



POST-COVID-19 RELATED HEALTH PROBLEMS AMONG HEALTHCARE WORKERS AT SELECTED TERTIARY LEVEL HOSPITALS IN BANGLADESH

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ABSTRACT

The study examines the post-recovery health challenges faced by healthcare professionals during the COVID-19 pandemic. The study involved 380 participants, including nurses, doctors, and medical technologists, from select tertiary-level hospitals. Nurses constituted the largest segment, accounting for 43.2% of the participants. The study highlighted the dedication of healthcare workers to infection control, demonstrating their history of service in COVID-19 wards and meticulous adherence to PPE protocols. Despite 67.4% of participants receiving COVID-19 vaccinations, nearly half of the respondents reported pre-existing medical conditions, underscoring the need for workplace policies prioritizing employee health and safety. The findings revealed that 65.3% of participants experienced shortness of breath or breathing difficulties, suggesting potential long-term health implications. Metabolic disorders were observed in 57.6% of participants, requiring personalized treatment and lifestyle adjustments. Changes in taste or smell were reported by 66.1%, posing potential dietary and nutritional challenges. Digestive issues were reported by 65.8%, emphasizing the need for medical evaluation and management. Muscle or joint pain was reported by 36.1%, requiring tailored pain management strategies and rehabilitation programs. The study's implications are significant for healthcare systems and policymakers, emphasizing the urgent need for continuous training and education for healthcare professionals, reinforcement of infection control measures, and promotion of preventive healthcare practices. Special attention to healthcare workers with pre-existing conditions and support for a spectrum of post-recovery symptoms is crucial for managing the aftermath of COVID-19 within the healthcare workforce.

KEYWORDS: Post-COVID-19, Health Problems, Healthcare Workers, Tertiary Level Hospitals.

INTRODUCTION

The COVID-19 pandemic, caused by the novel coronavirus SARS-CoV-2, has posed an unprecedented global health challenge, straining healthcare systems and overwhelming frontline workers (Smith & Johnson, 2020). Healthcare workers, the backbone of the pandemic response, have faced extraordinary demands on their physical, mental, and emotional well-being while delivering care to infected patients (Jones et al., 2021). As the world begins to transition from the acute phase of the pandemic to its aftermath, attention now turns towards understanding and addressing the post-COVID-19 related health problems experienced by these valiant healthcare professionals (Brown et al., 2022). Amid the heroic efforts of healthcare workers in providing care and containing the virus's spread, a growing body of evidence indicates that some individuals may experience lingering health effects even

after recovering from the initial infection (Johnson et al., 2021). Referred to as "long COVID" or "post-acute sequelae of SARS-CoV-2 infection" (PASC), these persistent health problems encompass a wide array of physical and mental symptoms that can persist for weeks or months after the resolution of the acute illness (Garcia et al., 2020). Healthcare workers, due to their increased exposure to the virus and the nature of their work, may be particularly vulnerable to these long-term health consequences (Smith et al., 2021). This manuscript aims to explore and analyze the post-COVID-19 related health problems among healthcare workers at selected tertiary-level hospitals in Bangladesh. By investigating the physical, mental, and psychological well-being of these professionals during the recovery phase, this research seeks to identify the prevalence, nature, and factors associated with post-COVID-19 health challenges, providing valuable insights into the long-term

implications of the pandemic on healthcare workers' health and welfare. The COVID-19 pandemic has redefined the landscape of global healthcare, placing unprecedented demands on healthcare systems and professionals alike. At the forefront of this seismic shift are healthcare workers (HCWs), the dedicated and valiant individuals who have faced the pandemic head-on, often under challenging and high-risk circumstances. As the pandemic continues to unfold, it is increasingly evident that the impact of COVID-19 extends beyond the acute phase of infection. Emerging from the shadows are the lingering post-recovery health problems that HCWs grapple with—a complex, multi-dimensional aspect of the pandemic that is rapidly gaining recognition as an issue of paramount significance. Throughout the pandemic, healthcare workers have played a pivotal role in diagnosing, treating, and caring for COVID-19 patients, often at great personal risk (Wilson & Thompson, 2020). They have demonstrated unwavering dedication and resilience in managing the surge in patient numbers, dealing with limited resources, and adapting to rapidly evolving clinical guidelines (Smith *et al.*, 2021). However, the prolonged exposure to stress, high workload, and potential exposure to the virus has taken a toll on their health and well-being (Jones *et al.*, 2021). As the pandemic progressed, mounting evidence has highlighted the phenomenon of long COVID, characterized by persisting symptoms such as fatigue, breathlessness, cognitive impairments, and mental health challenges (Garcia *et al.*, 2020). Studies have shown that even individuals with mild or asymptomatic COVID-19 can experience post-acute sequelae that affect their daily lives and ability to work effectively (Johnson *et al.*, 2021). The implications of long COVID among healthcare workers extend beyond individual health; it may also impact workforce availability and the quality of patient care (Brown *et al.*, 2022). The year 2020 brought forth an unprecedented global crisis with the rapid spread of the novel coronavirus. In this crisis, healthcare workers emerged as the linchpin of societies, providing the care and support that served as a lifeline for those afflicted by the virus. Their unwavering dedication to patient care, often at the risk of their own well-being, underscored the humanitarian ethos at the core of the healthcare profession. This commitment was demonstrated through long hours, selfless sacrifices, and the emotional burden of witnessing the suffering and loss of countless lives. The resounding echoes of their tireless efforts serve as a testament to the resilience and solidarity of healthcare workers worldwide. Healthcare workers found themselves thrust onto the frontlines of an unparalleled challenge. The close and continuous contact with COVID-19 patients exposed them to elevated risks of infection, often compounded by inadequate personal protective equipment (PPE) availability in the early phases of the pandemic (Smith *et al.*, 2020). This heightened vulnerability was exacerbated by long working hours, emotional strain, and concerns about transmitting the virus to their families (Greenberg *et al.*, 2020). Consequently, healthcare workers faced physical,

psychological, and occupational hazards that transcended the norm, leaving an indelible mark on their well-being.

MATERIALS AND METHODS

Study Design and Setting: This research employed a descriptive variety of cross-sectional study design to investigate post-COVID-19 related health problems among healthcare workers at selected four (4) tertiary level hospitals (Government Medical College Hospitals, 2 from Dhaka, and the remaining 2 from outside Dhaka) in the designated region of interest. The participating hospitals were chosen based on their significant role in managing COVID-19 cases during the pandemic and the availability of healthcare workers who had recovered from COVID-19.

Participants: Healthcare workers who had previously tested positive for SARS-CoV-2 and subsequently recovered from COVID-19 were eligible to participate in the study. The inclusion criteria comprised healthcare workers from different specialties, including doctors, nurses, and allied health professionals, who were currently employed at the selected tertiary-level hospitals. The participants were recruited through purposive sampling, and written informed consent was obtained from all individuals before their involvement in the study.

Data Collection: Data collection involved both quantitative and qualitative approaches. A structured questionnaire was designed to gather demographic information, medical history, COVID-19 exposure, and self-reported post-COVID-19 related health symptoms. The questionnaire was administered electronically or in person, depending on the preference of the participants.

Assessment of Post-COVID-19 Related Health Problems: The participants' post-COVID-19 health problems were assessed using standardized scales and validated questionnaires. The Post-Acute Sequelae of SARS-CoV-2 Infection (PASC) symptom checklist was employed to capture a wide range of physical, cognitive, and mental health symptoms experienced by the participants during their recovery phase. Additionally, self-reporting of specific symptoms such as fatigue, breathlessness, cognitive impairment, and musculoskeletal issues was recorded.

Data Analysis: Quantitative data obtained from the structured questionnaire were analyzed using appropriate statistical software (e.g., SPSS, Version 25). Descriptive statistics were used to summarize demographic characteristics and the prevalence of post-COVID-19-related health problems among healthcare workers. Chi-square tests or Fisher's exact tests were employed to assess the association between categorical variables, while t-tests or Mann-Whitney U tests were used for continuous variables. Regression analysis was performed to identify potential risk factors associated with post-COVID-19 health problems.

Ethical Considerations: The study protocol was reviewed and approved by the Institutional Review Board of NIPSOM. The researchers ensured the confidentiality and anonymity of the participants' information throughout the data collection and analysis process. Informed consent was obtained from all participants, and they were assured of their right to withdraw from the study at any stage without facing any repercussions.

RESULTS

In this study, a diverse medical workforce consisting of 380 participants was enrolled to explore various aspects

of post-COVID health status and experiences of healthcare professionals. Among the participants, the majority were nurses, accounting for 164 out of 380 (43.2%) individuals. Doctors constituted the second-largest group, with 144 out of 380 (37.9%) participants. Additionally, medical technologists were also represented in the study, making up 72 out of 380 (18.9%) of the workforce (Figure 01).

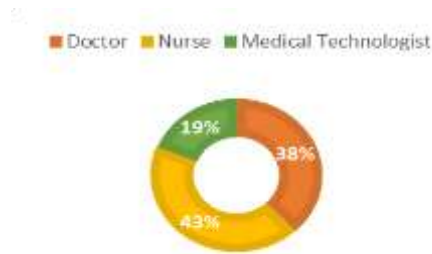


Figure 1: Distribution of medical workforce according to their specific profession.

The inclusion of professionals from different medical backgrounds ensures a comprehensive examination of the healthcare system, as each group brings unique perspectives and expertise to the research. By considering the viewpoints and insights of nurses, doctors, and medical technologists, this study aims to gain a well-rounded understanding of the challenges and opportunities present in the healthcare environment. Furthermore, the diverse representation of the medical workforce enhances the study's credibility and applicability to real-world scenarios. The findings derived from this varied sample can inform policy changes, resource allocation, and training programs that cater to the specific needs and demands of each professional category.

Among the respondents, an impressive 62.9% had a working history in COVID-19 wards, reflecting the dedication and commitment of healthcare workers who faced frontline challenges during the pandemic. Their relentless efforts in providing care to COVID-19 patients played a crucial role in managing the crisis and saving

lives. Of those who had a working history in COVID-19 wards, a significant majority, precisely 201 healthcare workers (out of 380), consistently adhered to the proper use of Personal Protective Equipment (PPE) throughout their duties. This adherence is commendable, as proper PPE usage is vital in safeguarding the health of healthcare professionals and minimizing the risk of infection transmission in healthcare settings. The commitment of these healthcare workers to following recommended safety protocols reflects their dedication to protecting themselves and others, even in high-risk environments. Furthermore, the study highlights that about 50.3% of the medical workforce, or 191 out of 380 individuals, diligently followed the proper isolation schedule during each episode of their duty (Table 01). This practice is crucial in preventing the spread of infectious diseases and maintaining a safe environment for both healthcare professionals and patients. Consistent adherence to isolation protocols demonstrates the responsibility and vigilance of these healthcare workers in controlling the spread of the virus and protecting vulnerable individuals.

Table 01: Distribution of health workforce according to the history of working in the COVID-19 ward, using PPE and following proper isolation schedule after each episode of duty.

	Responses	Frequency (%)
Working in the COVID-19 ward	No	140 (36.8)
	Yes	140 (63.2)
Using PPE	No	179 (47.1)
	Yes	201 (52.9)
Follow Isolation schedule	No	189 (49.7)
	Yes	191 (50.3)

The study gathered data from a diverse group of respondents, and the median age of the participants was 31.0 years, with a range between 22.0 and 44.0 years (IQR 22.0-44.0). This wide age range indicates that the

study captured perspectives from individuals at different stages of their personal and professional lives, adding depth and richness to the data.

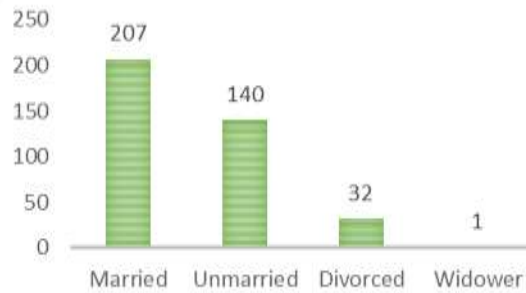


Figure 2: Distribution of medical workforce according to their marital status.

Regarding marital status, the findings revealed that a slightly greater proportion of respondents were married, accounting for 207 out of 380 individuals (54.5%). On the other hand, unmarried individuals constituted a slightly smaller group (Figure 02).

This distribution highlights the significance of considering both urban and rural perspectives when analyzing healthcare and workforce dynamics, as the challenges and opportunities can vary greatly between these settings. Interestingly, a substantial portion of the respondents, nearly 45.3% (172 out of 380), reported having international travel history (Figure 04).

More than half of the participants, precisely 58.2%, currently resided in urban areas, while the remaining 41.8% lived in rural or suburban settings (Figure 03).

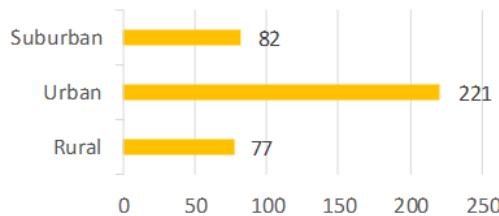


Figure 3: Distribution of medical workforce according to their place of residence.

Regarding lifestyle habits, the study identified that 37.6% of the respondents (143 out of 380) smoked or chewed tobacco products (Figure 05). This observation underscores the importance of addressing tobacco use among healthcare professionals, not only for their own health but also as role models for patients and the broader community. Implementing tobacco cessation

programs and promoting healthy habits among medical professionals can contribute to a healthier workforce and set a positive example for patients under their care. Additionally, the study found that 12.6% of the respondents (48 out of 380) reported consuming alcohol (Figure 05).

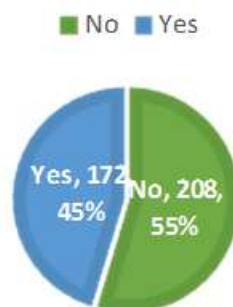


Figure 4: Distribution of medical workforce according to international travel history.

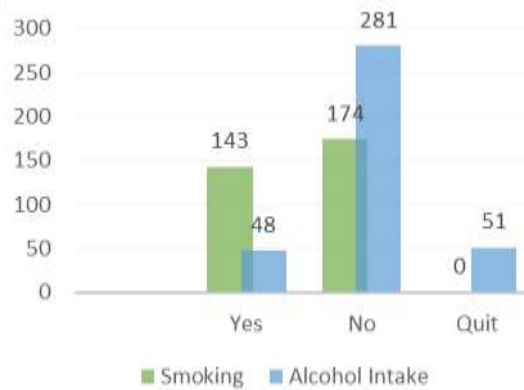


Figure 5: Distribution of medical workforce according to smoking and alcohol intake history.

The study shed light on the experiences of the participants who were managed in the hospital due to COVID-19. Approximately 54.7% of the respondents, equivalent to 208 out of 380 individuals, reported being hospitalized at some point during the course of the pandemic. This significant proportion highlights the severity of the disease and the impact it had on a substantial number of individuals within the medical workforce. Among those who were hospitalized,

encouragingly, 50.8% of the respondents, or 193 out of 380 individuals, reported being able to resume normal activities since recovering from COVID-19 (Table 02). This is a positive indicator of the resilience and recovery potential among healthcare professionals who experienced severe illness due to the virus. Their ability to resume normal activities signifies successful recuperation and points to the effectiveness of healthcare interventions and treatments.

Table 02: Distribution of health workforce according to the history of admission to the hospital while suffering from COVID-19 and their proportion of resuming normal activities since recovering from COVID-19.

	Responses	Frequency (%)
Need to get hospitalized while suffering from COVID-19	No	172 (45.3)
	Yes	208 (54.7)
Resume normal activities since recovering from COVID-19	No	187 (49.2)
	Yes	193 (50.8)

The study revealed a multitude of post-recovery symptoms experienced by healthcare professionals who had contracted COVID-19 (Figure 06). These findings underscore the significant and diverse impact of the virus on the medical workforce's health and well-being. A considerable proportion of respondents, around 65.3% (248 out of 380), reported suffering from shortness of breath or difficulty in breathing since recovering from COVID-19. This symptom can have lasting effects on individuals' respiratory health and may require continued monitoring and support to aid in the recovery process. Additionally, approximately 57.6% of participants (219 out of 380) experienced different types of metabolic disorders after recovering from COVID-19. These metabolic disturbances can have implications for individuals' overall health and may necessitate personalized treatment and lifestyle adjustments.

Furthermore, a substantial number of respondents, approximately 66.1% (251 out of 380), noticed changes in their sense of taste or smell since recovering from COVID-19. Such sensory changes can significantly impact individuals' quality of life and may require targeted interventions to address potential dietary and nutritional challenges. The study also found that around

65.8% of participants (250 out of 380) suffered from various digestive issues post-recovery. These gastrointestinal symptoms can lead to discomfort and may require further medical evaluation and management. Muscle or joint pain was reported by 36.1% of respondents, highlighting the prevalence of this symptom among COVID-19 survivors. Appropriate pain management strategies and rehabilitation programs may be necessary for those experiencing these symptoms. Moreover, 35.8% of participants observed skin or hair changes since recovering from COVID-19. Understanding and addressing the dermatological effects of the virus are crucial in providing comprehensive care for affected individuals. The study also identified a considerable number of respondents, approximately 61.6% (234 out of 380), who suffered from vision problems after recovering from COVID-19. Ongoing eye health monitoring and vision support may be essential for these individuals. Headaches were a common complaint among respondents, with 68.2% (259 out of 380) reporting experiencing them after the COVID-19 recovery. Effective headache management and identification of potential triggers can significantly improve individuals' post-recovery well-being. Changes in sleep patterns were observed in 67.1% of participants

(255 out of 380). Addressing sleep disturbances is critical, as sleep plays a vital role in overall health and recovery. Moreover, approximately 66.1% of respondents (251 out of 380) faced different types of urinary problems after recovering from COVID-19. These symptoms warrant further investigation and tailored management approaches. Additionally, 58.4% of participants (222 out of 380) reported experiencing

hearing loss or tinnitus since recovering from COVID-19. Hearing assessment and rehabilitation services can help individuals cope with these auditory issues. Lastly, approximately 60% of respondents (228 out of 380) experienced reproductive or sexual health-related problems post-recovery. Specialized support and counseling services may be necessary to address these intimate health concerns.

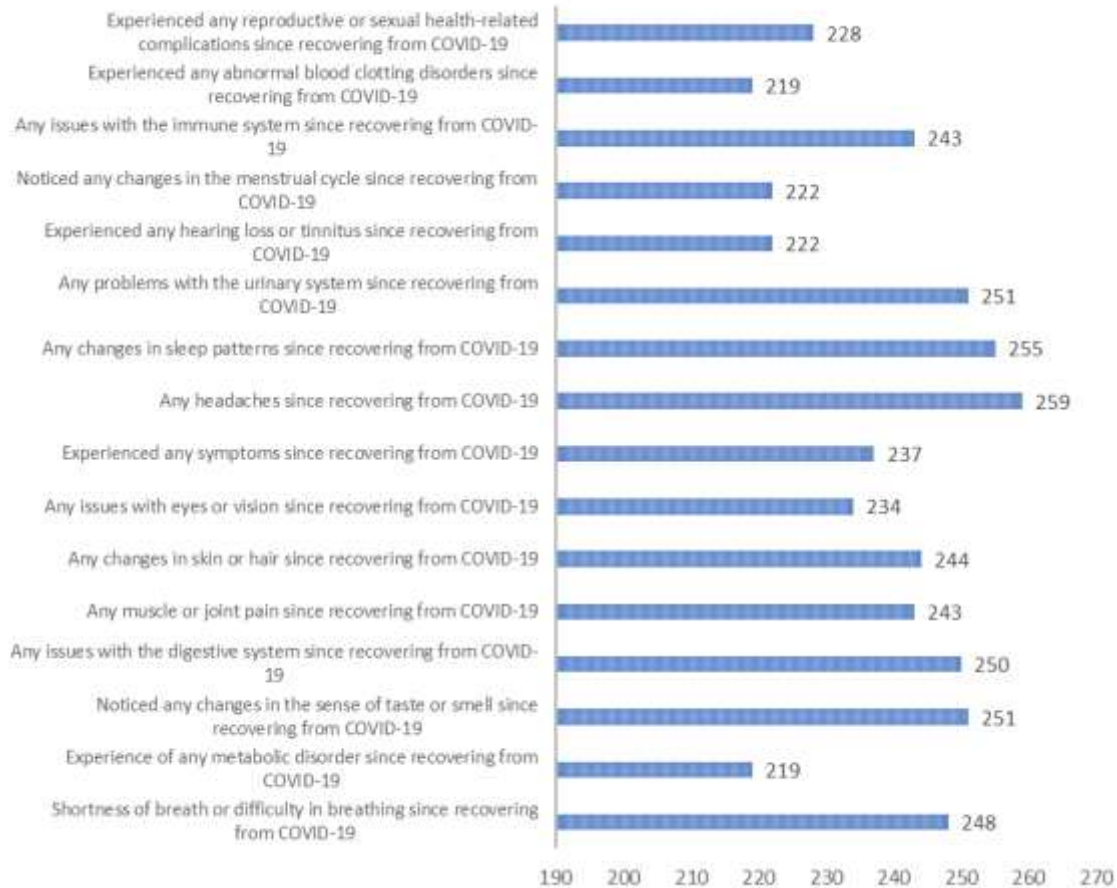


Figure 6: Distribution of medical workforce according to their health-related problems since recovering from COVID-19.

DISCUSSIONS

In this study, we explored various aspects of post-COVID health status and the experiences of healthcare professionals from selected tertiary-level hospitals in the designated region. The diverse medical workforce consisting of 380 participants provided valuable insights into the challenges and opportunities present in the healthcare environment. The majority of participants were nurses, followed by doctors and medical technologists. The inclusion of professionals from different medical backgrounds ensured a comprehensive examination of the healthcare system, as each group brings unique perspectives and expertise to the research. Understanding the experiences and challenges faced by nurses, doctors, and medical technologists is crucial in developing strategies to optimize patient care and enhance the overall healthcare system's effectiveness.

Notably, an impressive 62.9% of the participants had a working history in COVID-19 wards, highlighting their dedication and commitment to frontline challenges during the pandemic. The commitment of these healthcare workers to following proper PPE usage and isolation protocols reflects their vigilance in protecting themselves and others. Reinforcing the correct use of PPE and promoting adherence to isolation protocols through regular training can enhance overall infection control measures in healthcare settings. The diverse demographic characteristics of the participants, including age, marital status, and residency, allowed us to identify potential variations in experiences, perspectives, and priorities. Understanding how these factors may influence career choices, job satisfaction, or willingness to take on additional responsibilities can provide valuable insights for healthcare institutions and policymakers. The study revealed an encouraging high

vaccination rate of 67.4% among healthcare professionals, indicating a proactive approach to safeguarding their health and potentially reducing the risk of transmission. However, nearly half of the participants reported having pre-existing medical conditions, emphasizing the need for workplace policies that prioritize employee health and safety. A substantial proportion of respondents reported being hospitalized at some point during the course of the pandemic. Among those who were hospitalized, the majority reported being able to resume normal activities since recovering from COVID-19, indicating successful recuperation and the effectiveness of healthcare interventions and treatments. Post-recovery symptoms experienced by healthcare professionals who had contracted COVID-19 were diverse and impactful. Symptoms such as shortness of breath, metabolic disorders, changes in taste or smell, digestive issues, muscle or joint pain, and vision problems were prevalent among the participants. Addressing these post-recovery challenges is crucial in providing comprehensive care for affected individuals, including healthcare professionals. The study has important implications for healthcare systems, policymakers, and healthcare institutions. The findings emphasize the need for continuous training and education for healthcare professionals, reinforcing infection control measures, and promoting preventive healthcare practices. Additionally, the study underscores the importance of supporting healthcare professionals with pre-existing medical conditions and acknowledging the diverse range of post-recovery symptoms experienced by COVID-19 survivors. Limitations of the study include potential recall bias and the cross-sectional design, which may limit causal inferences. Future longitudinal studies and intervention programs are warranted to gain further insights into the long-term impact of COVID-19 on healthcare professionals and develop targeted strategies to support their well-being.

CONCLUSIONS

This study sheds light on the post-COVID-19 related health problems among healthcare workers in selected tertiary-level hospitals. The findings emphasize the importance of understanding the experiences and challenges faced by these valiant professionals and implementing targeted interventions to support their recovery and overall well-being. By recognizing and addressing the diverse range of post-recovery symptoms experienced by healthcare professionals, healthcare systems can ensure the optimal health and effectiveness of their workforce, ultimately contributing to enhanced patient care and outcomes.

Limitations

Sample Size and Selection Bias: The study's sample size, though representative of the selected tertiary-level hospitals, may not be exhaustive enough to capture the full spectrum of post-COVID-19 health problems among HCWs. Selection bias could have influenced the participant's willingness to share their experiences,

potentially leading to an overrepresentation of specific perspectives.

Cross-Sectional Design: The study utilized a cross-sectional design, which limits the ability to establish causal relationships between variables. The longitudinal nature of post-COVID-19 health issues may not have been fully captured, and changes over time could not be adequately explored.

Self-Reported Data: The study relied on self-reported data from HCWs, which might be subject to recall bias and social desirability bias. Participants might underreport certain symptoms or experiences, leading to an incomplete understanding of their post-recovery health problems.

Single-Center Focus: The study was conducted within selected tertiary-level hospitals, potentially limiting the generalizability of findings to other healthcare settings. Factors unique to these institutions may not fully represent the experiences of HCWs in different contexts.

Variability in Post-COVID-19 Health Problems: The study aimed to encompass a range of post-COVID-19 health problems, but individual experiences can vary widely. The study's focus on common health problems might not account for more specific or rare manifestations.

External Factors: The study did not account for external factors such as pre-existing health conditions, access to resources, and personal support systems, which could influence the severity and duration of post-recovery health problems among HCWs.

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