COVID-19 Worldwide: Strategies to reduce risk for frontline healthcare workers

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Abstract. The COVID-19 pandemic is putting a strain on global healthcare systems that has never been seen before, and current infrastructures must adapt and develop to deal with the challenges. Moreover, COVID-19 poses a significant threat to healthcare workers (HCWs), potentially leading to a reduction in health-care capacity and, as a result, a decline in population health. The necessity of disease transmission protection in HCWs is evident as health systems rely on the health of their workforces. This article mainly uses a literature research method to identify some feasible strategies to reduce the risk of frontline medical workers fighting the coronavirus.

Keywords: COVID-19; Healthcare workers; Factors; Strategies.

1. Introduction

Since the first cases of coronavirus disease 2019 (COVID-19) infection were reported in Wuhan, China, at the end of December 2019, case reporting has spread widely over the past years, resulting in a pandemic of crisis proportions and a rapidly increasing number of deaths, affecting virtually every country on the planet. As of 20 March 2022, over 468 million confirmed cases and just over 6 million deaths have been reported globally (WHO, 2022).

Obviously, as has been the case with many earlier infectious disease outbreaks, such as severe acute respiratory syndrome (SARS) and Ebola, healthcare professionals are on the front lines in terms of infection and death. A country’s capacity to handle COVID-19 cases successfully depends on physically and psychologically fit and well-equipped health providers, and learning from the SARS pandemic can be used to establish unique working arrangements to help safeguard healthcare workers from infection (Schwartz, King, & Yen, 2020).

Aside from the obvious infection risks posed by close contact with patients and/or possibly infectious coworkers during the COVID-19 pandemic, healthcare personnel are also experiencing increased stress and mental health hazards, as was the case during the SARS outbreak (Wu et al., 2020). Quantitative research have found that frontline health-care personnel who treat COVID-19 patients are more likely to have mental health issues such as anxiety, depression, sleeplessness, and stress (Liu et al., 2020). During an outbreak, attention should be paid to psychological crisis intervention for health care workers, where problems caused by psychological stress or other psychological conditions can be significantly alleviated in order to reduce the probability of subsequent health problems (Liu et al., 2020). The number of infected and critically sick patients is rising, as is the number of exposed healthcare professionals who have been placed under self-quarantine, either because they have been infected with COVID-19 or because they have come into contact with a case (Kaito et al., 2020). This results in a significant increase in strain and stress for those remaining in the healthcare industry, as well as a substantial deterioration in the quality of treatment given.

Many healthcare professionals are dying of COVID-19 while trying to save others. WHO estimates that between 80 000 and 180 000 health and care workers could have died from COVID-19 in the period between January 2020 to May 2021, converging to a medium estimate of 115 500 deaths. Health-care providers are extremely vital resources for every country. Their health and safety are critical not just for providing consistent and safe patient care, but also for containing any outbreaks (Xiang et al., 2020).

Therefore, it is necessary for us to pay due attention to the risk of the healthcare workers who have been fighting against COVID-19. In response to healthcare workers’ vulnerability to COVID-19, this
paper aims to identify the factors that increase the risk of health workers during COVID-19 and provide some feasible measures to minimize this risk.

2. Literature Review

Scholars at home and abroad have sorted out the possible factors affecting the physical and mental health of medical workers in the course of fighting the Covid-19.

Kang et al. (2020) claimed that Mental health issues not only influence medical personnel' concentration, comprehension, and decision-making abilities, potentially hindering the battle against 2019-nCoV, but they also have a long-term impact on their general well-being. Xiang et al. (2020) also indicated that there is an urgent need for measures to maintain the mental health of healthcare workers in such stressful situations. According to Zhang et al. (2020), medical health personnel experienced psychological disorders and were at risk of acquiring them during the COVID-19 pandemic. They were in desperate need of help and treatment programs.

Chen et al. (2019) assumed that professionals that operate in close physical proximity to patients, such as ophthalmologists and dentists, may be more susceptible to SARS-CoV-2 infection. Seah et al.(2020) identified tears as a medium of infection during the SARS-CoV pandemic, according to clinical accounts. Ophthalmologists should collaborate closely with local infection control teams to adopt infection control strategies that are appropriate for their specific clinical settings, as said by Lai et al. (2020).

Correct and consistent compliance with Infection prevention and control (IPC) protocols is effective in minimizing the risk of COVID-19 infection (Nguyen et al.,2020; Verbeek et al.,2020). Compliance with infection prevention and control practices is important for preventing infection transmission, according to Powell-Jackson et al. (2020), and it will worsen as facilities see far higher patient volumes, putting more strain on health workers' time and supplies for infection prevention and control.

Nguyen et al. (2020) stated that the risk was particularly significant among Black, Asian, and minority ethnic health-care professionals and those in close contact with COVID-19 patients who reported a shortage of personal protective equipment (PPE) or were obliged to reuse PPE because without inter-national support, any reserves of PPE in hospitals are likely to be rapidly depleted in African countries and new supplies will be very difficult to secure. As shown by Ranney et al. (2020), without sufficient PPE, health-care professionals will become ill, putting the entire health-care system at risk. That scenario's human and economic repercussions should not be underestimated. We need to make sure we have the necessary tools to care for patients and keep our health-care workers safe.

Kumar et al. (2020) studied that HCWs had a good attitude, but only a moderate-to-poor level of knowledge and practice when it came to using face masks. Healthcare personnel, according to Houghton et al. (2020), cite a number of variables that impact their capacity and desire to follow IPC principles when treating respiratory infectious illnesses. These include things like the guideline itself and how it's conveyed, management support, workplace culture, training, physical space, availability to and trust in PPE, and a willingness to provide excellent patient care.

To sum up, Scholars at home and abroad described the reasons that may affect the physical and mental health of health care workers fighting the epidemic on the front line from three perspectives: individual, organizational, and environmental.

3. Methodology

3.1. Method

We searched PubMed, ScienceDirect, and Google Scholar for studies published in English that described the risks of health-care providers treating patients with coronavirus disease 2019 (COVID-19) and strategies to reduce the risk, using the terms "COVID-19" or "coronavirus disease" or "novel
coronavirus" or “SARS-CoV-2” or “2019-nCoV” or “health-care providers” or "health-care professional” or ”medical workers” or "medical staff”.

3.2. Objectives

Try to identify the factors that increase the risk of frontline healthcare workers in the fight against the epidemic and some corresponding strategies to address them.

3.3. Criteria for considering studies for this review

Primary studies using qualitative research approaches, such as case studies, were considered. We included research that employed both qualitative and quantitative data collecting and analysis methodologies. Because some lessons may be learned from earlier situations, such as the SARS epidemic, we incorporated research that focused on obstacles and facilitators to healthcare workers’ security while dealing with respiratory infectious illnesses.

3.4. The definition of respiratory infectious diseases

The term "respiratory infectious diseases" refers to any disease that can cause an acute respiratory tract infection, such as pneumonia or acute respiratory distress syndrome, as well as severe disease in people with seemingly normal immune systems. It can also refer to a public health emergency of international concern (WHO, 2014).

3.5. The definition of IPC

WHO announced that early detection, physical separation, source control, precautions and proper use of personal and protective equipment (PPE), limitation of mobility, environmental cleaning and disinfection, as well as support for healthcare personnel should all be part of IPC strategies in response to highly infectious illnesses like COVID-19 (WHO, 2014).

3.6. Review findings

According to the National Health Commission of the People's Republic of China medical staff have been dispatched from other locations to care for sick and suspected infected patients, increase logistics support, and relieve strain on health-care employees, in which way the pressure on frontline healthcare workers can be reduced. Xu et al.(2021) thought that hospitals can alleviate and reduce the psychological stress of their medical staff through the Employee Assistance Program, which can provide proactive interventions and guidance to help them better fight the epidemic.

The many difficulties of being safe at work, such as the initial insufficient understanding of the virus, the lack of prevention and control knowledge, the long-term workload, the high risk of exposure to patients with COVID-19, and the shortage of medical protective equipment, according to WHO, may have contributed to the psychological distress experienced by medical health workers. Considering the incidence of mental symptoms in healthcare professionals, Bohlken et al. (2020) concluded that supporting mental health informed treatments to aid coping are required. Vindegaard and Benros (2020) conducted research to assess the direct neuropsychiatric implications as well as the indirect impacts on mental health. This research is critical in order to enhance treatment, mental health care planning, and preventative measures in the case of future pandemics.

Kang et al. (2018) encouraged patients to exchange information on online platforms with medical guidance, which can reduce the danger of transmission between patients in medical settings because the best way to protect frontline healthcare workers against COVID-19 infection is to limit their exposure to the SARS-CoV-2 virus. Zhai et al. (2021) also thought that an internet-based online medical consultation system is a strategy for proactively responding to medical needs during special times, such as the COVID-19 epidemic. Using such a system not only raises public awareness of the epidemic, it can also help solve clinical problems and can reduce the risk of infection for healthcare workers.
Bidra et al. (2020) had demonstrated experimentally that preoperative oral irrigation with PVP-I (for patients and healthcare workers) may be useful for dental and surgical professionals during the COVID-19 pandemic as an adjunct to personal protective equipment.

According to Griswold et al. (2021), the use of PPE decreases the risk of COVID-19 in healthcare workers significantly when compared to those who do not use a mask. Surgical masks give less protection than N95 and similar respirators. Decontamination and reuse appear to be viable options for overcoming PPE shortages and improving resource allocation. Moralejo et al. (2018) thought that in bid to address structural imbalances in pandemic risk, it is critical to ensure proper PPE allocation and adherence to other infection control measures and HCWs must have a thorough understanding of how to use and dispose of face masks in order for them to provide adequate protection.

Lai et al. (2020) stated that with the emergence of COVID-19 risk, healthcare workers improved IPC behaviour across the board, which facilitated better control of COVID-19. With further increases in risk (high-risk units and outbreak areas), most IPC behaviour improved. However, at risk of contact with suspected patients, HCWs showed worse IPC behaviour. This may be due to the higher workload of these HCWs and inadequate supplies and resources. Therefore preparedness systems should be improved and medical assistance is urgently needed. Islam et al. (2020) thought that the IPC strategy should consider all possible routes of transmission and should target all patient care activities that involve a risk of person-to-person transmission. What is more, policymakers, according to Ayat and Sami (2022), in the Ministry of Health should monitor the prophylaxis of COVID-19 infection by all health care providers in other facilities. They also recommended a systematic review and revision of the COVID-19 pandemic prophylaxis to promote maximum status in the population.

### 3.7. Limitations of the review

We did not synthesise all the studies that met our inclusion criteria due to time issues and we remain mindful that the studies we selected for synthesis may not reflect the diversity of healthcare workers’ behavior and experiences.

### 3.8. Discussion

In describing their lived experience of battling COVID-19, there was a general sense of responsibility among healthcare providers to alleviate the suffering of their patients and the need to work together to protect the entire country from the virus. "Everyone is accountable for his country's rise or collapse," says an old Chinese proverb. Despite their fears of infection and concerns for their families in the face of a new illness with unknown consequences, health-care providers applied to join the battle, accepted their obligations, focused on their jobs, and demonstrated a sense of togetherness and professional devotion. The health care workers found meaning in their experience. They felt proud of themselves for having the courage and potential to overcome obstacles. They also began to think about what was important to them and wanted to appreciate the present. Health-care providers had an important part in treating COVID-19 patients, and they did their utmost to deliver the best treatment possible to patients in a difficult scenario. (Liu et al., 2020).

However, COVID-19 infection among frontline healthcare professionals posed a danger of infection to themselves, patients, other healthcare workers, and the general public. Our review has increased our understanding of what can affect the security of the healthcare workers and the strategies to make them successfully complete the work without the risk.

Many other departments' health-care personnel lacked clinical training in infectious intensive care. When health-care systems aren't prepared to handle an infectious disease epidemic, training, education, and better communication are required. (Speroni et al., 2014). As a result, temporary attempts to provide intense training improved the knowledge and abilities of caregivers. To ensure that medical teams are appropriately equipped to deal with public health emergencies, continuous medical education and training is required. (Rai et al., 2021). Also, the SARS-CoV-2 pandemic, according to Younes et al. (2020), has "dramatically underlined the vital significance of diagnostic technology in the control of infectious illnesses. "What is more, Because the hard labor depleted
health-care personnel physically and emotionally, complete assistance should be provided to ensure their well-being, and preparation and efficacy to address emergencies should be fostered. Supportive chats and ideas, such as separating living places, changing clothes, and bathing promptly after duty, for example, may assist to lessen anxiety. (Adams & Walls, 2020).

Additionally, health care workers in countries with few medical resources are more likely to be infected during an outbreak of pandemic. For instance, without foreign assistance, any PPE resources in hospitals in African nations are likely to be quickly exhausted, making fresh supplies extremely difficult to obtain. (Hopman et al., 2020). Bharti and Singh (2020) believed that 3D printing technology had shown remarkable promise in solving the PPE supply gap during the COVID-19 epidemic, and that it may play a significant part in the worldwide situation.

In terms of the compliance with the IPC guideline, A guideline was deemed unsuitable by healthcare personnel if it was excessively extensive or difficult to follow. (Chau, 2008) The rapid change in some guidelines caused problems for some healthcare workers, making it difficult for them to implement the most recent protocols. (Kang, 2018). Furthermore, healthcare workers were also reported to have inaccurate opinions about infection transmission, cause, and containment, resulting in low compliance with the IPC guideline. (Chapman et al., 2017). More exact recommendations or training materials should be incorporated into health professions undergraduate curricula and health people training at medical institutes. (Huh, 2020).

4. **Conclusion**

Based on the information collected by reviewing the literature, the authors are able to make the following recommendations.

1. The amount of the personal protective equipment (PPE) and other supplies should be adequate and the healthcare workers must be trained to harness them, such as wearing and removing personal protective equipment appropriately, and 3D printing technology may come in handy.

2. Reduce outpatient activity and try to set up virtual or teleconference clinics instead of face-to-face clinics.

3. Increasing the staff members’ adherence with IPC guidance by encouraging and monitoring, such as ‘Eagle-Eye Observers’ who are dedicated full-time staff charged with observing and correcting infection control errors (Phan et al., 2019).

4. Risk allowances to compensate healthcare professionals for the risks they take and to inspire employees to continue working.

5. Politicians and other public figures to visit healthcare workers, praise their commitment and sacrifices, and address any bad attitudes of providers (Moberly, 2020).

6. Prioritize SARS-CoV-2 testing, beds in ICUs and other medical wards, drug and vaccine trials, and therapeutics as they become available.

7. Reduce theatre activity: non-emergency procedures should be postponed until after the pandemic.

8. Providing food and daily necessities for health care workers saves them time and shows the community’s appreciation for them (Rimmer, 2020).

This paper was undertaken in response to the COVID-19 pandemic. Health-care providers shown amazing fortitude and perseverance in the face of a variety of problems. They use multiple support systems and self-adjustment skills to relieve stress because they know they need to be strong and focused on their role to save more lives. However, during severe epidemic outbreaks, demand for healthcare staff increases even as their availability decreases due to the intense pressures they confront. Implementation of these recommendations at an international level might provide a framework to reduce the burden that the COVID-19 brought about and these suggestions apply equally to subsequent outbreaks of the pandemic. Comprehensive support should therefore be provided to safeguard the well-being of health care providers and to promote their preparedness and effectiveness in managing crises.
More research is needed on the risks to health from COVID-19 among healthcare and other workers at high risk of infection. In qualitative research on this issue, better reporting is required, particularly in the areas of sampling procedures, researcher reflexivity, and data processing.

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