

The Mental Health of Frontline Healthcare Providers During Pandemics: A Rapid Review of the Literature

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Highlights

- Most, if not all, health providers responding to COVID-19 will experience some level of adverse psychological outcomes, but only a significantly smaller subset will require referral to specialized mental health services.
- The evidence indicates that a stepped-care mental health response of healthcare leadership, psychotherapeutic intervention, and referral to specialized care will properly allocate mental health resources and treatment to best support healthcare workers with adverse psychological outcomes during and beyond the COVID-19 pandemic.
- There is an urgent need to develop and assess evidence-based mental health interventions to better serve healthcare workers both during and following pandemics.

Abstract

Objective: This rapid review addresses two key questions posed by COVID-19: 1) What are the anticipated mental health sequelae for frontline health workers?; 2) What evidence do we have about best practices to address these mental health needs? Methods: This review provides a synthesis of the literature on the mental health sequelae for health workers during major pandemics and epidemics that began in the 21st century (SARS, MERS, Ebola, and Swine Flu) and interventions used to address the related mental health. PubMed, MEDLINE, and PsycINFO were searched using a combination of terms related to pandemics (eg, “pandemic” and “swine flu”) and psychological outcomes (eg, “psych” and “anxiety”). Results: Of 3876 papers found, 94 are included in this review. Most health workers across studies exhibited some level of adverse psychological outcomes during outbreaks, with stress and anxiety symptoms most common. Psychological distress decreased over time; some studies report long-lasting outcomes of insomnia, burnout, and post-traumatic stress up to three years after the pandemic for a subset of individuals. Few interventions have been implemented to address providers’ mental health needs, and these strategies have not been evaluated systematically. Conclusions: Systems-level interventions may address distress for most providers without the need for specialized mental health intervention. Psychotherapeutic support and referral to specialty care should be available to health workers with severe and intense adverse psychological outcomes during and beyond the COVID-19 pandemic. There is an urgent need to develop and assess evidence-based interventions to better serve health workers both during and following pandemics.

Introduction

The COVID-19 pandemic has triggered abrupt and extreme changes and challenges in the delivery of health services. Frontline health workers responding to this pandemic are encountering many sources of stress, and emerging evidence indicates that COVID-19 has already taken a toll on frontline providers' mental health. In China, frontline health workers engaged in direct care of patients with COVID-19 had higher rates of depression, insomnia, and distress (1). In Wuhan specifically, health workers were twice as likely to suffer anxiety and depression than administrative staff (2). Irrespective of a pandemic, psychological distress of health workers is associated with poor quality care and reduced safety for patients (3). Health crises are associated with burnout and increased likelihood of providers choosing to leave the healthcare profession (4). Together, these data underscore the essential priority of mental health needs of COVID-19 health workers.

Despite an abundance of research linking provider mental health with emergencies in general, research specific to pandemics is limited. Unlike other emergency situations, pandemics and epidemics are unique in their biological threat to health, often with no immediate treatment or cure. As opposed to other types of emergency contexts, these health threats can run a protracted course with high degree of uncertainty about progression or suppression of the illness.

To date, there has been no systematic review of the literature to provide summary information regarding unique mental health factors and needs of health workers during major pandemic and epidemic outbreaks, nor on interventions that are targeted to this context and population. This report represents the first such review of the literature. In response to a need to quickly inform

policymakers and practitioners during the COVID-19 pandemic, we used a rapid review process to assess health worker mental health during four past pandemics and epidemics: Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), Ebola, and Swine Flu. These outbreaks were chosen based on their proximity in time to the COVID-19 pandemic, as they all began in the 21st century.

Methods

Rapid reviews are recommended by the World Health Organization in situations where developing health threats require a quick synthesis of evidence to produce guidance for the public (5). The advancing COVID-19 pandemic prompted this review. The requirements for this review were for a short but in-depth synthesis of the current state of science on the topic. We chose to include both quantitative and qualitative studies for analysis in order to provide the most comprehensive overview of the literature. Two study authors (EM and ZS) screened all titles and abstracts, extracted and synthesized study data, and reviewed the findings. The senior author (KMP) assisted in question development as well as synthesis and review of study data. All authors contributed to manuscript preparation.

The overarching review questions were: 1) What are the anticipated mental health sequelae for COVID-19 frontline health workers? and 2) What evidence do we have about best practices to address these mental health needs?

Several secondary questions were developed and refined as the review progressed: What factors may lead to adverse psychological outcomes among frontline health workers? Which health

workers are at higher risk for experiencing heightened adverse psychological outcomes or adverse psychological outcomes requiring specialized support? Are there changes in the anticipated mental health sequelae for health workers beyond the pandemic?

The rapid review method used is similar to Khangura and colleagues' seven-step process (6). This rapid review is focused on data from four major global pandemics and epidemics since 2000 (SARS, MERS, swine flu, and Ebola). These outbreaks were chosen due to their comparability and temporality with COVID-19. Using PubMed, MEDLINE, and PsycInfo, we identified articles from 2000 to 2020 using the MESH terms 'pandemic' and 'mental health' and the following non-MESH keywords: 'Severe acute respiratory syndrome', 'middle east respiratory syndrome', 'swine flu', 'H1N1,' 'Ebola', 'mental disorder', 'depressi*', 'anxi*', 'panic,' 'fear,' 'stress,' 'suicide,' 'psych*' and 'psycholog*'.

For studies to be included in this review, they had to report original research, be published in English in peer-reviewed journals, be related to one of the four chosen pandemics and epidemics from the 21st century and include data on the prevalence of mental illness or psychological wellbeing and closely related mental health factors. In addition, we reviewed and summarized findings from studies that evaluated a mental health interventions for health workers who worked in one of the designated outbreaks.

The initial search (3/28/2020), after removing duplicates, yielded 3876 titles/abstracts. A full description of the search and review strategies and PRISMA diagram of study flow can be found

in an online data supplement to this article. Although the research protocol adhered to PROSPERO guidelines, the timing did not allow for submission for formal PROSPERO review.

Study-level data were extracted on key components addressing our research questions including: study setting (country, dates, related pandemic, time relation to the outbreak, target population), study design (quantitative or qualitative, type of data analysis), mental health impact evaluated (impact tested, measurement tool, results), factors related to mental health outcomes (factors identified, association) and mental health intervention tested (name, related framework, measurement tool, results). Qualitative studies were also analyzed using grounded theory analysis related to mental health impacts or intervention described in each study. Synthesis of quantitative results and qualitative themes that came out of the search was done using convergent analysis.

Results

Overview of the Literature

The screening process resulted in 94 studies from which data were extracted. Major outcomes of these studies included: qualitative reports on provider mental health (n=35), prevalence of mental health outcomes (n=29), correlations between sociodemographic and work-related factors and mental health outcomes (n=26), and impact of interventions on provider mental health (n=4).

Distribution of the studies was as follows: SARS: 51% (n=48), Ebola: 25% (n=23), MERS: 18% (n=17), and Swine Flu: 6% (n=6).

Studies were conducted in twenty-four countries, with over 10% of studies conducted in Taiwan (n=16), Canada (n=13), and Sierra Leone (n=11). 68% of studies (n=67) included more than one type of health worker and 23% of studies (n=23) focused exclusively on nurses. The remaining studies focused on doctors (n=3), hotline workers (n=1), medical students (n=1), midwives (n=1), social workers (n=1), Chinese medicine practitioners (n=1), and volunteers (n=1).

All studies reported evidence of adverse impact of outbreaks on mental health among providers. The mental health outcomes studied were stress (n=32), anxiety (n=26), post-traumatic stress disorder (PTSD; n=25), a general measure of mental health (n=18), depression (n=16), and sleep (n=4). Two studies (7, 8) also measured obsessive-compulsive behavior and paranoid ideation, and one study measured substance abuse (9). Most studies assessed mental health symptoms, with only 20% (n=17) measuring criteria for full mental health disorder diagnosis.

This results section is arranged to provide summative information about the three types of mental health outcomes found across all studies: normative adverse psychological outcomes, heightened adverse psychological outcomes, and adverse psychological outcomes requiring specialized support. Each of these sub-sections includes results related to the review's primary and secondary questions: prevalence of these mental health symptoms, factors associated with these symptoms, and interventions conducted to relieve these symptoms. The final sub-section describes studies that analyzed the mental health sequelae of frontline health workers up to three years after the outbreaks studied and interventions conducted post-outbreak.

Normative Adverse Psychological Outcomes

Overall, adverse psychological consequences during outbreaks are common for health workers. Across studies, between 17.7% and 89% of health workers exhibited general psychological distress while working during a pandemic outbreak. The most commonly reported mental health symptoms included stress (range: 42%-89%) and anxiety (range: 56%-100%). Depressive symptoms were also noted across studies, with a prevalence between 27.5% and 77.2% among nurses in the SARS outbreak(10). These adverse mental health outcomes are relatively normative in the throes of a pandemic.

Across outbreaks, work-related stressors were reported to most directly lead to these adverse psychological consequences. The most common factor related to mental health concerns among providers was fear of infection and spreading infection to family members (11-21). Up to 75% of health workers worried about spreading the infection and felt responsibility for their family members' social isolation (14, 15, 21, 22). This fear led many health workers to isolate themselves after their work shifts; 15% of staff members would not go home after work to avoid infecting their family with SARS (11, 23). Throughout multiple studies, health workers associated this isolation with increased loneliness and sadness (20, 24).

Workload stress—defined heterogeneously across studies as increased workload, changing work duties, shortage of medical supplies and personnel, lack of safety for infection prevention, unfamiliarity with correct infection protocols, lack of agreement on treatment protocols, and inconsistent organizational support—was directly associated with anxiety and generalized stress levels of health workers across studies (8, 10, 18, 22, 24-28). Significant or severe job-related stress was reported by 68% of healthcare workers surveyed during the SARS outbreak (29).

Health workers in four qualitative studies directly reported that inconsistent information and misinformation from hospital management led to mistrust of authority as well as anxiety and stress among healthcare staff (30-32). In addition, four studies found that high levels of anxiety, fear and stress were caused by a lack of community support and network among health workers (15, 33-35). A study of nurses in Taiwan found that 26% of nurses studied felt such intense stress due to the SARS outbreak that they reported looking for another job (36).

An additional factor across pandemics related to provider mental health was the stigma felt by health workers. Five studies examined the prevalence of stigmatization among health workers during the SARS and Ebola pandemics and found that between 20% and 49% of workers felt socially stigmatized during these outbreaks. Workers reported feeling stigmatization by family and friends and the larger community. One example of community stigmatization was being avoided on public transportation while wearing hospital uniforms (37). Inaccurate media exposure was identified as a main cause of misinformation that led to stigmatization (38). Stigma was correlated with increased anxiety, depressive symptoms and post-traumatic stress (PTS) symptoms (39, 40). Health workers who described their experience during the SARS outbreak in Canada reported that they felt so much stigma that they would avoid identifying themselves as health workers (41).

It is important to note that not all mental health outcomes identified from pandemics were negative. Twelve studies noted positive psychological effects on healthcare workers, including a renewed appreciation for the meaning and importance of their profession, feelings of appreciation from society, courage, self-awareness, and emotional connectedness and community

with other healthcare providers (12, 15, 29, 33-35, 42-46). Across all four studies that measured prevalence of positive mental health outcomes, over 75% of healthcare workers reported these positive mental health outcomes in addition to the other adverse psychological outcomes noted in each study (12, 29, 42, 43).

Studies consistently demonstrate that heightened mental distress diminished with support from workplace and communities. Evidence found that hospital systems-level activities, even if not directly related to mental health, limited and improved adverse psychological outcomes among providers across outbreaks by engendering confidence and enhancing positive psychological effects described above. For example, a SARS prevention program implemented in Taiwan resulted in decreased depression and anxiety for health workers (47). Effective institutional and organizational support and leadership are commonly cited by health workers as critical to reducing mental distress and burnout, allaying anxiety and fear, and increasing confidence (13, 16, 26, 30, 31, 33, 43, 44, 48-55). Training, access to necessary equipment, clear communication, and outward praise from hospital leadership were all noted across studies as particularly supportive of health workers' mental health (44, 49, 50). In one study, the potential for additional compensation for exposure to MERS was mildly effective in reducing stress during the outbreak (55).

Beyond hospital-level interventions, five studies analyzed how individual health workers' coping behaviors impacted their mental health (28, 38, 56-58). Coping measures assessed across studies included: religious practices, using emotional supports, taking sleep medication, reducing travel, venting, engaging in social isolation, self-distraction, denial, and substance use. Overall, there

was no clear correlation between individual coping behaviors and mental health status. Findings from one study suggests that two common coping strategies, behavioral disengagement from work and self-distraction, actually had the highest correlation with overall distress level (58).

Heightened Adverse Psychological Outcomes

Beyond the common adverse psychological outcomes of stress, anxiety, and depressive symptoms during a pandemic, some healthcare workers will experience heightened levels of psychological distress that require more specific mental health supports and services.

Evidence suggests that PTS is one adverse psychological outcome that may be particularly heightened among providers during pandemics and epidemics: 93.5% of health workers who worked at a SARS-affected hospital in China considered the outbreak to be a traumatic event (51). Across studies, up to one third of health workers reported moderate to severe PTS symptoms during the outbreaks (range: 10%-33%). Up to one year after the outbreaks, these scores remained relatively consistent (range: 1.4%-32.0%)(8, 13, 21, 59-61). 25.1% of South Korean nurses working at isolation hospitals during the MERS outbreak experienced all PTSD symptoms after the outbreak, and another 32.0% experienced moderate or some level of PTS symptoms (59).

Persistent anxiety and generalized stress symptoms also led to additional mental health issues of panic attacks, insomnia, and burnout in some studies. One study reported sleep disturbances among 37.1% of nurses surveyed during the SARS outbreak (62). Among health workers from a Toronto hospital that treated SARS patients, 19% experienced panic attacks even up to two years

after the outbreak (60). Between 19.2% and 50% of health workers experience burnout one year later (50, 61).

It is important to anticipate which health providers are at greater risk of higher levels of adverse psychological outcomes during a pandemic. The overall trend across all pandemics and epidemics studied is that health workers who worked at health facilities and had direct contact with affected patients had higher prevalence and severity of mental health symptoms than those who did not. One study that compared PTS symptoms among providers one to two years post-SARS outbreak in Canada found that 13.8% had high PTS at the high-contact hospital, compared to only 8.4% at the low-contact hospital (61).

Among providers who worked with affected patients, providers in higher-risk wards (e.g., intensive care units or emergency departments) had higher rates of psychological distress. This was true during (51, 62), immediately after (8), and up to two years (61) after the outbreak. One study found that 21.7% of health workers who worked in the emergency unit at a Chinese hospital during the SARS pandemic met criteria for PTSD compared to 13.0% of health workers who worked in the psychiatric ward (51).

Interestingly, three studies found that health workers who worked in hospitals treating patients affected by the outbreak, but who did not directly work with the patients themselves, had higher stress and anxiety than providers working directly with patients affected by the pandemic or epidemic in high-risk wards (41, 63, 64). One study found that their distress was higher even at three years post-outbreak (63). Significantly higher anxiety was also found among providers who

only worked with one patient affected by the outbreak, as compared to providers who worked with two or more affected patients (65). It was suggested that this may be because providers caring for numerous patients either have a high level of knowledge and training a priori or develop greater experience in the course of the pandemic as compared to workers on other wards or those who have less contact with pandemic care (66).

Several studies indicate that fewer years of healthcare experience correlates with increased anxiety (36, 59, 60, 66). Health workers in under-resourced or inadequately resourced settings with less training also reported higher levels of mental distress (22, 25, 27, 30, 32, 37, 43, 54, 67-69).

It is unclear whether healthcare worker discipline influences adverse psychological outcomes. Four studies (50, 64, 70, 71) noted that nurses were more likely to exhibit mental health symptoms than other health workers; however, two studies (13, 14) found that doctors were most likely to show psychological distress. One study suggested that this could be a function of varied professional responsibilities rather than discipline in diverse contexts, which results in differing degrees of exposure risk (14).

Limited data exist on the efficacy of psychotherapeutic interventions for health workers. Three studies reported primary outcome data on specific mental health interventions, which were all forms of low-intensity psychotherapeutic support consisting of group workshops or one-on-one counseling sessions. Interventions evaluated were: brief CBT (72), narrative medicine (73), and combined peer support, debriefing, and psychoeducation (53). Six studies assessed the impact of

any type of mental health support on providers, which included: general psychological support workshops, mental health debriefing sessions, individual counseling sessions, sleep aids, and a social media platform targeted to mental health support (17, 26, 28, 35, 37, 74).

Specific interventions and general psychological support services were reported to be beneficial to mental health by respondents across all studies; however, only one study quantitatively assessed a specific mental health intervention, finding significant improvement relating to stress, depression, and anxiety (72). Across qualitative assessments, health workers reported improvements in stress, depression, and anxiety, as well as sleep (53, 73). One qualitative analysis found that Ebola hotline workers who participated in support groups most valued having a safe space to meet that sustained their emotional resilience, helping them to manage their stress (53). When assessed, the vast majority of health workers reported that non-specific mental health supports were beneficial for their well-being (17, 36, 37). Nurses in one study who participated in mental health debriefing sessions suggested that these sessions could be more effective if they were more flexible to match individuals' work shifts, had fewer participants per group session, and were shortened to 50 minutes or less (17). In addition, these nurses asked for continuing mental health services even beyond the outbreak, reflecting the perceived success of the intervention.

Adverse Mental Health Outcomes Requiring Specialized Support

It is clear from the evidence reviewed that a minority of health providers develop adverse psychological outcomes to the point of meeting full diagnostic criteria for mental disorders that require specialized care. One study found that despite ubiquitous reports of stress symptoms

among providers at a hospital during the SARS outbreak in Taiwan, only 11% of health workers exhibited full stress reaction syndrome (75). Another study found that 100% of providers reported minimal anxiety, but none reported severe anxiety during the MERS outbreak in Saudi Arabia (66). In Toronto following the SARS outbreak, 5% of health workers were diagnosed with a new psychiatric disorder in the year after the pandemic; authors noted that this incidence rate was lower than that reported for the general population (60). Across three studies, providers who had pre-existing mental health conditions were more likely to exhibit severe mental health outcomes during outbreaks (60, 67, 76). No further data were reported on risk factors for severe mental health outcomes related to the outbreaks, and no studies reported specifically on treatment for health workers with severe mental health outcomes during or after pandemics.

Mental Health Beyond the Pandemic

Across outbreaks, mental health consequences did not end with the viruses themselves. A number of studies (n=19, 20.2%) measured mental health of providers following outbreaks. These studies were conducted immediately after the outbreak (7, 13, 21, 51, 56, 59, 77), up to six months after the outbreak ended (76), one year post-outbreak (9, 19, 61), one to two years post-outbreak (12, 18, 33, 71, 78, 79), and up to three years post-outbreak (10, 80).

Within this timeframe, adverse mental health outcomes continue to be reported; however, the number of symptomatic individuals and the severity of disturbance tend to decline. Immediately after pandemics, the majority of studies found that about half of health workers continued to experience psychological distress (range: 14.1%-57%). At one year, the range of health workers reporting psychological distress symptoms remained between 17.3% and 44.9%.

Immediately following the pandemic, health worker distress ranged from 17.7% to 68% (29, 76). About 20% of health workers exhibited PTS symptoms immediately post-outbreak (13). Studies that assessed psychological outcomes at one year found that general psychological distress was still elevated but reduced from levels during and immediately after the outbreaks: this was true for PTS (59), depression (10), anxiety (19, 56) and generalized stress (50). Two studies showed that after both SARS and MERS, health workers reported continuation, and even an increase in sleep symptoms, up to one year after the outbreak ended (78, 79). One study found that 4% of hospital employees reported high PTS symptoms three years post-SARS outbreak, as compared to 10% during the outbreak itself (80).

Physical isolation during mandatory quarantines was reported to increase interpersonal stress (81), anxiety (66), and exhaustion (52). One study that specifically studied health worker stress levels upon being quarantined after the SARS pandemic in Canada found that adverse mental health sequelae were expressed in both somatic symptoms such as headaches and psychological symptoms of stress (82). Time spent in quarantine predicted higher levels of emotional exhaustion (52). After returning from quarantine, health workers continued to experience community stigma, which was associated with continued stress (40).

Providers who had lost family members and co-workers to the virus were among those who experienced continued psychological distress immediately after and beyond six months post-outbreak. This was particularly true in Sierra Leone after the Ebola outbreak, in which an estimated 21% of the overall health workforce died due to the virus (37). One qualitative study

post-outbreak found that 87% of health workers surveyed had depressive symptoms that they associated with witnessing colleagues die (39).

Many of the psychotherapeutic interventions described above were implemented or continued post-outbreak to support providers with continued adverse psychological outcomes, including group therapies (73) and narrative writing workshops (72). Health workers also leaned on their work community post-outbreak due to their unique shared experience of working during the pandemic. One study found that 29% of health workers reported feeling isolated after the pandemic due to their challenging experiences caring for patients during a pandemic that could not be fully explained and processed with family members and friends (38). Health workers in three studies reported that supportive work environments even beyond the outbreak's end, with continued praise and acknowledgement of the hardships faced by health workers, significantly improved their wellbeing and transition back to normal work (16, 49, 83). In one study, supervisor support had a strong buffering effect that limited turnover intention among nurses after the MERS outbreak (59). Table 1 includes an overview of types of interventions that can be implemented to support mental health of providers both during and following outbreaks based on the evidence described here and above.

This review summarizes data from 94 studies; those that are not uniquely mentioned are nonetheless included in the References and in an online data supplement (84-101).

Discussion:

The purpose of this rapid review was to synthesize and describe what is currently known on the topic of mental health of providers during pandemics and epidemics to inform the mental health response to the COVID-19 pandemic.

The data from past pandemics and epidemics indicates that most, if not all, health providers responding to COVID-19 will experience some level of adverse psychological outcomes. Up to 90% of health workers reported mental distress during the health outbreaks studied in this review. Much of this distress is associated with workload and workplace issues that are malleable. These adverse psychological outcomes do not require high-intensity mental health interventions. Rather, they require a sensitivity to mental health issues that can be addressed by healthcare leadership. Leadership that acts swiftly with clear, consistent communications and strategies that address these workplace stresses reduce general levels of anxiety, fear and depressive symptoms. Further, to the extent that leadership works to enhance positive experiences, health workers will report more positive and lasting mental health outcomes.

A smaller, but significant, subset of providers who experience higher and/or prolonged levels of adverse psychological outcomes during COVID-19 are likely to benefit from low-intensity psychotherapeutic intervention. Few interventions have been rigorously tested among this population, with no randomized control trials found in this review. Nonetheless, initial data suggest that group therapy can reduce adverse psychological outcomes. The current pandemic is an opportune time to develop more rigorous studies of treatment interventions to provide improved guidance on the allocation of limited mental health resources.

The data from previous outbreaks suggests that the majority of individuals who experience mild to moderate adverse psychological outcomes will benefit from positive organizational leadership and low-intensity psychological supports as described above. A considerably smaller percentage of individuals, up to approximately 10% of the total health provider population, who will require referral to more specialized mental health services. Among this group, a large subset will already have a pre-existing mental health condition. Given that access to specialized mental health services are limited in virtually all parts of the world, it is essential that intensive, specialty care be reserved for these individuals. The needs of health workers with mild to moderate distress, anxiety, and depressive symptoms should be served by enlightened leadership focused on appropriate organizational accommodations and low-intensity psychological supports.

Our review of the mental health sequelae associated with pandemics indicates that mental distress, anxiety, fear and depressive symptoms are common. These are normative human responses to crises as serious as the outbreaks studied. However, a subset of individuals will develop more severe mental health disturbances and disorders that require more intensive and specialty care. A stepped care approach to serving the mental health needs in the context of a pandemic is essential to establishing a rational and effective allocation of limited resources. Everyone will benefit from workplace systems-level efforts to support health workers' mental health and wellbeing. Some workers will benefit further from low-intensity psychotherapeutic interventions, and those with new or exacerbated symptoms of severe mental ill health will benefit from specialty care. To protect limited healthcare resources, it is critical to utilize mental health screening and assessment tools to identify the appropriate level of care for health workers

during and following the healthcare crisis. Of note, the data suggest that sleep may be a persistent mental health disturbance requiring longer term attention following a health crisis.

It is important to recognize that the COVID-19 pandemic is especially unique compared to other pandemics in its impact on health workers due to its high prevalence and burden for inpatient medical settings (102). In addition, a lack of personal protective equipment has led to significant risk of infection for healthcare workers across healthcare settings (103). It would be reasonable to infer that previous outbreaks likely had more limited impact on health providers' mental health as compared to the global burden of COVID-19. Thus, any extrapolation of findings or recommendations must recognize this inherent underrepresentation of the anticipated mental health burden, especially in relation to post-traumatic stress due to death or illness of loved ones.

The body of literature is limited in its scientific rigor because it is conducted in response to disaster and crisis events. However, even in these contexts there are quality metrics available to evaluate the rigor of the research which were used in multiple studies reviewed: appropriate sample description (10, 17, 36, 58), standardized measures (7, 41, 59, 79), careful data collection management (9, 23, 62, 78), and evidence-based data analysis methods (21, 61, 67, 90). This review found that the quality of data examining efficacy of interventions is particularly limited. Only two interventions were quantitatively assessed related to their impact on psychological outcomes (47, 72), and only one of these was a mental health intervention (72); none used a randomized control design. Thus, it is impossible to recommend an evidence-based psychotherapeutic intervention for health workers during the COVID-19 pandemic. This review makes it eminently clear that the field urgently needs appropriate research to inform

organizational strategies and clinical interventions to better address the mental health needs of health workers. The COVID-19 pandemic provides the opportunity for researchers to develop innovative research methods that are appropriate to the particular constraints of post-disaster and pandemic contexts. Innovative alternatives that take us beyond the randomized control trial will enable the field to fill the gaping hole that exists in terms of evidence-based mental health interventions in this context (104).

It is important to acknowledge the limits of the rapid review. This review included both qualitative and quantitative studies related to any mental health impact, which complicates generalizations across studies. Studies defined mental health impacts heterogeneously even within disorder groupings; for example, some studies measured rates of anxiety disorders while others measured only anxiety symptoms. This meant that a meta-analysis could not be conducted. Quantitative and qualitative studies could also not be fully compared even using mixed-methods analysis. Thus, our review focused on breadth of understanding about this topic but lacks quantitative synthesis and analysis. Second, due to time constraints, we were unable to complete a full quality assessment on all included studies and instead non-systematically identified higher-quality studies according to quality research metrics. Finally, the review focused solely on major pandemics and epidemics that began in the 21st century. Further research could expand this review's focus to include other health outbreaks.

Healthcare leadership plays a crucial role in supporting the mental health needs of all health workers by effectively managing workplace regulations, workload, and infection control guidance in crisis situations. To protect the long-term health of their workforce, leaders must

provide direction and clear, consistent communication throughout the pandemic and must remain engaged long beyond the pandemic's end. Appropriate assessment of need and allocation of specialty services for more severely impacted health workers will result in improved mental health outcomes, rational allocation of limited resources, reduce attrition and preserve the healthcare workforce.

Conclusion:

This rapid review identified the main impacts on the mental health of providers during pandemics that began in the 21st century, as well as interventions and coping strategies used to address these mental health impacts. The evidence indicates that a stepped-care mental health response will properly allocate mental health resources and treatment to best support providers with adverse psychological outcomes during and beyond the COVID-19 pandemic.

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WHO NEEDS SUPPORT	WHAT PERCENTAGE OF HEALTH WORKERS	WHAT CAN BE DONE	WHO IS RESPONSIBLE
All healthcare providers who report any adverse psychological outcomes	Up to 100%	Hospital-level interventions: clear and consistent communication, public support for providers, training, provision of necessary protective equipment	Hospital leadership
Healthcare providers exhibiting moderate psychological symptoms Providers especially at risk include: Nurses, Providers with extended contact with patients with COVID-19, Less-experienced providers	Around 50%	Psychotherapeutic support services: individual or group psychotherapy, narrative medicine, peer-led support groups (all evidence-informed but lacking an empirical base)	Peer providers, Community laypersons, Counselors
Healthcare providers exhibiting severe psychological symptoms and/or prolonged psychological symptoms Providers especially at risk include: Providers with pre-existing mental health disorders, Providers who witness individuals they know die from COVID-19	No more than 15%	Referral to Specialty Mental Health Services	Specialized mental health practitioners

Table 1: Overview of the Intervention Types to Support Provider Mental Health During And Following COVID-19