ORIGINAL ARTICLE

# Mental health status and associated factors with stress among healthcare workers during the COVID-19 pandemic: a cross-sectional study

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## ABSTRACT

COVID-19, being the most terrible occurrence of the 21st century, has profoundly affected the physical and mental well-being of healthcare workers (HCWs). Throughout this pandemic, HCWs have been at the forefront, confronting numerous physical and mental health problems. Our study aimed to identify the major mental health issues experienced by HCWs in Dhaka City, Bangladesh. Additionally, we aimed to uncover the contributing factors that led to their heightened stress. According to this purpose, this cross-sectional study was conducted from June 2021 to February 2022 with different categories of HCWs selected from twelve hospitals exclusively designated for COVID-19 patients. Data were collected through face-to-face interviews using semi-structured questionnaires. A 10-item Perceived Stress Scale (PSS) was used to assess the stress levels experienced by the respondents. Among the total of 483 HCWs, 76.6% were nurses, 19.9% were doctors, and 3.5% were medical technologists. Our study found that the prevalence of COVID-19 positive cases among HCWs (nurses, doctors, and medical technologists) was 28.6%. Based on the PSS, 93.2% experienced low to moderate levels of stress, and 6.8% reported high levels of stress. A number of sociodemographic, habitual, organizational, and family factors of the respondents were significant, with the PSS at a 5% level of significance and a p-value less than 0.05. However, the variable 'experience of any negligence, torture, blaming/bullying/threat from society' was insignificant to the stress experienced by the HCWs. In brief, the study highlights the mental health issues faced by HCWs amid the pandemic, emphasizing significant associated factors. Organizational support and the role of the HCWs' families are crucial in reducing their stress levels.

**Key words:**
COVID-19; factors; healthcare workers; mental health; stress

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# INTRODUCTION

Coronavirus Disease 2019 (COVID-19) has changed the world a lot, and its impact on healthcare workers (HCWs) is immense[1]. Globally, as of October 18, 2023, there have been nearly eight hundred million confirmed cases of COVID-19, including approximately seven million deaths[2]. For such a huge number of cases, HCWs worldwide were under immense strain[3]. At the height of the COVID-19 pandemic, they had to face this unprecedented situation, were forced to make impossible decisions, and worked under a lot of pressure[4] and the situation led to serious mental health and psychosocial consequences[5]. They were at the forefront, and had to maintain an increased workload and be exposed to high-risk situations. They had to provide treatment to patients while also dealing with their anxieties about contracting the illness and spreading it to their loved ones[6,7]. The emotional toll of dealing with illness and loss[8] had also raised concerns about their mental well-being[9]. They experienced notably increased levels of stress, burnout, secondary trauma, anxiety, and depression. In areas with higher infection rates, there was a greater prevalence of heightened stress and burnout, as well as a reduced sense of compassion and satisfaction[9]. Many factors were simultaneously responsible for this stress[10].

In Bangladesh, the first case of COVID-19 was identified on March 08, 2020[10]. Since then, the situation of the country has been no different than that of the rest of the world[11]. From January 3, 2020, to October 18, 2023, Bangladesh witnessed almost two and a half million confirmed cases of COVID-19, with nearly thirty thousand deaths[12]. During the height of the COVID-19 pandemic, there was a widespread fear of contracting and transmitting the infection[13], which was also shared by HCPs in Bangladesh[14]. Their responsibility was challenging due to the limited healthcare infrastructure[15]. There were problems at the healthcare facilities, and HCWs faced difficulties in getting the necessary equipment to deal with the situation, such as Personal Protective Equipment (PPE)[16] and necessary training[17]. Very few stakeholders had thought of the HCWs' physical and mental health support[18], whose families were also at risk[19], and at some point, society was against them[19]. Young age (25-31), nurse, pharmacist, having a higher educational level or qualifications[20], lack of updated information, lack of confidence to manage stress[21], financial limitations, self-employment, and routine responsibilities[22], physical exhaustion[23], long working hours, and isolation from society[24] further contributed to the mental strain experienced by HCWs.

Numerous countries have conducted studies into the contributing factors of stress among HCWs[25-31]. However, in Bangladesh, we noticed a lack of a comprehensive approach, that encompasses HCWs from all sectors in addressing this issue[32-34]. We ventured into this cross-sectional study, which aims to investigate the mental health status of HCWs in Dhaka City, Bangladesh, and explore the associated factors contributing to their mental well-being. By examining the mental stress of HCWs and identifying the factors associated with this stress, this study aims to provide insights that can apprise targeted interventions. The findings will contribute to the development of evidence-based strategies to mitigate the stress experienced by HCWs, ultimately ensuring their well-being and ability to provide quality care to those in need.

# METHODOLOGY

### *Study design, study areas and data collection*

This cross-sectional study was conducted from June 2021 to February 2022 on HCWs of different categories, such as doctors, nurses, and medical

technologists (pathology, radiology, and imaging), from 10 government and 02 non-government COVID-19-dedicated hospitals in Dhaka City, Bangladesh. Data were collected physically from June to November 2021 through face-to-face interviews. Respondents were helped by explaining the questions if they faced any difficulties answering them.

### *Target population*

We included HCWs who were directly working with COVID-19 patients across different departments such as wards, intensive care units, emergency, etc. HCWs working in areas other than COVID-19 were excluded. Medical and nursing students were excluded from this survey as most of them usually do not enter the stage of clinical practice. Supporting staff were also excluded as they had no professional qualifications in the field and it was not feasible to collect data from this group with this self-administering tool.

### *Sample Size determination*

Considering the 71.2% prevalence of stress[35], 4% error, and a 95% confidence interval, our study's sample size was 492.

n=z2pq/d2, where, n = desired sample size,
z = 1.96 (95% confidence interval)
p = prevalence of stress (71.2%) = 0.712
q = 1-p = 1-0.712 = 0.288, and d = 4% = .04
So, n = (1.96)2 (0.712 x 0.288)/ (0.04) = 492.339456 ~ 492 = 492
Therefore, sample size, n = 492,

Nevertheless, information was gathered from 483 respondents. Nine individuals (constituting 2% of the sample) did not provide responses, resulting in a response rate of 98%.

### *Sampling technique*

The hospitals (10 government and 02 non-government) were selected for this study through a randomized lottery process. The chosen hospitals effectively represent both Dhaka North City and Dhaka South City corporations, encompassing the entire city of Dhaka. Doctors, nurses, and medical technologists were included in the sampling frame. From this sampling frame, the respondents were again nominated by simple random sampling (Figure 1).

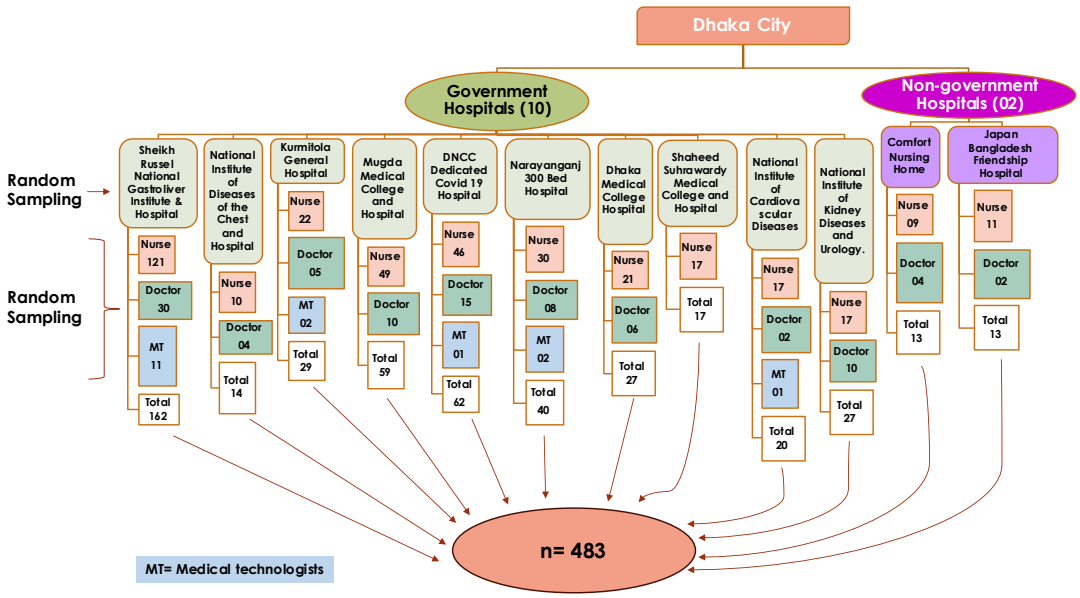


**Figure 1**. Sampling technique of Hospitals and participants (Simple Random Sampling)

***Research instruments and validity and reliability tests of instruments***

A semi-structured self-administering questionnaire was developed to collect data from the respondents. The questionnaire was developed in English and then translated into Bangla[37]. The validity of the contents of the questionnaire was checked by the researchers themselves. While developing the questionnaire, piloting was also done on 14 respondents in a non-sampling area to identify and revise any issues such as ambiguous questions, confusing instructions, or disorder in the questionnaire. This process confirmed the reliability of the questionnaire.

A 10-item Perceived Stress Scale (PSS) was used within the questionnaire to assess the stress experienced by the HCWs[38], to evaluate the perceived stress levels of our study participants. Each item on the scale has a maximum score of 4 (always) and a minimum score of 0 (never). Items 1, 2, 3, 6, 9, and 10 are scored on a scale of 0 to 4, whereas items 4, 5, 7, and 8 are reverse-scored from 4 to 0. The total assessment scores range from 0 to 40: scores between 0 and 13 indicate low stress, 14–26 signify moderate stress, while scores equal to or greater than 27 are indicative of high perceived stress related to COVID-19 [39]. After collecting data, a reliability analysis was conducted that showed that there was an acceptable degree of internal consistency among the items in the PSS, with a Cronbach's alpha of 0.789. The mental health of the respondents was also identified by seven yes-no questions that asked about the respondents' feelings of isolation, depression, fear, and anxiety about different things related to their involvement in managing COVID-19 patients.

***Data Analysis***

All the collected data were checked, edited carefully, coded, and entered into the database using the statistical software IBM SPSS V22. The data were analyzed using descriptive and inferential statistics. Our dependent variable was stress, measured by PSS scores. PSS scores were divided into two categories: one is "low and moderate stress" (consolidating the percentages of 'low' and 'moderate' stress scores), and the other is "high stress." This categorization was adopted to conduct multivariate logistic regression and was also used to perform chi-square tests. Independent variables were socioeconomic characteristics, organizational factors, familial factors, and social factors.

To examine the relationships between the dependent variable and the independent variables, we used the chi-square test. In situations where there was an expected cell count of less than 5, we applied Fisher's exact test to ensure more accurate results. Multivariate logistic regression analyses were performed to explore the relationship between the categories of PSS (dependent variable) and familial, organizational, and social factors (independent variables). In all cases, our chosen level of statistical significance (p-value) was less than 0.05. The strength of the association was evaluated using adjusted odds ratios (AOR) along with their corresponding 95% confidence intervals (CIs).

***Ethical Issues***

To ensure compliance with ethical guidelines, the research protocol underwent evaluation and approval by the Research Ethics Committee (REC) at the Faculty of Allied Health Science (FAHS), Daffodil International University (DIU), with the reference number REC/FAHS/DIU/2021/1017. Before conducting interviews, respondents were provided with information about the study's background and objectives. Each respondent gave written consent, ensuring their strict anonymity and confidentiality. Additionally, permission was obtained from the relevant hospital authorities before collecting data.

## RESULTS

### *Characteristics of the respondents*

In our study, the major age group between 18 - 40 constituted 95.2%, and the remaining individuals, included in the age group 41- 60, accounted for 4.8%, with a mean of 30.89 and a standard deviation (SD) of ± 5.647. Males made up one-quarter (24.6%) of the population, while females made up one-third (75.4%). Among all the 483 respondents, 76.6% were nurses, 19.9% were doctors, and the rest, 3.5%, were medical technologists (Figure 2).

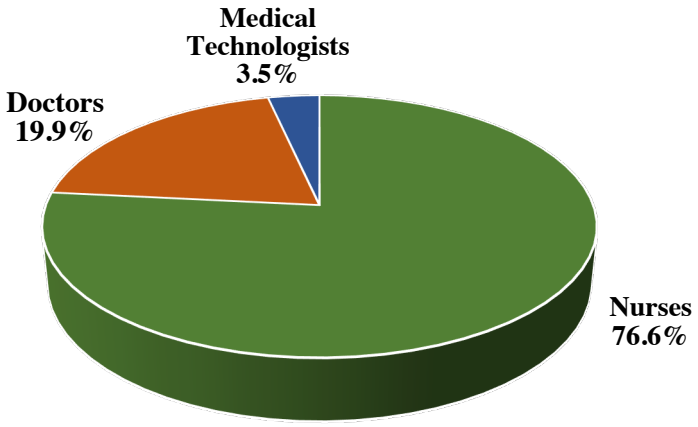


**Figure 2**. Designations of the respondents

As part of our research, we assessed the prevalence of COVID-19 among the respondents. We reviewed their history to determine if they had tested positive for the virus at any point since the beginning of the pandemic. The prevalence of COVID-19 positive cases among the HCWs (nurses, doctors, and medical technologists) was 28.6%. (Figure 3).

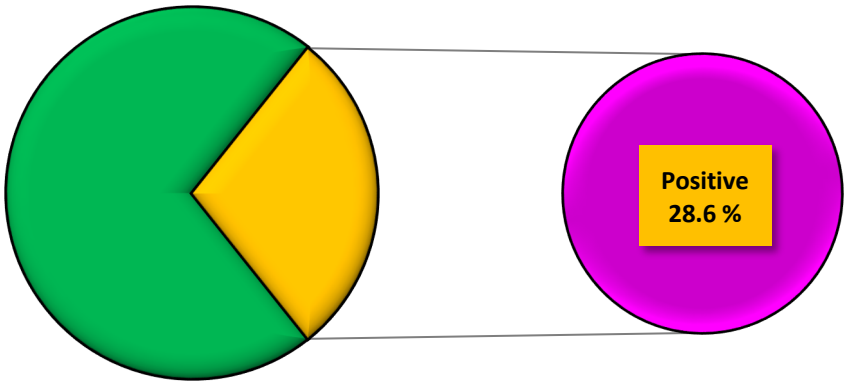


**Figure 3.** Prevalence of COVID-19 positive cases among HCWs (nurses, doctors, and medical technologists)

***The stress level of the respondents according to the PSS***

Respondents were divided into three levels according to PSS; among them, 29.60% reported low stress (scores 0-13), 63.60% presented moderate stress (scores 14-26), and 6.80% reported high perceived stress (scores 27-40) (Figure 4). However, in our analysis, we combined the low and moderate stress levels into a single category (scores 0-26), comprising 93.2% of the data, while categorizing high-stress (scores 27-40) levels separately to conduct multivariate logistic regression.

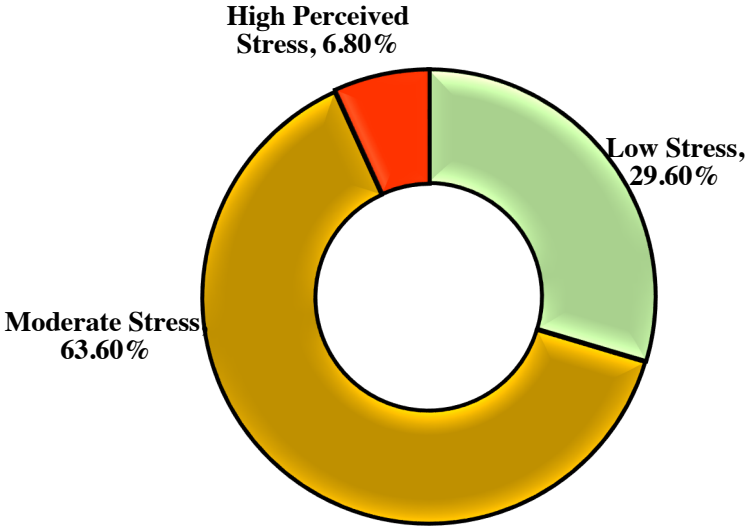


**Figure 4.** The stress level of Covid-19 HCWs according to the PSS

From our study, we found that education, designations, religion, 'special eating habits to avoid COVID-19', and 'extra care at home to avoid COVID-19' of the respondents were significant with the PSS at a 5% level of significance, as indicated by a p-value less than 0.05 (Table 1).

**Table 1.** Association between sociodemographic and habitual factors and stress level of HCWs (n=483)

| Characteristics | Low and moderate stress (%) | High stress (%) | Total n (%) | p Value* |
|---|---|---|---|---|
| **Age group** | | | | |
| 18-40 | 428 (95.1) | 32 (97.0) | 460 (95.2) | 0.628 |
| 41-60 | 22 (4.9) | 1 (3.0) | 23 (4.8) | |
| **Sex** | | | | |
| Male | 110 (24.4) | 9 (27.3) | 119 (24.6) | 0.716 |
| Female | 340 (75.6) | 24 (72.7) | 364 (75.4) | |
| **Marital Status** | | | | |
| Married | 342 (76.0) | 27 (81.8) | 369 (76.4) | 0.198 |
| Unmarried | 104 (23.1) | 5 (15.2) | 109 (22.6) | |
| Divorced/Widowed | 4 (0.9) | 1 (3.0) | 5 (1.0) | |
| **Education** | | | | |
| Diploma | 247 (54.9) | 11 (33.3) | 258 (53.4) | **0.048** |
| Graduation | 147 (32.7) | 17 (51.5) | 164 (34.0) | |

| Characteristics | Low and moderate stress (%) | High stress (%) | Total n (%) | p Value* |
|---|---|---|---|---|
| Post-graduation/Masters | 56 (12.4) | 5 (15.2) | 61 (12.6) | |
| **Designations** | | | | |
| Nurse | 352 (78.2) | 18 (54.5) | 370 (76.6) | **0.008** |
| Doctor | 83 (18.4) | 13 (39.4) | 96 (19.9) | |
| Medical technologists | 15 (3.3) | 2 (6.1) | 17 (3.5) | |
| **Years of Experience** | | | | |
| 2 years or less | 164 (34.0) | 10 (2.1) | 174 (36.0) | 0.478 |
| More than 2 years | 286 (59.2) | 23 (4.8) | 309 (64.0) | |
| **Monthly Income** | | | | |
| Below 50,000 | 405 (90.0) | 29 (87.9) | 434 (89.9) | 0.679 |
| Above 50,000 | 45 (10.0) | 4 (12.1) | 49 (10.1) | |
| **Religion** | | | | |
| Muslim | 376 (83.6) | 22 (66.7) | 398 (82.4) | **0.041** |
| Hindu | 56 (12.4) | 9 (27.3) | 65 (13.5) | |
| Christian | 18 (4.0) | 2 (6.1) | 20 (4.1) | |
| **Special eating habits to avoid COVID-19** | | | | |
| Not at all | 83 (18.4) | 12 (36.4) | 95 (19.7) | **0.028** |
| Sometimes | 220 (48.9) | 15 (45.5) | 235 (48.7) | |
| Regularly | 147 (32.7) | 6 (18.2) | 153 (31.7) | |
| **Extra care at home to avoid COVID-19** | | | | |
| Not at all | 31 (6.9) | 6 (18.2) | 37 (7.7) | **0.041** |
| Sometimes | 208 (46.2) | 16 (48.5) | 224 (46.4) | |
| Regularly | 211 (46.9) | 11 (33.3) | 222 (46.0) | |
| **Respondents tested COVID-19 positive** | | | | |
| No | 324 (72.0) | 21 (63.6) | 345 (71.4) | 0.305 |
| Yes | 126 (28.0) | 12 (36.4) | 138 (28.6) | |

**Significant p Value <0.05 shown in bold*

Behind the stress (according to PSS) experienced by HCWs, various organizational factors were found to be significantly related. These were the safety of the working environment, availability of PPE, monitoring for mental stress, monitoring for family-related responsibilities, HCWs being notified about up-to-date information on COVID-19, getting adequate health support from the organization, and financial support. Training for infection prevention and control (IPC) was found to be statistically insignificant with PSS. The contribution of family, and society had an impact on HCWs. In our study, some factors related to the family such as 'family members take special care of HCWs as they work for COVID-19 patients' and 'a family member who tested COVID-19 positive' were found to be statistically significant. However, the 'experience of any negligence, torture, blaming/bullying/threat from society' was insignificant to the stress of HCWs (Table 2).

**Table 2.** Association between organizational, familial, and social factors and stress level of HCWs (n=483)

| Characteristics | Low and moderate stress (%) | High stress (%) | Total n (%) | p Value* |
|---|---|---|---|---|
| **The safety of the working environment** | | | | |
| Not safe | 50 (11.1) | 10 (30.3) | 60 (12.4) | **0.005** |
| Moderately safe | 171 (38.0) | 11 (33.3) | 182 (37.7) | |
| Highly safe | 229 (50.9) | 12 (36.4) | 241 (49.9) | |
| **Availability of PPE** | | | | |
| A small amount | 174 (38.7) | 19 (57.6) | 193 (40.0) | **0.032** |
| Adequate amount | 276 (61.3) | 14 (42.4) | 290 (60.0) | |
| **Monitoring for mental stress** | | | | |
| Not at all | 266 (59.1) | 27 (81.8) | 293 (60.7) | **0.036** |
| Sometimes | 148 (32.9) | 5 (15.2) | 153 (31.7) | |
| Regularly | 36 (8.0) | 1 (3.0) | 37 (7.7) | |
| **Monitoring for family-related responsibilities** | | | | |
| Not at all/sometimes | 353 (78.4) | 31 (93.9) | 384 (79.5) | **0.033** |
| Regularly | 97 (21.6) | 2 (6.1) | 99 (20.5) | |
| **HCWs notified about up-to-date information on COVID-19** | | | | |
| Not at all/sometimes | 286 (63.6) | 27 (81.8) | 313 (64.8) | **0.034** |
| Regularly | 164 (36.4) | 6 (18.2) | 170 (35.2) | |
| **Getting adequate health support from the organization** | | | | |
| Not at all | 64 (14.2) | 12 (36.4) | 76 (15.7) | **0.003** |
| Sometimes | 223 (49.6) | 12 (36.4) | 235 (48.7) | |
| regularly | 163 (36.2) | 9 (27.3) | 172 (35.6) | |
| **Financial support** | | | | |
| Not satisfactory | 156 (34.7) | 20 (60.6) | 176 (36.4) | **0.003** |
| Satisfactory | 294 (65.3) | 13 (39.4) | 307 (63.6) | |
| **Training for Infection Prevention and Control** | | | | |
| No | 256 (56.9) | 20 (60.6) | 276 (57.1) | 0.677 |
| Yes | 194 (43.1) | 13 (39.4) | 207 (42.9) | |
| **Family members take special care of HCWs as they work for COVID-19 patients** | | | | |
| Not always | 168 (37.3) | 21 (63.6) | 189 (39.1) | **0.003** |
| Always | 282 (62.7) | 12 (36.4) | 294 (60.9) | |
| **A family member who tested COVID-19 positive** | | | | |
| No | 324 (72.0) | 17 (51.5) | 341 (70.6) | **0.013** |
| Yes | 126 (928.0) | 16 (48.5) | 142 (29.4) | |
| **Experience of any negligence, torture, blaming/bullying/threat from society** | | | | |
| Infrequently | 435 (96.7) | 32 (97.0) | 467 (96.7) | 0.925 |
| All the times | 15 (3.3) | 1 (3.0) | 16 (3.3) | |

**Significant p Value <0.05 shown in bold*

***Experiencing mental health problems (other than stress) during COVID-19 management***

Our study found that while working with COVID-19 patients, 99.4% of HCWs experienced some form of mental health problem and only 0.6% had no such problems. Our data reveals that 86.3% feared infecting their family members, 76.0% had a fear of contracting COVID-19,

70.0% of them experienced feelings of isolation, and 60.5% felt depressed. Additionally, 49.5% felt anxious about becoming infected due to the improper fit of masks or other parts of PPE. Furthermore, 36.4% experienced fear of death, and 28.2% had concerns about not receiving adequate treatment (Figure 5).

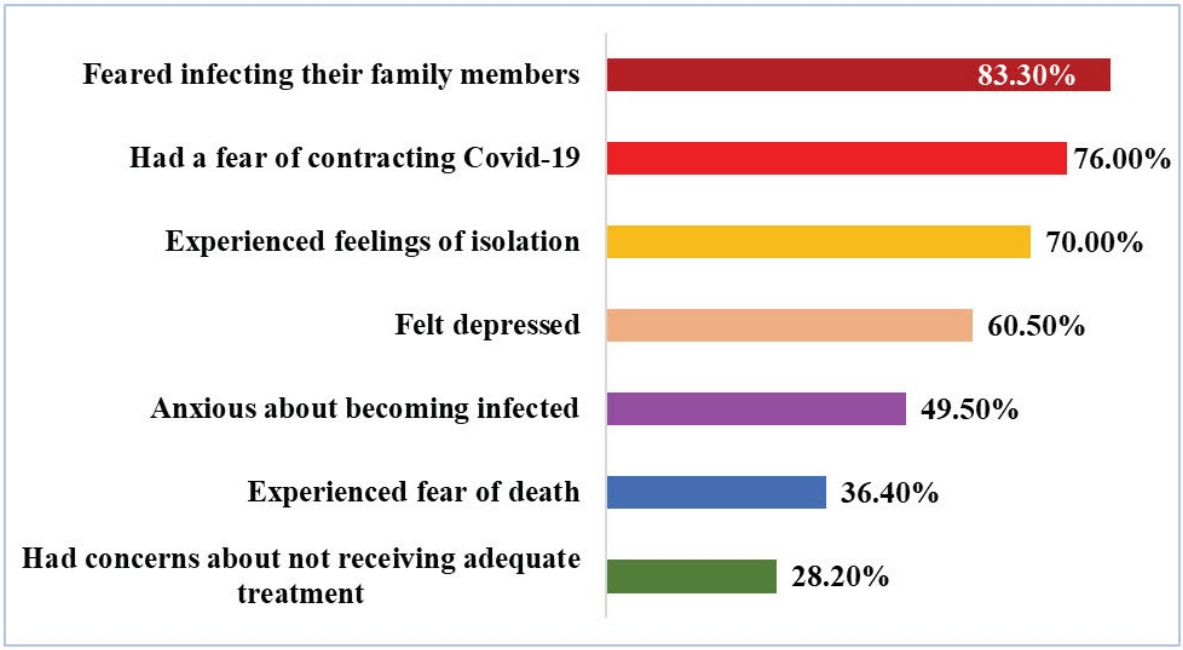


**Figure 5.** Experience of mental health problems of HCWs during COVID-19 management

***The results of the odds ratio for the stress level of HCWs***

Multivariate logistic regression was used to determine the results of the odds ratio for the stress level of HCWs. Factor such as 'Family members taking special care of HCWs, as they work for COVID-19 patients' indicated a statistically significant association [the p-value associated with this AOR is 0.022] between 'always taking special care' and the stress level of HCWs [Odds Ratio (OR) (95% CI): 0.408 (0.189-0.881)]. Meanwhile, the factor 'A COVID-19-positive family member' indicates a strong significant association (p-value for this AOR is 0.029) between testing negative for COVID-19 and the stress level of HCWs [OR (95% CI): 0.440 (.210-.921)]. However, the factor 'The safety of the working environment' was not statistically significant after adjusting for other variables, which suggests no significant association between a highly safe working environment and the stress level of HCWs. On the contrary, the variable 'financial support by the organization' was found to be very significant, (p-value 0.024), showing an association between satisfactory financial support and the stress level of HCWs [OR (95% CI): 0.419 (0.197-0.892)]. The variable 'Experience of any negligence/torture/blaming/bullying/threat from society' was statistically insignificant, showing no association between infrequent experiences and the stress level of HCWs [OR (95% CI): 1.799 (0.200-16.187)] (Table 3).

**Table 3.** The results of the odds ratio for the stress level of HCWs

| Variables | AOR (95% CI) | p-value* |
|---|---|---|
| **Family members take special care of HCWs as they work for COVID-19 patients** | | |
| Always | .408 (.189-.881) | **0.022** |
| Occasionally | Reference | |
| **A family member who tested COVID-19 positive** | | |
| No | .440 (.210-.921) | **0.029** |
| Yes | Reference | |
| **The safety of the working environment** | | |
| Highly safe | 0.453 (0.175-1.174) | 0.103 |
| Moderately safe | 0.416 (0.161-1.072) | 0.069 |
| Not safe | Reference | |
| **Financial support** | | |
| Satisfactory | 0.419 (0.197-0.892) | **0.024** |
| Not satisfactory | Reference | |
| **Experience of any negligence/torture/blaming/bullying/threat from society** | | |
| Infrequently | 1.799 (0.200-16.187) | .601 |
| All the times | Reference | |

*Abbreviation: AOR, Adjusted Odds Ratio.*
*CI, Confidence Interval.*
**Significant p Value <0.05 shown in bold*

## DISCUSSION

In Bangladesh, from January 3, 2020, to October 18, 2023, there have been 2,045,843 confirmed cases of COVID-19, with 29,477 deaths[40]. For this huge number of patients, our HCWs are dedicated to providing care. As a consequence, these frontline workers have been experiencing high levels of stress, influenced by various factors. This study aimed to determine the reasons for stress among them so that steps could be taken to improve their mental health.

The study reported that more than one-quarter (28.6%) of the HCWs were infected with COVID-19. The result of a study done in Mexico was very similar to ours. As of September 20, 2020, 57,758 HCWs were tested for SARS-CoV-2, and 17,531 were confirmed, which was 30.35%[41]. Similar studies were also conducted in India and the United States of America (USA). In India, the prevalence of SARS-CoV-2 infection among HCWs is 11.0%[42]. And in New York City, USA, the prevalence is 9.8%[43]. In comparison to other studies, the percentage found here is very high. It might be due to the time gap between the implementation of various studies. The study done in Mexico corresponds to the time of our study, and the percentage is close enough. So, it can be asserted that the percentage of COVID-19 positive cases among the HCWs was very high.

In our study, 29.6% reported low stress, 63.6% presented moderate stress, and 6.8% reported high perceived stress. A similar study was found in Saudi Arabia, where the PSS revealed that 7.0% of the respondents were suffering from low stress levels, 77.2% were experiencing moderate stress levels, and 15.8% had high stress levels[44]. Suffering from high stress was also elevated in the case of the HCWs from Saudi Arabia, and in that study, most of the participants joined the Corona pandemic team, which was significantly associated

with their stress levels. A study conducted in Northern Colombia reports that the proportion of HCWs with stress was 59,97%. Working areas and occupations related to healthcare and work-stressful situations were found to be associated with stress[45]. Another study conducted in Northern Vietnam also found out that the prevalence of stress symptoms in HCWs was 13.9%. Working areas and occupations related to healthcare and work-stressful situations, engaging in shift work during the pandemic, taking care of patients with COVID-19, and staff's health status were reported to be associated with stress[46]. In our study, participants' education, designation, religion, special eating habits, extra care at home, and many organizational and familial factors were significant contributors to the stress. The perspective underlying the stress, therefore, changed. A wide range of factors should be introduced to mitigate their stress.

In our study, we found associations between sociodemographic, habitual, and organizational factors and the stress levels of HCWs. A comparable study undertaken in China during mid-2020 also revealed a strong association between mental health problems and factors such as sociodemographic characteristics, perceptions of the COVID-19 threat, and the level of support provided by hospitals[47]. So, emphasis should be given to these factors to reduce the stress experienced by HCWs. Besides, our study finds that stress is associated with higher education levels and with the designations of the participants. With higher education levels, people become more sophisticated, and designations are also related for the same reason. Their stress levels increase as they become more concerned. A study conducted in Ethiopia also corresponds with our study, which states that HCWs with a master's degree or above in their qualifications were found to have a strong statistically significant association with the perceived stress of coronavirus disease[48]. Meticulous safety measures may be helpful to reduce their stress levels.

Our study explores the association between stress among HCWs and care from family members. Family relationships play a pivotal role in the recovery process for individuals struggling with mental health challenges. The support provided by family members significantly improves the HCPs' commitment to treatment, their active involvement in the process, and their overall state of mental and emotional health. Families serve as a vital support network, offering not only encouragement and empathy but also practical help when needed[49]. A study conducted in Indonesia in 2020 states that the predominant factor motivating HCWs to offer healthcare services during the COVID-19 pandemic was the support they receive from their families[50]. Based on this statement, it can be inferred that family members can provide a supportive environment for HCWs to alleviate their stress.

From our study, 99.4% of HCWs experienced some form of mental health problem, and 0.6% had no such problems. A study conducted in Iran showed similar high probabilities (98.2%) of mental disorders among HCWs[51]. Both studies had a comparable timeframe, and it was anticipated that the emergence of the new infectious virus would lead to the development of mental health issues. We found that among the participants, 86.3% were in fear of infecting their family members, 76.0% were in fear of contracting COVID-19 , and 60.50% reported feeling depressed. Another study in Bangladesh shows that the overall fear score among the HCPs was $19.39 \pm 5.26$ ($M \pm SD$) out of 28. This study also demonstrated a significant positive correlation between anxiety, insomnia, and fear[22]. A study done in China shows the prevalence of anxiety at 53.0%,

insomnia at 79.0%, depression at 56.0%, and post-traumatic stress disorder at 11.0%[53]. A similar cross-sectional study was done in southern Ethiopia, where depression, anxiety, and stress prevalence were shown to be 50.1%, 55.0%, and 38.5%, respectively[18]. In comparison to these other studies, the percentage of mental health problems was much higher here. In our study, almost all the HCWs faced mental health problems to some extent.

The odds ratio for the stress level of HCWs reveals that factors such as "having a family member who took special care as HCWs worked for COVID-19 patients", "having a family member who is COVID-19 positive", and "having financial support from the organization" were all strongly linked. A separate study conducted in Trinidad and Tobago demonstrated that HCWs who had contact with suspected COVID-19 patients experienced lower stress levels ($p<0.001$, 95% CI −5.364 to −1.591)[54]. This study complies with the finding that when HCWs are in contact with COVID-19 patients or their family members who have tested positive, they tend to have a better understanding of the situation, leading to decreased stress. Regression analysis of another Italian study's data revealed that factors such as younger age, being a woman, working as a front-line HCW, and having a deceased, hospitalized, or quarantined colleague were linked to poor mental health outcomes[55]. The difference might occur due to the timing of the study and different socio-economic situations between the countries. The odds ratio of our study reveals a significant association between satisfactory financial support from the organization and lower stress levels among HCWs. A similar study conducted in Bangladesh also states that financial constraints were an independent predictor of COVID-19 fear[22]. Another study again states that the economic condition is associated with development of mental health problems[13]. These studies suggest that financial compensation may be a means to mitigate stress of the HCWs.

## STRENGTHS AND LIMITATIONS OF THE STUDY

The study was carried out in the midst of the pandemic in 2021 and provided an accurate portrayal of the challenges confronted by HCWs. The participants, predominantly comprising doctors, nurses, and medical technologists from diverse workplaces and backgrounds, shed light on a multitude of mental health issues they were encountering during that period.

Gathering data during the pandemic proved challenging, and hospital staff faced difficulties expressing their true particulars. Consequently, the issues they encountered might have been more significant than what they revealed. So, the pandemic situation itself was a limitation in bringing out the most significant problems faced by HCWs. The study opted for random sampling. Delays in data collection were encountered due to various unavoidable reasons. Additionally, this method may not guarantee sample representativeness, particularly regarding variations in hospital sizes and the distribution of healthcare workers. However, given the constraints of the pandemic situation, it was the most practical choice available.

The research could have gained valuable insights from including support staff, but doing so would have extended the duration of the study more. Additionally, minority subgroups like nutritionists and biomedical engineers were excluded due to their small numbers, limiting the study's scope.

## CONCLUSION AND RECOMMENDATIONS

Stress levels among HCWs were found to be linked to various socio-

demographic, and habitual factors. Additionally, the stress experienced by HCWs was also associated with organizational factors, including the safety of their work environment and the availability of adequate health and financial support. Familial factors were also related to stress. Other various mental health problems were also very high among the HCWs.

These findings indicate that implementing strategies to enhance the safety and security of HCWs and making constructive changes to organizational factors can effectively reduce their stress levels. Additionally, when family members engage supportively with HCWs, it can contribute to lower stress levels. Recognizing the significance of comprehensive support systems is crucial for stakeholders and policymakers in enhancing the overall health and well-being of HCWs.

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