Original Article

POST-TRAUMATIC STRESS DISORDER AMONG MEDICAL SUPPORT STAFF IN BANGLADESH DURING THE COVID-19 PANDEMIC

Dr. Faisal Ahmed¹, Dr. Tansiv Zubayer², Dr. Md. Ali Ajim³, Dr. Masum Billah⁴, Dr. Jannat Ara⁵, Dr. Radaur Rahman Khan⁶, Dr. Maymunah Mahmood⁷, and Dr. Fahmida Akter⁸

ABSTRACT

Background: The healthcare professionals, especially the medical support staff, suffered a huge physical as well as psychological trauma during the COVID-19 pandemic. By recognizing their role as frontline workers, they were the most exposed group who faced the terrifying virus, which created mental health problems during the pandemic. The purpose of this study is to find the prevalence of PTSD among medical support staff during the COVID-19 pandemic.

Methods: This cross-sectional study was designed to assess the prevalence of post-traumatic stress disorder (PTSD) among purposefully selected 289 medical support staff working at treating COVID-19 patients in government hospitals during the COVID-19 pandemic in Bangladesh. The Impact of Event Scale-Revised (IES-r) was used to prepare the questionnaire.

Results: The mean age of the medical support staff was 31.09±8.91 years. All of them suffered from mild to severe types of PTSD. Most of the participants were male (65.7%), aged between 26 to 35 years (46.7%), married (70.6%), working indoors (64.4%), and living with family (73.4%). 65.1% of the participants didn't have any co-morbidities, 12.1% of the participants were suffering from hypertension, 11.4% of them were suffering from asthma/copd, 8.0% were suffering from diabetes, and the rest of them were suffering from other chronic diseases. This study also found that about two-thirds of the participants (181) were suffering from mild PTSD.

Conclusion: Appropriate measures were urgent to make the frontliner health care support staff's mental health conditions recognized and well-treated, as well as for prevention.

_____

1. *Dr. Faisal Ahmed, Deputy Civil Surgeon, Civil Surgeon's Office, Mymensingh.*
2. *Dr. Tansiv Zubayer, Upazila Health and Family Planning Officer. Bhanga Upazila Health Complex, Bhanga, Faridpur.*
3. *Dr. Md. Ali Ajim, Lecturer, Department of Community Medicine and Public Health, Dhaka Medical College, Dhaka.*
4. *Dr. Masum Billah, Medical Officer (Unani), Upazila Health Complex, Amtoli, Barguna.*
5. *Dr. Jannat Ara, Assistant Registrar, Department of Pediatrics Hematology and Oncology, Mymensingh Medical College Hospital.*
6. *Dr. Radaur Rahman Khan, Lecturer, Department of Biochemistry, Mymensingh Medical College.*
7. *Dr. Maymunah Mahmood, Indoor Medical Officer, Department of Gynaecology and Obstetrics, Mymensingh Medical College Hospital.*
8. *Dr. Fahmida Akter, Associate Professor, Department of Epidemiology, NIPSOM.*
***Correspondence:** Dr. Faisal Ahmed, Deputy Civil Surgeon, Civil Surgeon's Office, Mymensingh. Mobile no: 01715458709, Email address: tusher151@gmail.com, ORCID iD: 0009-0002-8780-5196*

INTRODUCTION

In late December 2019, the Chinese city of Wuhan was informed about some cases of pneumonia that had no known cause.[1] China was affected by a new type of virus called the 2019 novel coronavirus (2019-nCoV). This virus was named COVID-19. It quickly spread around the world, causing the WHO

to declare it a pandemic.[2] This pandemic is causing a lot of damage all over the world. So far, there have been over 92.51 million confirmed cases and about 2 million deaths.[3] Bangladesh has seen almost 29,500 deaths out of over 20.42 million confirmed cases so far.[4] The ongoing pandemic has caused uncertainty and worries about the economy, jobs, money, relationships, and both physical and mental well-being. Medical support staff are on the frontlines of the pandemic, and their profession has been linked to increased mental health issues during emergencies.[5,6] These workers are more likely to develop PTSD. Especially, medical support staff have a higher chance of getting sick, becoming impatient, and having their usual support systems changed.[7] In healthcare workers, the number of people experiencing PTSD is higher compared to the general public. In a recent study in Singapore about COVID-19, it was found that 6-10% of healthcare staff had PTSD.[8] Overall, 18% of hospital nurses in different studies also had PTSD,[9] and during the SARS outbreak, the percentage was 20%.[10] Therefore, during pandemics, people are more likely to experience higher levels of PTSD compared to non-pandemic times. As shown in past pandemics like SARS and MERS, having close contact with infected people is linked to experiencing strong PTSD symptoms.[11-13] In Bangladesh, there is a serious lack of resources for healthcare professionals for medical support staff (MSS). Due to not having enough protective gear and having to handle a lot of work, they are at risk of feeling worried, tired, and not able to sleep well.[14] The mental health of medical support staff in Bangladesh is getting worse because they are worried about getting infected with the disease they are in contact. They also feel stressed because they worry about spreading the infection to their families and being isolated from others because of the stigma around the disease.[15] Many medical support staff (MSS) have been exposed to the virus, either directly or indirectly, and have also witnessed the deaths of patients. Such exposure to traumatic events can contribute to the development of post-traumatic stress disorder (PTSD). The incidence of PTSD amongst medical support staff throughout the COVID-19 pandemic isn't yet completely known; however, it's anticipated to be high. A recent study reported that the overall prevalence of PTSD among healthcare workers was 14%, which suggests that approximately one in seven HCWs exposed to the COVID-19 pandemic may develop PTSD.[16] Symptoms of PTSD can include flashbacks, nightmares, avoidance of reminders of the disturbing occasion, and problem-napping. PTSD can also lead to social isolation, depression, and anxiety. The look at the superiority of PTSD amongst medical support staff is vital for

several reasons.[17] First, it can help raise awareness about the problem of PTSD among medical support staff. Second, it can help identify those who are at risk of developing PTSD. Third, it can support the development of interventions to prevent and treat PTSD in this group. The study provides important information on the prevalence of PTSD among medical support staff (MSS) and identifies factors associated with an increased risk of developing PTSD. The findings of this study can be used to expand interventions to help us prevent and treat PTSD in MSS. In addition to the above, there are several other reasonswhy it is important to observe the prevalence of PTSD among scientific guides during the covid-19 pandemic to understand the long-term mental health impact of the pandemic on healthcare professionals, perceive threat factors for PTSD with MSS, expand and explore interventions to save and treat PTSD in MSS, recommend rules and procedures to promote the mental health of MSS.

METHODS

Study design and settings:

This cross-sectional study was conducted among 289 medical support staff working in COVID-19 units of five government hospitals in the Dhaka division of Bangladesh (Dhaka Medical College Hospital, Bangladesh Kuwait Moitree Hospital, Mugda Medical College Hospital, Kurmitola General Hospital, and Tungipara Upazila Health Complex) between July and December 2020.

Study population:

The study was conducted with 289 medical support staff at five government hospitals in Bangladesh during the COVID-19 pandemic. The hospitals were Dhaka Medical College Hospital, Bangladesh Kuwait Moitree Hospital, Mugda Medical College Hospital, Kurmitola General Hospital, and Tungipara Upazila Health Complex. People who were not able to participate in this study were medical support staff who were not working in the COVID unit.

Data source and tools:

Participants were asked questions in person or on the phone, depending on what was easiest for them, from July 2020 to December 2020. Information was gathered using a questionnaire that had been tested beforehand and was designed to provide flexibility in how the questions were answered. The sociodemographic characteristics of the participants and the IES-R were used to find out if medical support staff had PTSD and their characteristics. The research included things like age, gender, marital

status, education level, living situation, work history, and whether someone had COVID-19. The IES-R has 22 questions and a cutoff score of 33 or higher. It is suggested that the initial diagnosis of PTSD. Patients can use numbers from 0 to 4 to show how often certain comments have been true in the past 30 days. 0 means "not at all", 1 means "a little bit" or "mild", 2 means "moderately", 3 means "quite a bit", and 4 means "extremely". The total scores, which go from 0 to 88, show how bad PTSD is.[18] At first questionnaire was prepared in English. Then it was translated into Bangla and then re-translated into English to verify the translation. Bangla questionnaire was used to collect data.

Statistical analysis:

The information was carefully organized, inputted, corrected, and prepared, and then put into SPSS v25. We did a preliminary analysis to describe the group of people in the study. The information about different categories will be shown in tables that tell us how often each category appears. We looked at continuous numbers and found out their mean, percentile, and standard deviation. To determine if there was a meaningful connection, the Chi-square test ($\chi 2$) and Fisher's exact test were used. They both checked for associations and had a 95% confidence level. If the p-value was less than 0.05, it meant there was a significant association. The findings were displayed in tables and charts.

Selection Criteria:

Inclusion Criteria:

a. Any medical support staff of hospitals where COVID-19 patients get treatment.

b. Currently working and must have been working for at least 1 month.

c. Medical support staff of all sexes and ages.

Exclusion Criteria:

a. Medical support staff currently on leave.

b. Diagnosed patient with insomnia.

Ethical Implication

Ethical approval was obtained from the Institutional Review Board (IRB) of NIPSOM (memo no: NIPSOM/IRB/2020/1225). An informed written consent in Bengali was used to take consent from the respondents. Before starting the interview, the respondents were informed about the general and specific objectives of the study and its purpose of the study. Respondents were assured of the confidentiality of the data. The risks and benefits of the study were also explained clearly. They were informed about their full right to participate and refuse the study at any time. No invasive procedures or interventions were done in this study. Data were collected only from those respondents who participated voluntarily. This study was conducted according to the guidelines laid down in the Declaration of Helsinki protocols.

RESULTS

This cross-sectional study was carried out on 289 medical support staff working at hospitals where COVID-19 patients were admitted for treatment. Data were analyzed using the appropriate statistical procedure by SPSS 25, and the results are presented in this chapter through tables and figures.

Figure 1 depicts the distribution of post-traumatic stress disorder (PTSD) symptoms among the respondents. The majority, 181 participants, had subclinical PTSD. 81 respondents experienced mild symptoms, 25 experienced moderate symptoms, and only 2 medical support staff had a severe impact of events on their mental health.

Figure 1: Frequency distribution of PTSD medical support staff (N = 289)
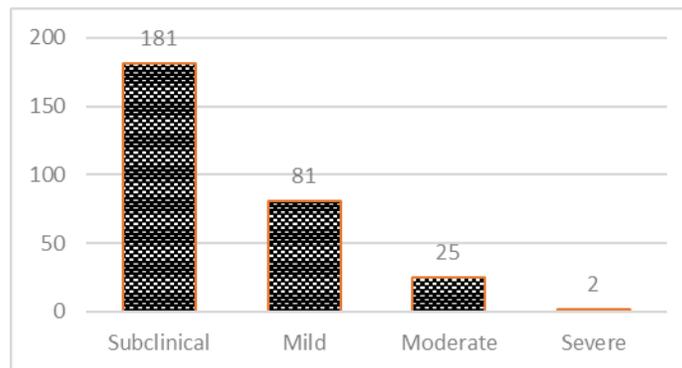
Table 1 presents the socio-demographic characteristics of the individuals who participated in the study. The majority of participants were male, accounting for 65.7% of the total sample, while the remaining 34.3% were female. The age range of participants was between 18 and 63 years, with a mean age of 31.09 years and a standard deviation of 8.91. Nearly half of the participants (46.7%) were in the age group of 26 to 35 years. The majority of participants (70.6%) were married, while 26.6% were single, and only 2.8% were widowed or divorced. All participants had basic literacy skills, and only 9.7% had completed graduation or post-graduation. Among the remaining participants, 12.1% studied primary education, 25.3% studied junior school, 26.6% studied secondary school, and 26.3% studied higher secondary school.

Table 1: Socio-demographic characteristics of the respondents (N = 289)

Socio-demographic characteristics	Frequency (f)	Percentage (%)
Sex		
Female	99	34.3
Male	190	65.7
Age group (in years)		
18 to 25	83	28.7
26 to 35	135	46.7
36 to 45	49	17.0
46 and above	22	7.6
Marital status		
Single	77	26.6
Married	204	70.6
Widowed or divorced	8	2.8
Educational status		
Primary	35	12.1
Junior school	73	25.3
S.S.C.	77	26.6
H.S.C.	76	26.3
Graduation or above	28	9.7

Table 2 displays the work-related characteristics of the study participants. Of the total respondents, 31.1% worked as cleaners, 24.6% worked as ward boys, and 15.6% worked as security guards. Additionally, 17.0% worked as healthcare attendants (aya), and the remaining participants worked as cooks or in other positions. The majority (64.4%) worked indoors, while 11.1% worked outdoors, 8.0% worked in emergency departments, and 16.6% worked in operating theatres (OT), intensive care units (ICU), or high dependency units (HDU). Of the 289 respondents, 51.2% had direct contact with feverish or infected patients, while 48.8% did not have such contact.

Table 2: Work-related characteristics of the respondents (N = 289)

Work-related characteristics	Frequency (f)	Percentage (%)
Respondents' profession		
Cleaner	90	31.1
Cook	9	3.1
Security guard	45	15.6
Aya	49	17.0
Ward boy	71	24.6
Others	25	8.7
Current work station		
Indoor	186	64.4

Outdoor	32	11.1
O.T./ICU/HDU	48	16.6
Emergency	23	8.0
Direct contact with feverish or infected patients		
Yes	148	51.2
No	141	48.8

Table 3 presents the social characteristics of the respondents. Of the participants, 73.4% lived with their family, 21.8% lived with colleagues, and 4.8% lived with friends. Overall, 64.7% did not contract COVID-19, while 35.3% of MSS or their cohabitants did contract the virus.

Table 3: Social characteristics of the respondents (N = 289)

Social characteristics of the respondents	Frequency (f)	Percentage (%)
Living situation of the respondents in the past 2 weeks		
Family	212	73.4
Friends	14	4.8
Colleague	63	21.8
A person her/himself or persons living with her/him got infected		
No	187	64.7
Yes	102	35.3

Table 4 illustrates the presence of co-morbidities among the respondents. The majority of medical support staff (65.1%) did not have any comorbidities, while hypertension and asthma/COPD were the most common conditions.

Table 4: Presence of co-morbidities among medical support staff (N = 289)

Co-morbidities (Multiple response)	Frequency (f)	Percentage (%)
No	188	65.1
Diabetes mellitus	23	8.0
Hypertension	35	12.1
Hyperthyroid	4	1.4
Arthritis	15	5.2
Asthma/COPD	33	11.4
Others	8	2.8

* Multiple responses

Table 5 indicates that there is no significant association of different variables with the prevalence of various types of PTSD levels among medical support staff, except that direct contact with feverish or infected patients had a borderline result ($\chi^2(3)$ = 7.812, p = 0.050).

Table 5: Association of different variables with the prevalence of PTSD levels among medical support staff

Characteristics	PTSD levels among medical support staff				Total N (%)	χ^2	p-value
	Subclinical n (%)	Mild n (%)	Moderate n (%)	Severe n (%)			
Sex							
Female	60 (60.6)	30 (30.3)	9 (9.1)	0 (0)	99	0.693	1.452
Male	121 (63.7)	51 (26.8)	16 (8.4)	2 (1.1)	190	df=3	
Age group							

18 to 25	52 (62.7)	23 (27.7)	7 (8.4)	1 (1.2)	83		1.945
26 to 35	85 (63)	38 (28.1)	11 (8.2)	1 (0.7)	135	0.992	
36 to 45	32 (65.3)	13 (26.5)	4 (8.2)	0 (0)	49	df=9	
46 and above	12 (54.5)	7 (31.9)	3 (13.6)	0 (0)	22		
Marital status							
Single	50 (64.9)	18 (23.4)	7 (9.1)	2 (2.6)	77	0.354	6.650
Married	126 (61.8)	61 (29.9)	17 (8.3)	0 (0)	204	df=6	
Widowed or divorced	5 (62.5)	2 (25)	1 (0.5)	0 (0)	8		
Education level Primary							
Junior school	23 (65.7)	9 (25.7)	3 (8.6)	0 (0)	35		8.799
S.S.C.	48 (65.8)	19 (26)	6 (8.2)	0 (0)	73	0.720	
H.S.C.	52 (67.5)	19 (24.7)	6 (7.8)	0 (0)	77	df=12	
Graduation or	41 (53.9)	27 (35.5)	7 (9.3)	1 (1.3)	76		
Post-graduation	17 (60.7)	7 (25)	3 (10.7)	1 (3.6)	28		
Respondents' profession							
Cleaner	64 (71.1)	22 (24.5)	4 (4.4)	0 (0)	90		20.004
Cook	2 (22.2)	5 (55.6)	2 (22.2)	0 (0)	9		
Security guard	30 (66.7)	12 (26.6)	3 (6.7)	0 (0)	45	0.172	
Aya	31 (63.3)	15 (30.6)	3 (6.1)	0 (0)	49	df=15	
Ward boy	40 (56.3)	20 (28.2)	10 (14.1)	1 (1.4)	71		
Others	14 (56.0)	7 (28.0)	3 (12.0)	1 (4.0)	25		
Current workstation							
Indoor	126 (67.7)	47 (25.3)	12 (6.45)	1 (0.5)	186	0.103	18.439
Outdoor	14 (43.8)	13 (40.6)	5 (15.6)	0 (0)	32	df=12	
O.T./ICU/HDU	29 (60.4)	13 (27.1)	6 (12.5)	0 (0)	48		
Emergency	12 (52.2)	8 (34.8)	2 (8.7)	1 (4.3)	23		
Direct contact with feverish or infected patients							
No	98 (69.5)	35 (24.8)	8 (5.7)	0 (0)	141	0.050	7.812
Yes	83 (56.1)	46 (31.1)	17 (11.4)	2 (1.4)	148	df=3	
Living situation of the respondents in the past 2 weeks							
Family	128 (60.4)	65 (30.7)	18 (8.5)	1 (0.4)	212	0.649	4.204
Friends	9 (64.3)	3 (21.4)	2 (14.3)	0 (0)	14	df=6	
Colleague	44 (69.8)	13 (20.6)	5 (7.9)	1 (1.6)	63		
A person her/himself or persons living with her/him got infected							
No	121 (64.7)	52 (27.8)	14 (7.5)	0 (0)	187	0.182	4.870
Yes	60 (58.8)	29 (28.4)	11 (10.8)	2 (2)	102	df=3	
Presence of co-morbidities							
No	123 (65.5)	48 (25.5)	16 (8.5)	1 (0.5)	188	0.556	2.078
Yes	58 (57.5)	33 (32.7)	9 (8.9)	1 (0.9)	101	df=3	

DISCUSSION

During the pandemic in Bangladesh, this cross-sectional study was conducted. Almost all the research on PTSD discusses lifespan prevalence, which provides higher numbers for individuals with PTSD. In this research performed among US and Canadian people, the lifetime prevalence ranged from 6.1 to 9.2%.[19-23] Many studies have been conducted on medical personnel, but among medical support staff, there are few. Our study reveals that the prevalence is under-reported. According to the WHO, it is estimated that in lower-middle- to upper-income countries, around 2.1% to 2.3% of permanent residents suffer from PTSD once in a lifetime.[23-25] The current study reveals that the prevalence of PTSD among male medical support staff (65.7%) is nearly double that of female support staff (34.3%). According to age group, the medical support staff aged between 26 and 35 (46.7%) is nearly the same as those aged 18 to 25 (28.7%), 36 to 45 (17%), and 46 to above (7.6%) combined. According to a study conducted in Canada to determine PTSD and associated comorbid conditions, the prevalence of PTSD among females is 51.7%, among males is 48.3%, and the age group 18 to 35 is 40.3%, and the age group 35 to 60 is 42.8%, which is the reverse in this study.[19] According to marital status, married people are suffering from PTSD (70.6%) nearly three times more than that of unmarried persons (26.6%), which is in contrast to the previous studies.[26,27] Reduced social and other types of socio-cultural support might play negative roles in creating PTSD. The association between marital status and PTSD is significantly strong. Previously, it was found that single citizens had a higher number of referrals than married citizens, which is nearly similar to these study results.[8,12,25] The study shows that around one-third of the medical support staff (34.9%) are suffering from different co-morbidities like hypertension (12.1%), asthma/copd (11.4%), and diabetes mellitus (8.0%). A previously conducted study found that around 24.8% of doctors are suffering from at least one of the chronic diseases, including asthma.[27] In this study, around two-thirds of the study subjects are suffering from subclinical PTSD (181), nearly one-third are suffering from mild PTSD (81), and only two are suffering from severe PTSD. The test of significance shows that there is no significant relation between PTSD and the participant's sex, age group, marital status, education level, professional discipline, current work station, living situation, or presence of co-morbidities (p >

0.05). Table 5 shows that the oldest group (≥46 years) had a somewhat higher proportion of moderate PTSD (13.6%) compared with younger groups (~8%). The chi-square test did not find a statistically significant association ($\chi^2(9) = 1.95$, p = 0.99), likely because the sample size in this subgroup was small. However, the HSC group showed the highest proportion of mild PTSD (36.8%), compared with ~23–30% in other education groups. In Table 5, the chi-square test shows $\chi^2 (15) = 20.0$, p = 0.172, indicating no significant association between profession and PTSD severity. However, the descriptive results suggest potentially meaningful patterns: cooks (n=9) had high levels of mild (55.6%) and moderate (22.2%) PTSD, ward boys showed the highest proportion of moderate PTSD (14.1%), and the "other" group included severe cases (4%). While these differences are not statistically significant, they may still be clinically relevant since the small sample sizes limit the statistical power. However, direct contact with feverish or infected patients had a borderline result (p = 0.050). Even if it does not reach conventional significance, it is an important finding because it is clinically plausible that direct exposure increases PTSD risk. The research was done on only a few hospitals, so the results cannot be applied to all hospitals. There could be some recall bias because the people themselves shared the information. The past experiences of having mental disorders were not ignored, so there is a possibility that they might come back or worsen during the COVID period.

CONCLUSION

This study reveals that all the medical support staff are suffering from PTSD, which is a serious health issue and must be of concern to the relevant ministries, divisions, and other authorities. This is important both in pandemic and normal situations because of its long-term effect on persons and their related family and friends. An appropriate and coordinated approach should be taken to treat and prevent mental health disorders. Adequate supply of PPEs, sufficient training, motivational incentives, etc., should be provided to ensure mental health safety to reduce PTSD and other psychological disorders.

Conflict of interests: We do not have any conflict of interest.

Ethical Implications:

Written permission from the participants in the Bengali language was used, which was translated from the English version that was prepared beforehand when applicable. At the beginning of the interview, the participants were told about the overall and specific goals of the research and why the research was being conducted. The people who answered were told that their information would be kept private. The study's possible dangers and advantages were also clearly described. They were told that they had the choice to join and leave the study whenever they wanted. No surgeries or treatments were performed in this study. Only information from people who willingly took part was collected. This study followed the rules set out in the Declaration of Helsinki protocols.

REFERENCES

01. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. The Lancet. 2020 Feb 15;395(10223):497-506.

02. WHO's COVID-19 response. www.who.int. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline#event-43

03. WorldOMeter. Coronavirus toll update: Cases & deaths by country. Worldometer. 2023. Available from: https://www.worldometers.info/coronavirus/

04. Bangladesh Coronavirus: 8,238 Cases and 170 Deaths - Worldometer. www.worldometers.info. Available from: https://www.worldometers.info/coronavirus/country/bangladesh/

05. Wu P, Fang Y, Guan Z, Fan B, Kong J, Yao Z, Liu X, Fuller CJ, Susser E, Lu J, Hoven CW. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. The Canadian Journal of Psychiatry. 2009 May;54(5):302-11.

06. Nickell LA, Crighton EJ, Tracy CS, Al-Enazy H, Bolaji Y, Hanjrah S, Hussain A, Makhlouf S, Upshur RE. Psychosocial effects of SARS on hospital staff: survey of a large tertiary care institution. Cmaj. 2004 Mar 2;170(5):793-8.

07. Johnson SU, Ebrahimi OV, Hoffart A. PTSD symptoms among health workers and public service providers during the COVID-19 outbreak. PloS one. 2020 Oct 21;15(10):e0241032.

08. Tan BY, Chew NW, Lee GK, Jing M, Goh Y, Yeo LL, Zhang K, Chin HK, Ahmad A, Khan FA, Shanmugam GN. Psychological impact of the COVID-19 pandemic on health care workers in Singapore. Annals of internal medicine. 2020 Aug 18;173(4):317-20.

09. Mealer M, Burnham EL, Goode CJ, Rothbaum B, Moss M. The prevalence and impact of post-traumatic stress disorder and burnout syndrome in nurses. Depression and anxiety. 2009 Dec;26(12):1118-26.

10. Chan AO, Huak CY. Psychological impact of the 2003 severe acute respiratory syndrome outbreak on health care workers in a medium-sized regional general hospital in Singapore. Occupational medicine. 2004 May 1;54(3):190-6.

11. Maunder RG, Lancee WJ, Rourke S, Hunter JJ, Goldbloom D, Balderson K, Petryshen P, Steinberg R, Wasylenki D, Koh D, Fones CS. Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. Psychosomatic medicine. 2004 Nov 1;66(6):938-42.

12. Lee SM, Kang WS, Cho AR, Kim T, Park JK. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. Comprehensive psychiatry. 2018 Nov 1;87:123-7.

13. Jung H, Jung SY, Lee MH, Kim MS. Assessing the presence of post-traumatic stress and turnover intention among nurses post–Middle East respiratory syndrome outbreak: the importance of supervisor support. Workplace health & safety. 2020 Jul;68(7):337-45.

14. Sabur MA. Health Workforce in Bangladesh. The Journal of Ad-din Women's Medical College. 2024;12(2):1-4.

15. Oswald LO. Protecting health care workers in low-resourced Bangladesh. Scope. 2021. Available from: https://scopeblog.stanford.edu/2021/08/09/protecting-health-care-workers-in-low-resourced-bangladesh/

16. Alberque B, Laporte C, Mondillon L, Baker JS, Mermillod M, Brousse G, Ugbolube UC,

Bagheri R, Bouillon-Minois JB, Dutheil F. Prevalence of post-traumatic stress disorder (PTSD) in healthcare workers following the first SARS-CoV epidemic of 2003: a systematic review and meta-analysis. International journal of environmental research and public health. 2022 Oct 11;19(20):13069.

17. d'Ettorre G, Pellicani V, Ceccarelli G. Post-traumatic stress disorder symptoms in healthcare workers: a ten-year systematic review. Acta Bio Medica: Atenei Parmensis. 2020 Nov 30;91(Suppl 12):e2020009.

18. The. The Impact of Event Scale – Revised (IES-R). NovoPsych. 2021. Available from: https://novopsych.com/assessments/diagnosis/the-impact-of-event-scale-revised-ies-r/

19. Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. Archives of general psychiatry. 2005 Jun 1;62(6):593-602.

20. Van Ameringen M, Mancini C, Patterson B, Boyle MH. Post-traumatic stress disorder in Canada. CNS neuroscience & therapeutics. 2008 Sep;14(3):171-81.

21. Goldstein RB, Smith SM, Chou SP, Saha TD, Jung J, Zhang H, Pickering RP, Ruan WJ, Huang B, Grant BF. The epidemiology of DSM-5 posttraumatic stress disorder in the United States: results from the National Epidemiologic Survey on Alcohol and Related Conditions-III. Social psychiatry and psychiatric epidemiology. 2016 Aug;51:1137-48.

22. Marco CA, Larkin GL, Feeser VR, Monti JE, Vearrier L, ACEP Ethics Committee. Post-traumatic stress and stress disorders during the COVID-19 pandemic: Survey of emergency physicians. Journal of the American College of Emergency Physicians Open. 2020 Dec;1(6):1594-601.

23. Koenen KC, Ratanatharathorn A, Ng L, McLaughlin KA, Bromet EJ, Stein DJ, Karam EG, Ruscio AM, Benjet C, Scott K, Atwoli L. Posttraumatic stress disorder in the world mental health surveys. Psychological medicine. 2017 Oct;47(13):2260-74.

24. Gold JA. Covid-19: adverse mental health outcomes for healthcare workers. Bmj. 2020 May 5;369.

25. Abir T, Kalimullah NA, Osuagwu UL, Yazdani DM, Husain T, Goson PC, Basak P, Rahman MA, Al Mamun A, Permarupan PY, Khan MY. Prevalence and factors associated with mental health impact of COVID-19 pandemic in Bangladesh: a survey-based cross-sectional study. Annals of global health. 2021;87(1).

26. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, Wu J, Du H, Chen T, Li R, Tan H. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Network Open. 2020 Mar 2;3(3):e203976-.

27. Barua L, Zaman MS, Omi FR, Faruque M. Psychological burden of the COVID-19 pandemic and its associated factors among frontline doctors of Bangladesh: a cross-sectional study. F1000Research. 2020;9.