mental health outcomes, and 3) mental health service access and interventions (if applicable). Commentaries, letters to editors and support papers reporting prospective or retrospective data directly related to the experience of frontline workers during COVID-19 and the impact on their mental health were analyzed using thematic analysis to identify the deeper experience of frontline workers during this pandemic and to inform mental health policies and interventions for frontline workers during COVID-19.

3. Results

3.1 Selection of Sources of Evidence

A total of 684 articles were identified across all electronic databases using the search strategy summarized in Supplementary Table 1, Appendix. Two independent reviewers (JS and TJ) screened titles and abstracts of all studies independently resulting in the exclusion of duplicate studies and those that did not meet the inclusion criteria (n=634 studies). As a result, 50 studies were assessed as full-text for eligibility by JS and TJ. Only papers that focused on the direct mental health impact of COVID-19 on frontline workers were included in the scoping review to ensure an accurate picture of the mental health issues surrounding frontline workers during COVID-19. As such 20 articles were retained which included 16 original articles and 4 other types of articles (commentaries, letters to editors and support papers) (Figure 1).
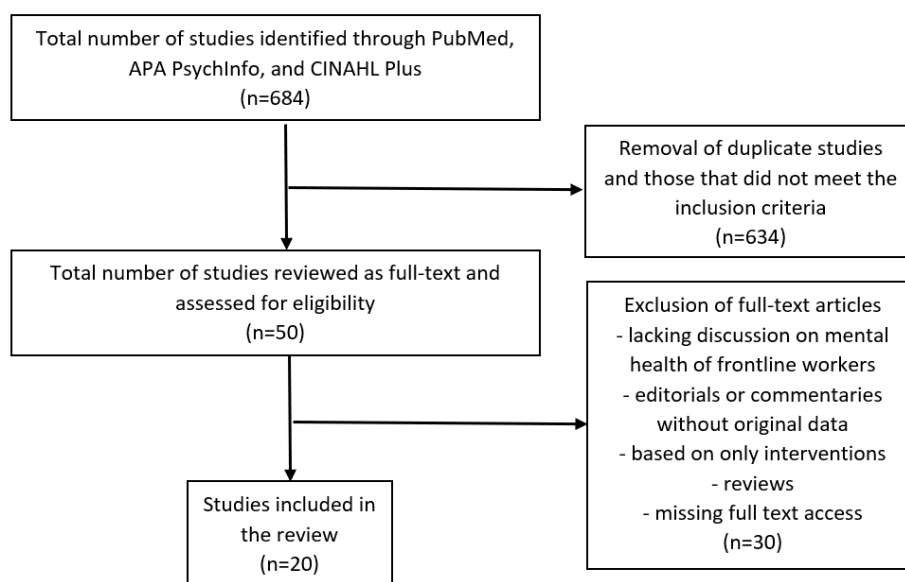

Figure 1. Flow diagram presenting the breakdown of the number of studies identified, reviewed, and included in the scoping review, resulting in the inclusion of 20 studies

3.2 Characteristics of Included Studies

Study design details, participants and mental health outcomes of interest for 16 included original articles are reported in Table 1. General study details of included letters to editors are also summarized in Table 1. Among the 16 original articles, almost all the studies were prospective cross-sectional surveys (93.7%) using online questionnaires, and one study (6.3%) was an interview study. Geographically, most of the studies were conducted in China (81.3%) and remaining 3 studies were done in Italy, Iraq and Turkey. The study sample size ranged from 20 to 7236 frontline workers all of which were healthcare workers in a hospital or healthcare facility. A total of 12 studies assessed the mental health impact across multiple broad healthcare workers which included doctors, nurses, administrative or other medical staff while two studies reported only on nurses and two on only doctors (Table 1). Among the four other types of articles, all articles were letters to the editor reporting a short prospective quantitative study on mental health of healthcare workers during COVID-19 in China. Letters to the editors discussed healthcare workers in general, and surgical staff.

Table 1. Descriptions of the 16 included original studies and 4 letters to editors in the scoping review, all published in 2020.

Original Articles

First Author, Year	Location of Study	Occupation	Sample Size	Study Design	Method of Data Collection	Mental Health Risk Factors and Outcomes Collected
Abdulah, 2020	Iraq	Doctors	268	Cross-sectional	Online questionnaire	Demographic information, stress, insomnia
Barello, 2020	Italy	Doctors, nurses, other health professionals	1, 153	Cross-sectional	Online questionnaire	Demographic information, psychological stress, sleep quality, physical health, emotional exhaustion
Elbay, 2020	Turkey	Doctors	442	Cross-sectional	Online questionnaire	Demographic information, anxiety, depression, stress
Huang, 2020	China	Doctors, nurses, administrative staff	7, 236	Cross-sectional	Online questionnaire	Demographic information, depression, anxiety, sleep quality
Kang, 2020	China	Doctors, nurses	994	Cross-sectional	Online questionnaire	Demographic information, mental health assessment, exposure to COVID-19, mental healthcare services accessed, psychological needs
Lai, 2020	China	Doctors, nurses	1, 257	Cross-sectional	Online questionnaire	Demographic information, exposure to COVID-19, depression, anxiety, insomnia, psychological distress
Liu, 2020	China	Healthcare workers	512	Cross-sectional	Online questionnaire	Demographic information, anxiety
Lu, 2020	China	Doctors, nurses, administrative staff	2, 299	Cross-sectional	Online questionnaire	Demographic information, exposure to COVID-19, fear, depression, anxiety
Mo, 2020	China	Nurses	210	Cross-sectional	Online questionnaire	Demographic information, stress, anxiety
Qi, 2020	China	Healthcare workers	801	Cross-sectional	Online questionnaire	Demographic information, anxiety, insomnia
Sun, 2020	China	Nurses	20	Phenomenological approach (qualitative)	Interviews (face to face, telephone)	Psychological experience
Wang, 2020	China	Doctors, nurses	123	Cross-sectional	Online questionnaire	Demographic information, sleep, psychological distress
Wu, 2020	China	Medical staff	2, 210	Cross-sectional	Online questionnaire	Psychological status
Xiao, 2020	China	Healthcare workers	958	Cross-sectional	Online questionnaire	Demographic information, anxiety, depression

First Author, Year	Location of Study	Occupation	Sample Size	Study Design	Method of Data Collection	Mental Health Risk Factors and Outcomes Collected
Zhang, 2020a	China	Doctors, nurses, administrative staff, other medical staff	1, 563	Cross-sectional	Online questionnaire	Demographic information, COVID19 exposure, insomnia, anxiety, depression
Zhou, 2020	China	Doctors, nurses	1, 001	Cross-sectional	Online questionnaire	Depression, anxiety, insomnia, psychological distress

Letter to Editor Articles

First Author, Year	Location of Study	Occupation	Sample Size	Study Design	Method of Data Collection	Mental Health Risk Factors and Outcomes Collected
Du, 2020	China	Healthcare workers	134	Cross-sectional	Online questionnaire	Demographic information, COVID-19 exposure, access to medical and psychological supplies, self-efficacy, sleep, stress, depression, anxiety
Li, 2020	China	Medical staff	948	Cross-sectional	Online questionnaire	Demographic information, insomnia, psychological status
Xu, 2020	China	Surgical staff	120	Prospective cohort	Anxiety and depression scales	Demographic information, anxiety, depression
Zhang, 2020b	China	Healthcare workers	304	Mixed methods	Interviews, questionnaire	Demographic information, access to PPE, exposure to COVID-19, Physical health, anxiety, depression, psychological distress, job satisfaction

3.3 Summary of Findings

Included studies were categorized into 3 categories; 1) risk factors and sources of stress, 2) symptoms and mental health outcomes, and 3) mental health service access and interventions. All 20 studies discuss at least one source of stress or risk factor reported by frontline workers along with mental health symptoms and outcomes during the COVID-19 pandemic. Only one study discusses mental health services accessed.

In this review, few studies reported demographic risk factors associated with increased risk of mental health issues in frontline healthcare workers. One study reported lower education being associated with increased insomnia and another reporting increased insomnia among females than males (Zhang et al., 2020a; Abdulah & Musa, 2020). Females also reported higher depression, anxiety, and emotional exhaustion than males across two studies (Xiao et al., 2020b; Barello, Palamenghi, & Graffigna, 2020). Zhang et al. (2020a) explored insomnia symptoms among medical staff identifying multiple risk factors such as low educational level, isolation, worry and fear of being infected with COVID-19, lack of psychological support from media or news outlets regarding the outbreak, and uncertainty surrounding appropriate COVID-19 disease control (Zhang et al., 2020a). With respect to occupation two studies reported nurses at higher risk of experiencing mental health issues than physicians (Zhang et al., 2020a; Barello et al., 2020). Exposure to COVID-19 patients was a major source of stress reported among 14 studies followed by being in isolation and quarantine from loved ones in 6 studies. Key sources of stress reported by frontline workers during the COVID-19 pandemic reported in included studies are shown in Table 2.

Table 2. Sources of stress related to frontline workers during the COVID-19 pandemic reported in the 20 included studies in the scoping review

Sources of Stress	Original Studies (OS) and Editorials (E)
Direct contact with COVID-19 infected patients (confirmed/symptomatic and asymptomatic cases)	OS: Abdulah et al., 2020; Barello et al., 2020; Elbay et al., 2020; Huang et al., 2020; Kang et al., 2020; Lai et al., 2020; Lu et al., 2020; Sun et al., 2020; Wang et al., 2020; Wu W et al., 2020, Liu et al. 2020, Xiao et al., 2020b
	E: Du et al., 2020; Li et al., 2020; Xu et al.
Isolation or quarantine especially from loved ones	OS: Huang et al., 2020; Kang et al., 2020; Lai et al., 2020; Lu et al., 2020; Zhang et al., 2020a
	E: Li et al., 2020
Putting loved ones at risk of infection or knowledge of loved ones being infected	OS: Kang et al., 2020; Lu et al., 2020; Sun et al., 2020
	E: Du et al., 2020
Facing life and death decision making around critical COVID-19 patients	OS: Lu et al., 2020; Wu W et al., 2020
Uncertainty around COVID-19 disease control in the workplace/community	OS: Sun et al., 2020; Zhang et al., 2020a
Shortage or limited personal protective equipment	OS: Lu et al., 2020; Mo et al., 2020, Xiao et al. 2020b
	E: Zhang et al., 2020b
Time spend focusing or thinking about COVID-19 due to occupation	OS: Huang et al., 2020
Increased burnout/stress, staff or resource shortages/low pay	OS: Elbay et al., 2020; Mo et al., 2020; Sun et al., 2020,
	E: Du et al., 2020; Li et al., 2020
Stigma related social rejection and prejudice due to high risk occupation	OS: Lu et al., 2020

Depression, anxiety, and sleep quality/insomnia were the three most common reported mental health symptoms experienced by frontline healthcare workers, followed by stress and fear. Three studies reported overall scores of anxiety and depression but did not report overall rates of these symptoms among frontline workers (Kang et al., 2020, Wu et al., 2020, Xu et al., 2020). A cross-sectional study identified that one in four healthcare workers reported sleep issues more than those in other occupations (Huang & Zhao, 2020). This finding was attributed to

the increased work intensity and time, resulting in increased chronic stress and psychological distress (Huang & Zhao, 2020). Sleep disturbance was also prevalent in healthcare workers in other included cross-sectional studies (Wang et al., 2020; Wu et al., 2020), associated with increased depression and exposure to COVID-19 patients (Wang et al., 2020). The percent of negative mental health symptoms and outcomes experienced by frontline workers during the COVID-19 pandemic across included studies is shown in Table 3. Mental health services and resources accessed by frontline workers reported in one study by Kang et al. (2020) (Table 1) included non-specific psychological materials and resources and counselling or psychotherapy. No other details of mental health service access and resources were discussed in any of the remaining 19 articles.

One qualitative study on nurses in China was included, which reported nurses experienced increased negative emotions in the early stage of the pandemic, as the workload increased with the number of infected patients increasing (Sun et al., 2020). This was followed by the nurses using coping mechanisms such as distraction, humour, isolation to actively attempt to self-care (Sun et al., 2020). They also experienced support from loved ones, colleagues, and members of the society which helped to mediate stress and increase positive emotions. The nurses felt positive emotions alongside the negative emotions, improving their confidence, especially with increased training and practice as the pandemic continued (Sun et al., 2020). Another cross-sectional study in China identified that mental health, psychological distress, and sleep quality substantially improved in healthcare workers in the late stage of the outbreak (Zhou et al., 2020). The study attributed the improvement to effective psychosocial measures that were implemented.

Table 3. Negative mental health symptoms and outcomes among frontline workers during the COVID-19 pandemic reported in included studies in the scoping review

Mental Health Symptoms and Outcomes	Study (First Author, Year)	Occupation	Percentage of Participants Reporting Symptoms and Outcomes (%)
Fear	Lu et al, 2020	Medical Staff	70.6
	Sun et al, 2020	Administrative Staff	58.4
		Nurses	100.0
Stress	Abdulah et al, 2020	Doctors	93.7
	Du et al, 2020	Healthcare workers	59.0
	Elbay et al, 2020	Healthcare workers	41.2
	Mo et al, 2020	Nurses	100.0
	Zhang et al, 2020	Medical Staff	73.4
	Zhou et al, 2020	Healthcare workers	27.5
Anxiety	Du et al, 2020	Healthcare workers	20.1
	Elbay et al, 2020	Healthcare workers	51.6
	Huang et al, 2020	Healthcare workers	35.6
	Lai et al, 2020	Healthcare workers	44.6
	Liu et al, 2020	Healthcare workers	12.5
	Lu et al, 2020	Medical Staff	25.5
		Administrative staff	18.7
	Sun et al, 2020	Nurses	75.0
	Wang et al, 2020	Healthcare workers	18.3
	Xiao et al, 2020	Healthcare workers	54.1
	Zhang et al, 2020	Medical staff	44.7
	Zhang SX et al, 2020	Healthcare workers	28.0

Depression	Du et al, 2020	Healthcare workers	12.7
	Elbay et al, 2020	Healthcare workers	64.7
	Huang et al, 2020	Healthcare workers	19.8
	Lai et al, 2020	Healthcare workers	50.4
	Lu et al, 2020	Medical staff	12.1
		Administrative staff	8.2
	Wang et al, 2020	Healthcare workers	57.9
	Xiao et al, 2020	Healthcare workers	57.3
	Zhang et al, 2020	Medical staff	50.7
	Zhang SX et al, 2020	Healthcare workers	30.6
Insomnia/Decreased Sleep	Abdulah et al, 2020	Doctors	68.3
	Barello et al, 2020	Healthcare workers	55.3
	Elbay et al, 2020	Healthcare workers	78.4
	Huang et al, 2020	Healthcare workers	23.6
	Lai et al, 2020	Healthcare workers	34.0
	Li et al, 2020	Medical Staff	32.8
	Wang et al, 2020	Healthcare workers	38.0
	Zhang et al, 2020	Medical staff	36.1
	Zhou et al, 2020	Healthcare workers	16.8
Psychological Distress	Lai et al, 2020	Healthcare workers	71.5
	Zhang SX et al, 2020	Healthcare workers	20.1

Wu, 2020; Kang, 2020; Xu, 2020 did not report percentage of healthcare worker participants reporting these specific mental health symptoms and outcomes

4. Discussion

This is one of the very few reviews addressing mental health issues among frontline workers during the COVID-19 pandemic. All included studies reported on healthcare workers, specifically doctors, nurses, and medical/hospital staff. It is important to mention that there are other health related frontline workers such as personal support workers, auxiliary staff (ex. custodians, housekeeping), mental healthcare workers, respiratory therapists, and paramedics. Although findings are primarily from China, a better understanding of healthcare workers' mental health during the pandemic is important as the number of cases continue to increase in Europe and North America. This review of current literature could drive and inform research and policies during these unprecedented times.

Among mental health symptoms of depression and anxiety, sleep disturbances and insomnia were commonly reported among healthcare workers (Huang & Zhao, 2020; Wang et al., 2020; Wu et al., 2020). Sleep issues were also exacerbated by exposure to COVID-19 and increased reports of depression and anxiety suggesting a cumulative effect of mental health issues (Wang et al., 2020). Having a low educational level or being female was also associated with increased insomnia (Zhang et al., 2020a; Abdulah & Musa, 2020; Barello et al., 2020). Socioeconomic stressors, specifically lower education or income levels, are linked to adverse mental health outcomes (Gold et al., 2020). Sleep quality is also influenced by self-efficacy, which provides a positive mental state helping medical staff cope in their high-intensity work (Xiao et al., 2020a). For instance, it is common practice for nurses to work in shifts, however during the pandemic many healthcare workers, including nurses, were and are continuing to work overtime or excessive hours (Zhang et al., 2020a; Xiao et al., 2020a). The increased workload and work hours, essentially burnout, impacts the sleep patterns of workers, which can lead to adverse long-term effects on their sleep patterns. Increased disturbance on sleep patterns can lead to prolonged insomnia, disrupting the circadian rhythm and ultimately having long term effects on the health of these workers (Zhang et al., 2020a; Xiao et al., 2020a).

Healthcare worker wellness is also significantly linked to stress and burnout in the workplace (Barello et al., 2020). This can lead to increased errors or malpractice, and may lead to increased alcohol and drug use, suicide, and divorce (Bansal et al., 2020; Gold et al., 2020). This can also be compounded by pre-existing mental health disorders (Gold et al., 2020). Another contributing factor are the changing personal protective equipment recommendations and unclear standards directed at healthcare workers over the course of this pandemic (Zhang et al., 2020b; Bansal et al., 2020). This can cause increased depression, stress, and anxiety based on uncertainty and confusion during the outbreak (Zhang et al., 2020b).

Stigma is another major aspect affecting the mental health of healthcare workers. Stigma is related to social rejection, prejudice, and the fear that workers may be infected because of their close contact with infected patients (Park, Lee, Park, & Choi, 2018; Lu et al., 2020). This can lead to increased stress and eventually a decline in mental health. Looking at the past SARS and MERS outbreaks, there is evidence that hospital staff who worked directly with these patients demonstrated an increased risk of post-traumatic stress disorder (PTSD) after the outbreaks had passed (Min Lee, Kang, Cho, Kim, & Park, 2018).

All healthcare workers need to be protected and supported during this time, especially nursing staff, to avoid a mental health spillover causing a secondary pandemic of mental distress (Choi, Heilemann, Fauer, & Mead, 2020). Aside from primarily treating COVID-19 patients, these workers are also at risk of increased mental health issues stemming from the shortage of personal protective equipment, patients not knowing or not being forthcoming about their COVID-19 diagnosis, fear of bringing the virus home to loved ones, and the struggles with facing critical patients where life and death decisions need to be made (Lu et al., 2020; Mo et al., 2020; Gold et al., 2020). These stressful situations are internalized by healthcare workers leading to increased anxiety and depression symptoms. In Italy, over 15,000 health personnel were infected as of mid-April, with 127 physicians succumbing to the virus after treating COVID-19 patients (de Girolamo et al., 2020). Healthcare workers in Italy were infected twice as high as healthcare workers in China, and it is not clear why. An important lesson from Italy was the focus that is needed on healthcare staff working directly with COVID-19 patients (de Girolamo et al., 2020).

4.1 Home Care Workers

An important occupational group that is often overlooked are home care workers. These workers are employed in long term homes or participation homes that primarily look after the elderly and adults who require assisted living. Long term care facilities are predominately made up of unregulated healthcare workers such as personal support workers and care aids (Estabrooks, Squires, Carleton, Cummings, & Norton, 2015). The remaining home care workforce is made up of nursing staff, including registered nurses (RNs) and licensed practical nurses (LPNs) (Squires et al., 2019). Although nurses working in hospital settings have been shown to have a higher risk for health problems compared to nurses in other health settings (Hoben et al., 2017), this is quite different during the pandemic. Given the increase of COVID-19 in long term care facilities home care workers are continuously exposed to patients with COVID-19 and stress related to the severity of COVID-19 in the elderly. In North America, there were many COVID-19 outbreaks reported across long term care facilities making it clear that pandemic planning and infection control were not implemented quickly enough.

A recent study in 2019 reported younger nurses (both RNs and LPNs) to have significantly poorer mental health and burnout-emotional compared to older nurses and may be attributed to older nurses having higher seniority and more control over shift choices (Squires et al., 2019). It was also reported that LPNs were more likely to take on nursing activities that were beyond their scope of practice which often leads to increased burnout (Squires et al., 2019). Another study in 2015 identified that care aid workers reported higher levels of job efficacy, while also reporting higher levels of burnout. These workers were more likely to have been born outside of Canada with English not being their first language (Estabrooks et al., 2015). Given that many of the personal support and care aid workers are unregulated, there is a continued lack of information on the characteristics of these workers (Estabrooks et al., 2015). To our knowledge there are currently no published studies on the mental health issues faced by home care workers during the course of the pandemic. Other concerns among these workers during the pandemic include low pay, extreme staffing shortages, employment at multiple homes increasing risk of infection and infection spread, residents leaving for outside appointments, and a lack of personal protective equipment (Victorian Order of Nurses for Canada (VON Canada), 2020). Shortcomings of healthcare systems, like in Canada, were identified through this pandemic, specifically in that the primary focus are hospitals rather than other facilities like long term care homes (Registered Nurses' Association of Ontario (RNAO), 2020).

4.2 Other Frontline Workers

Other essential workers in the frontlines include those employed in protective services often referred to as first responders (ex. police, firefighters), supply of food/medicine such as grocery or retail, critical infrastructure (ex.

transportation), emergency shelters, supportive housing, social services, correctional institutions, and youth justice facilities. The mental health issues concerning these workers should also be investigated to ultimately protect the mental health of these workers during this pandemic, and for future outbreaks.

4.3 Recommendations: Mitigating Factors for Mental Health Issues

Mitigating methods addressed by various governments include increasing the number of healthcare staff to reduce the workload of existing healthcare staff, establishing psychological intervention teams to provide psychological services, and providing services through counseling, psychotherapy, and brochures (Kang et al., 2020; Zhou et al., 2020). Individual mental health targeted interventions are also being used to provide immediate access to support groups, and online or phone counselling. This can ultimately reduce stress and burnout among workers and help to strengthen the healthcare workforce (Bansal et al., 2020; Harrad & Francesco, 2018).

Self-care is also often recognized as a key mitigating factor in mental health burden influenced by sleep, exercise, and diet (Gold et al., 2020). However, given the dire circumstances of the pandemic, self-care is challenging for frontline workers to achieve (Gold et al., 2020). There are also multiple community efforts towards improving the wellness of frontline workers, such as thanking workers through social media, while many businesses are offering free services for frontline workers (ex. free meals) (Bansal et al., 2020). Some countries have provided financial assistance or increased pay, free child care, and additional family services to ease financial or child care burden (Bansal et al., 2020; Gold et al., 2020). Social media can also be beneficial for frontline workers helping them connect with loved ones and other professionals and gain up to date best practice information (Bansal et al., 2020). Social support is an important mitigating factor, however this can be difficult for healthcare workers who often work long hours, neglect social relationships, or are in fear of possibly infecting others (Blake et al., 2020; Mo et al., 2020; Wu et al., 2020).

There is an important need for system-level changes to reach a larger number of affected workers (Wu et al., 2020). Changes include strict health and safety hospital policies, adequate resources including replenished personal protective equipment (Wu et al., 2020), increased pay, increased food and supplies. When examining home care facilities in particular, the Registered Nurses' Association of Ontario (RNAO) have recently provided a comprehensive framework to guide the healthcare system through COVID-19. The framework provides recommendations for establishing person-centered focus for disease prevention and health promotion, expanding primary care teams, integrating nursing and retirement homes into enhanced community care plans and funding, utilizing evidence-based practice, improving access and person-centered care through digital health technologies (RNAO, 2020). There is also a need for rigorous annual inspections for workplace health and safety across long term care facilities. Disease protocols and coping mechanisms need to be adapted for long term care facilities, with appropriate education and training for workers (Harrad & Francesco, 2018). The development of a free and accessible digital intervention which encompasses digital learning packages to provide evidence-based support for health care workers may also be valuable (Blake et al., 2020). The digital intervention focuses on normalizing psychological responses during a public health crisis, and promoting help-seeking behaviour and self-care. (Blake et al., 2020). Lastly, there is a need for universal testing protocols for all frontline workers, not just hospital-based workers.

4.4 Limitations & Strengths

There are several limitations that are expected with a scoping review, specifically that there are currently limited studies on the mental health impact among frontline workers during the COVID-19 pandemic. The studies included in this review include very recent data originating mostly from China. Both original articles and letters to the editors were included to provide a wider range of data and to encompass a better understanding of the mental health impact in frontline workers. A majority of included original studies were of cross-sectional design, representative of data captured at only one point in time and not as a longitudinal approach. However, these studies provide findings that are comparable and consistent with one another. Studies included were not assessed for bias, it is expected that bias may exist across included studies. We also aimed to avoid selection bias by identifying and reviewing all available published data on the topic.

This scoping review is valuable as we reviewed a novel topic with very recent literature. The results of this review provide useful insights for mental health awareness and intervention related to the COVID-19 pandemic, an unprecedented time in history. Review of current studies provides better understanding of common mental health themes reported by frontline workers which can lead to better mental health evaluation and intervention. There is opportunity for healthcare systems to plan, mobilize, and develop new resources and interventions to address the major mental health challenges stemming from COVID-19 (Choi et al., 2020). This will require hospitals, healthcare workers, and mental health systems to work together effectively to intervene across different

occupations. Creating specific programs that are catered towards each unique workplace, with mitigating factors in mind, will provide the necessary resources for frontline workers.

5. Conclusion

In conclusion, mental health is important for maintaining a healthy and sustainable frontline workforce, especially across the healthcare system. By understanding the common mental health issues experienced by frontline workers, the mental wellbeing of these workers can be improved and we can be better prepared for future public health crises.

Author Contributions

All authors (JS, TJ, DV, AS) were involved and contributed to the study conception and design. The literature search and data synthesis were performed by JS and TJ. All authors (JS, TJ, DV, AS) contributed to the interpretation of the data, drafting and critically revising the manuscript. All authors (JS, TJ, DV, AS) have read and approved the final manuscript.

Competing Interests Statement

The authors declare that they have no conflict of interest.

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Supplementary Table 1. List of search strategies used to identify all included studies in the scoping review, 2020.

Search engine	Date of Search	Search Words	Number of studies Retrieved	Number of studies excluded*	Number of Unique Studies Reviewed
PubMed	4-May-20	(((mental health[Title/Abstract]) AND frontline[Title/Abstract]) AND coronavirus[Title/Abstract]) OR COVID-19 [Title/Abstract])	6	1	5
PubMed	4-May-20	(((mental health[Title/Abstract]) AND front line [Title/Abstract]) AND COVID-19[Title/Abstract])	4	4	0
PubMed	4-May-20	(((psychological distress[Title/Abstract]) AND frontline[Title/Abstract]) AND coronavirus[Title/Abstract])	2	2	0
PubMed	4-May-20	(((mental health[Title/Abstract]) AND nurse[Title/Abstract]) AND coronavirus[Title/Abstract]) OR COVID-19 [Title/Abstract])	5	0	5
PubMed	4-May-20	((mental health[Title/Abstract]) AND nurses[Title/Abstract]) AND coronavirus[Title/Abstract]	7	5	2
PubMed	4-May-20	(((mental health[Title/Abstract]) AND physician[Title/Abstract]) AND coronavirus[Title/Abstract])	0	0	0
PubMed	4-May-20	(((mental health[Title/Abstract]) AND medical staff[Title/Abstract]) AND coronavirus[Title/Abstract])	5	1	4
PubMed	4-May-20	(((mental health[Title/Abstract]) AND hospital staff[Title/Abstract]) AND coronavirus[Title/Abstract])))	2	1	1
PubMed	4-May-20	(((mental health[Title/Abstract]) AND personal support worker[Title/Abstract]) AND coronavirus[Title/Abstract])	0	0	0
PubMed	4-May-20	(((mental health[Title/Abstract]) AND first responder[Title/Abstract]) AND coronavirus[Title/Abstract])))	0	0	0
PubMed	4-May-20	(((mental health[Title/Abstract]) AND firefighter[Title/Abstract]) AND coronavirus[Title/Abstract])))	0	0	0
PubMed	4-May-20	(((mental health[Title/Abstract]) AND police[Title/Abstract]) AND coronavirus[Title/Abstract])))	0	0	0
PubMed	4-May-20	(((mental health[Title/Abstract]) AND protective services[Title/Abstract]) AND coronavirus[Title/Abstract])))	0	0	0
PubMed	4-May-20	(((mental health[Title/Abstract]) AND occupation[Title/Abstract]) AND coronavirus[Title/Abstract])))	1	1	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(frontline worker) AND ab(coronavirus) found 0 results.	0	0	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(frontline) AND ab(coronavirus) found 0 results.	0	0	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(nurse) AND ab(coronavirus)	1	1	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(medical staff) AND ab(coronavirus)	1	1	0

APA PsycInfo	4-May-20	ab(mental health) AND ab(hospital staff) AND ab(coronavirus)	0	0	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(physician) AND ab(coronavirus)	0	0	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(personal support worker) AND ab(coronavirus)	0	0	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(first responder) AND ab(coronavirus)	0	0	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(protective services) AND ab(coronavirus)	0	0	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(police) AND ab(coronavirus)	0	0	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(firefighter) AND ab(coronavirus)	0	0	0
APA PsycInfo	4-May-20	ab(mental health) AND ab(occupation) AND ab(coronavirus)	2	1	1
CINAHL Plus	4-May-20	AB mental health AND AB front line AND AB coronavirus	1	0	1
CINAHL Plus	4-May-20	AB mental health AND AB frontline AND AB coronavirus	2	2	0
CINAHL Plus	4-May-20	AB mental health AND AB nurse AND AB coronavirus	2	2	0
CINAHL Plus	4-May-20	AB mental health AND AB nurses AND AB coronavirus	2	2	0
CINAHL Plus	4-May-20	AB mental health AND AB medical staff AND AB coronavirus	0	0	0
CINAHL Plus	4-May-20	AB mental health AND AB hospital staff AND AB coronavirus	0	0	0
CINAHL Plus	4-May-20	AB mental health AND AB physician AND AB coronavirus	1	1	0
CINAHL Plus	4-May-20	AB mental health AND AB personal support worker AND AB coronavirus	0	0	0
CINAHL Plus	4-May-20	AB mental health AND AB first responders or firefighters or paramedics or police or emergency services or ems AND AB coronavirus	0	0	0
CINAHL Plus	4-May-20	AB mental health AND AB protective services AND AB coronavirus	0	0	0
CINAHL Plus	4-May-20	AB mental health AND AB police AND AB coronavirus	0	0	0
CINAHL Plus	4-May-20	AB mental health AND AB firefighter AND AB coronavirus	0	0	0
CINAHL Plus	4-May-20	AB mental health AND AB occupation AND AB coronavirus	0	0	0
Pubmed	14-May-20	(((((((((((((((((((((((((((healthcare) OR healthcare worker) OR physician) OR primary care) OR doctor) OR nurse) OR doctors) OR nurses) OR frontline) OR front line worker) OR primary care physician) OR hospital staff) OR medical system) OR healthcare staff) OR cleaners) OR front-line staff) OR frontline staff) OR paramedic) OR paramedics) OR health specialist) OR respiratory therapist) OR therapist) OR firefighter) OR police) OR first responder)) AND (((((COVID-19) OR covid-19) OR coronavirus) OR "severe acute respiratory syndrome coronavirus 2") OR "SARS-CoV-2")) AND ("2020/01/01"[PDat] : "2020/12/31"[PDat]))) AND mental health	148	118	30

APA PsycInfo	28-May-20	healthcare OR (healthcare worker) OR physician OR doctor OR nurse OR (hospital staff) OR (medical staff) AND COVID-19 OR coronavirus AND (mental health) [restricted to publications past may 14, 2020]	170	170	0
Pubmed	29-May-20	(((((((((((((((((((((((((healthcare) OR healthcare worker) OR physician) OR primary care) OR doctor) OR nurse) OR doctors) OR nurses) OR frontline) OR front line worker) OR primary care physician) OR hospital staff) OR medical system) OR healthcare staff) OR cleaners) OR front-line staff) OR frontline staff) OR paramedic) OR paramedics) OR health specialist) OR respiratory therapist) OR therapist) OR firefighter) OR police) OR first responder)) AND (((((COVID-19) OR covid-19) OR coronavirus) OR "severe acute respiratory syndrome coronavirus 2") OR "SARS-CoV-2")) AND ("2020/01/01"[PDat] : "2020/12/31"[PDat]))) AND mental health	328	322	6
TOTAL			**684**	**634**	**50**

Studies excluded if they did not meet the inclusion criteria or were duplicates of already included studies.

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