Original Article

PREDICTORS OF PSYCHOLOGICAL IMPACT AMONG THE HEALTHCARE WORKERS EXPOSED TO COVID-19 CASES IN A TERTIARY HOSPITAL OF BANGLADESH

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ABSTRACT

Background: The unprecedented global pandemic caused by SARS-CoV-2 creates considerable psychological problems among the health care workers (HCW). The present study aimed to determine the predictors of psychological impact (in terms of depression, anxiety and stress) among the HCWs exposed Covid-19 cases in Combined Military Hospital (CMH) Dhaka.

***Methods*:** This cross-sectional study was conducted at CMH Dhaka among purposively selected 390 HCWs. Data were collected through face-to-face interview using a pre-tested semi-structured questionnaire with validated and reliable tools. The study was conducted in the Combined Military Hospital Dhaka from 15 July 2020 to 30 September 2020.

***Results*:** Among the 390 respondents, 21.6%, 43.1% and 24.1% had depression, anxiety and stress symptoms, respectively. Being married (OR=0.391, 95% CI=0.160-0.953), graduate (OR=2.977; 95% CI=1.181-7.509) and attending 41-80 patients per day (OR=1.996; 95% CI=0.965-4.125) was significantly associated with depressive symptoms. In respect of anxiety, being graduate (OR=2.788, 95% CI=1.228 -6.333) and HSC qualified (OR=2.714, 95% CI=1.073-6.869), staying in family accommodation (OR=2.720, 95% CI=1.136 - 6.516), with nuclear family (OR=0.459, 95% CI=0.281-0.750), smoker (OR=1.827, 95% CI=0.987 - 3.384), doctor (OR=0.362, 95% CI=0.173-0.758), having service length <20 years (OR=2.229, 95% CI=1.158 - 4.289), service in current place of posting for <20 months (OR=0.460, 95% CI=0.241-0.880), attended 41-80 patient daily (OR=1.720, 95% CI=0.933 - 3.169) and performing overtime duty (OR=2.568, 95% CI=1.609-4.099) were significantly associated with anxiety symptoms. Being graduate (OR=2.249, 95% CI=0.866-5.844), with nuclear family type (OR=0.423, 95% CI=0.249-0.721), having duty place at emergency (OR=2.135, 95% CI=0.902-5.053), being a nurse (OR=0.364, 95% CI=0.162-0.819), having service length <10 years (OR=2.570, 95% CI=1.207-5.472) and performing overtime duty (OR=2.214, 95% CI=1.3101-3.742) were significantly associated with stress symptoms.

***Conclusion*:** Psychological problems among the HCW found very common in our study which needs psychological crisis interventions to protect the mental health of HCWs.

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INTRODUCTION

Since December 2019, the world is experiencing the unprecedented global pandemic of novel coronavirus disease 2019 (COVID-19) caused by the SARS-CoV-2 virus [1]. By now the global outbreak of coronavirus has reached a toll of over 11,35,44,308 cases worldwide with over 25,19,255 cases of death [2]. As

a consequence of global pandemic, the novel corona virus was confirmed to have spread to Bangladesh in March 2020 and by now the number of affected people has been increasing with total number of 5,44,954 cases and death toll of 8,384 cases [3]. As a part of the total community, members of Bangladesh armed forces also suffer from this disease. On 6 April 2020, army revealed its first case of COVID-19 and so far about 12751 affected individuals treated in CMH Dhaka.

With the rapid spread of the COVID-19, infection prevention, identification and management of cases as well as ensuring effective strategies to protect public health has become a critical challenge for the global health systems. These challenges, although primarily emerging from an infectious disease with physical health implications, may also affect mental health and wellbeing profoundly which may have multiple impacts on mental health across populations, which necessitates the attention of global health researchers and practitioners [4].

Psychosocial impact is defined as the effect caused by environmental and/or biological factors on individual's social and/or psychological aspects [5]. Health Care Workers (HCW) generally are at risk of exposure to highly infectious pathogens while they care for patients or by exposure to patient environment or biological samples which may worry them of being infected as well as transmitting the infection to others [6]. Likewise mental health and wellbeing of the frontline HCWs may be affected by the unprecedented COVID-19 pandemic. As a consequence of increasing COVID-10 cases, many of the HCWs are working beyond their regular schedules to meet the increased demand for critical care which makes those HCWs susceptible to anxiety, depression, stress and insomnia. Moreover, working without adequate personal protective equipment and other preventive measures increases the fear of contracting the infection, which is becoming a growing concern as a high prevalence of infection among healthcare providers which is already reported in China, Italy, and the USA. Furthermore, a lack of social support, working under stress, guilt about suboptimal care to the patient or leaving hospitals understaffed, or and worrying about their families may result in critical mental health challenges among HCWs amid COVID-19 [4].

Like others, HCWs of CMH Dhaka are also exposed to various infectious material while serving the COVID-19 positive cases. Studies have shown that the group of HCWs who are in direct contact with the patients are exposed to highest levels of risk. HCWs are particularly vulnerable to many job-related hazards, and undergo a considerable amount of emotional pressures in relation to their jobs. This is even more important during a pandemic outbreak of an infectious disease on a global scale, and can lead to depression, anxiety and stress among the HCWs. In workplace, mental health problems are found to be associated with plenty of negative influences, such as reduction of efficiency, loss of productivity, disability and absenteeism. Given the adverse impacts, it is of great importance to investigate the potential factors and mechanisms that could enlighten the improvement of the mental health and maintenance of productivity of HCWs in the mist of the global pandemic of COVID-19.

In this study, we hypothesize that healthcare workers exposed to COVID-19 positive cases are at high risk of developing psychological problems in terms of depression, anxiety and stress. The objective of this study was to determine the risk factors of psychological problems (in terms of depression, anxiety and stress) among the HCWs exposed COVID-19 positive cases in CMH Dhaka. The study findings may be helpful for the policy makers and personnel working in the field of mental health problems.

METHODS

This cross-sectional study was conducted from July 2020 to September 2020 at the Combined Military Hospital Dhaka. Purposively selected 390 HCWs were included in this study with an objective to assess the predictors of psychological impact of COVID-19 in terms of depression, anxiety and stress. Data were collected from the HCW (Doctors, nurse and paramedics) through face to face interview using a pretested questionnaire. Prior to data collection, informed written consent were obtained from the respondents. Ethical approval for the study was granted by the ethical committee of CMH Dhaka with the number 2020/187 and neither any intervention nor invasive procedure were given. The study instrument comprised a structured questionnaire which includes demographic and job related information, including gender, age, education, monthly income, residence, length of service, among others. Respondent's depression, anxiety and stress were assessed through 21 itemed validated Bangla version of DASS-21 scale. The 21-item Depression Anxiety Stress Scale (DASS) is a validated, simplified version of the original DASS developed by Lovibond et al. The validated Bangla version of DASS-21 includes three subscales with a total of 21 items that investigate the degree of depression (items 3, 5, 10, 13, 16, 17, and 21), anxiety (items 2, 4, 7, 9, 15, 19, and 20), and stress (1, 6, 8, 11, 12, 14, and 18). Items are scored on a 4-point scale

ranging from 0-3, where 0 is never, 1 is sometimes, 2 is often, and 3 is almost always or always. The sum of the item scores for each subscale multiplied by 2 is the subscale score, which ranges from 0–42 points. For the Depression subscale, a score of ≤9 points is normal, while a score of 10-l3 points indicates mild depression, 14–20 points moderate depression, 21–27 points severe depression, and ≥ 28 points very serious depression. For the Anxiety subscale, a score of ≤ 7 points is normal, while 8-9 points indicates mild anxiety, 10–14 points moderate anxiety, 15–l9 points severe anxiety, and ≥ 20 points very serious anxiety. For the Stress subscale, a score of ≤ 14 points is normal, while 15–l8 points indicates mild stress, 19–25 points moderate stress, 26–33 points severe stress, and ≥ 34 points very serious stress. The higher the score is, the more serious the degree of depression, anxiety or stress [7][8]. Cronbach's alpha coefficient of this questionnaire found 0.86. Data processing and analyses were done using Statistical Package for Social Sciences (SPSS) version 23. Frequencies, percentage, mean and standard deviation (SD) were used for descriptive statistics. Binary logistic regression analyses was performed to estimates the strengths of associations which were demonstrated by the odds ratio (OR) with a 95% confidence interval (CI). A two-tailed p <.05 was considered statistically significant.

RESULTS

Among the respondents, half of the respondents (49.7%) belongs to the age group <30 years, average age was 32.38 years (±8.81) years and range was 20 to 53 years, 65.6% of them were male and 79.2% were Muslim. Highest (41.0%) were HSC qualified and 67.7% were married. About half (42.6%) of the respondents had monthly income in the 30001 to 60000 taka with average of 47953.31 (±30881.99) Taka. Minimum monthly family income was 15000 and maximum was 170000 Taka. Majority (70.3%) of the respondents belonged to the nuclear family and 41.8% stayed at family accommodation [Table-1].

Table – 1: Socio-demographic characteristics of the respondents

Characteristics	Frequency	Percentage
Age of the Respondents (Years)		
<30	194	49.7
31-40	121	31.0
>41	75	19.2
Mean (±SD)	32.38 (±8.81)	
Range	20-53	
Sex		
Male	256	65.6
Female	134	34.4
Religion		
Muslim	309	79.2
Hindu	68	17.4
Christianism	13	3.3
Educational Qualification		
SSC	63	16.2
HSC	160	41.0
Graduate	105	26.9
Post-Graduate	62	15.9
Marital Status		
Married	264	67.7
Single	126	32.3
Monthly income		
<30000	139	35.6
30001-60000	166	42.6
>60001	85	21.8
Mean (±SD)	47953.31 (±30881.99)	
Range	15000 -170000	
Place of Residence		
Family Accommodation	163	41.8
Sainik Line	136	34.9

Officers Mess	91	23.3
Type of Family of the Respondent		
Nuclear	274	70.3
Joint	116	29.7
Family members		
<3	91	23.3
4-6	223	57.2
>7	76	19.5
Mean (±SD)	5.05 (±2.28)	
Range	2-15	

Majority (54.6%) were paramedics which was followed by nurse (25.6%) and physicians (19.7%). More than half (54.4%) of the respondents had the length of service <10 years. The average length of service was11.67 years with SD ±8.93 years. Highest (38.7%) of the respondents attended <40 COVID-19 patients daily and 52.6% of then did their duty at the Corona ward with more than half (51.8%) of them perform their duty <9 hours in a day. More than half (53.8%) of the respondents performed overtime duty with the COVID-19 patients. Majority of the respondent perform their duty as a matter of profession i.e. professionally motivated [Table 2].

Table 2: Occupational history of the respondents (n=390)

Attributes	Frequency	Percent
Profession of the respondents		
Doctor	77	19.7
Nurse	100	25.6
Paramedics	164	42.1
ICA/OTA	49	12.6
Length of service (in years)		
<10	212	54.4
11-20	101	25.9
>21	77	19.7
Mean (±SD)	11.67 (±8.93)	
Range	1 – 34	
Length of service in current place (in month)		
<20	152	39.0
21-40	165	42.3
>41	73	18.7
Mean (±SD)	26.67 (±19.482)	
Range	2-99	
Number of patients attended (per days)		
<40	151	38.7
41-80	128	32.8
>81	111	28.5
Mean (±SD)	67.46 (±34.719)	
Range	30 – 170	
Place of duty		
E and C Dept	44	11.3
Fever Clinic	49	12.6
Corona Ward	205	52.6
Corona ICU/HDU	92	23.6
Duration of duty with the corona patients (in hours)		
<9	202	51.8
>10	188	48.2

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Mean (±SD)	9.47 (±1.40)	
Range	6 – 12	
Over time duty performed		
Yes	210	53.8
No	180	46.2
Motivation in treating corona patients		
Professional Motivation	108	27.7
Humanitarian Motivation	100	25.6
Job Motivation	34	8.7
Professional and Humanitarian	81	20.8
Professional and Job	55	14.1
Humanitarian and Job	12	3.1
Affected by COVID-19		
Yes	107	27.4
No	283	72.6

Among the 390 respondents, 21.6%, 43.1% and 24.1% were above the cutoff point for the depression, anxiety and stress subscale of DASS-21 respectively indicating the presence of mild to severe/extremely severe depression, anxiety and stress symptoms. The mean score for depression, anxiety and stress were 5.32 (±5.26), 7.29 (±6.01) and 10.09 (±7.20) respectively. The DASS-21 scale showed a mean score of 22.70±16.170 (Table-3).

Table 3: Distribution of DASS-21 Scale Sub items

Variables	**Frequency**	**Percent**
Having depression	84	21.6
Level of depression		
Normal	306	78.5
Mild	51	13.1
Moderate	26	6.7
Severe	7	1.8
Mean (±SD)	5.32 (±5.26)	
Range	0-26	
Having anxiety	168	43.1
Level of anxiety		
Normal	222	56.9
Mild	43	11.0
Moderate	88	22.6
Severe	20	5.1
Extremely Severe	17	4.4
Mean (±SD)	7.29 (±6.01)	
Range	0-36	
Having stress	94	24.1
Leve of stress		
Normal	296	75.9
Mild	57	14.6
Moderate	27	6.9
Severe	8	2.1
Extremely Severe	2	0.5
Mean (±SD)	10.09 (±7.20)	
Range	0-36	

Results of binary logistic regression analysis of factors associated with depression among the HCWs during COVID-19 are presented in table 4 (a). It was revealed that, odds for depressive symptoms were 2.977 (95% CI; 1.181-7.509) times significantly higher for graduate respondents compared to post-graduate respondents. Married respondents, in contrast to the unmarried respondents was protective factor for depression (OR: 0.391, 95% CI: 0.160 – 0.953). Performing overtime duty was a risk factor for depression (OR: 1.891; 95% CI: 1.087 – 3.291).

Table – 4 (a): Logistic regression results for the factors associated with depression

Attribute	**Depression**					
	B	S.E.	Sig.	OR	95% C.I. for OR	
					Lower	Upper
Age group						
<30	-.267	.570	.639	.765	.250	2.341
31-40	.325	.411	.429	1.384	.618	3.099
>41 (RC)						
Sex						
Male	.178	.332	.592	1.195	.623	2.290
Female (RC)						
Education						
SSC	.454	.726	.532	1.574	.379	6.528
HSC	.862	.540	.111	2.367	.821	6.827
Graduate	1.091	.472	**.021**	2.977	1.181	7.509
Post-grad (RC)						
Religion						
Islam	.305	.808	.706	1.357	.279	6.606
Shanatan	.567	.847	.504	1.762	.335	9.270
Christian (RC)						
Marital status						
Married	-.940	.455	**.039**	.391	.160	.953
Unmarried (RC)						
Monthly income						
<30000	-.223	.600	.710	.800	.247	2.592
30001-60000	-.382	.375	.308	.682	.328	1.422
>60001 (RC)						
Residence						
Family house	.278	.498	.577	1.321	.497	3.506
Sainik line	-.664	.608	.275	.515	.156	1.696
Mess (RC)						
Type of family						
Nuclear	-.141	.289	.625	.868	.492	1.531
Joint (RC)						
Smoking habit						
Yes	-.127	.370	.732	.881	.427	1.818
No (RC)						
Place of Duty at the Hospital						
E and C Dept	.408	.474	.389	1.504	.594	3.806
Fever Clinic	-.618	.507	.223	.539	.199	1.457
Corona Ward	-.395	.379	.298	.674	.320	1.417
ICU/HDU (RC)						
Profession of the Respondent						
Doctor	.323	.425	.447	1.382	.600	3.180
Nurse	-.026	.419	.951	.974	.429	2.215
Medical Assistant	-.298	.399	.455	.742	.340	1.622

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ICA/OTA (RC)						
Length of service						
<10	.357	.377	.343	1.429	.683	2.990
11-20	.271	.402	.499	1.312	.597	2.883
>21 (RC)						
Service in current place						
<20	.342	.404	.397	1.408	.638	3.108
21-40	.366	.383	.340	1.442	.680	3.057
>41 (RC)						
Number of patient attended						
<40	.163	.387	.673	1.177	.552	2.512
41-80	.691	.370	**.048**	1.996	.965	4.125
>81 (RC)						
Over Time duty						
Yes	.637	.283	**.024**	1.891	1.087	3.291
No (RC)						
Affected by Corona						
Yes	.236	.288	.414	1.266	.719	2.228
No (RC)						

Results of binary logistic regression analysis of factors associated with anxiety among the HCWs during COVID-19 are presented in table 4 (b). It was revealed that, odds for anxiety symptoms were 2.714 (95% CI: 1.073 – 6.869) and 2.788 (95% CI: 1.228 – 6.333) times higher for HSC and graduate respondents respectively, compared to the post-graduate respondents. Residing in the family accommodation (OR: 2.720; 95% CI: 1.136 – 6.516), having smoking habit (OR: 1.827; 95% CI: 0.987 – 3.384), having length of service <10 years (OR: 2.089; 95% CI: 1.123 – 3.886) and 11-20 (OR: 2.229; 95% CI: 1.158 – 4.289), everyday attending 41-80 patients (OR: 1.720; 95% CI: 0.933 – 3.169), performing overtime duty (OR: 2.568; 95% CI: 1.609 – 4.099) were risk factors for anxiety whereas being a doctor (OR: 0.362; 95% CI: 0.173 – 0.758) and nurse (OR: 0.326; 95% CI: 0.161 – 0.662), staying in nuclear family (OR: 0.459; 95% CI: 0.281 – 0.751), and service duration in current place of posting for <20 months (OR: 0.460; 95% CI: 0.241 – 0.880) found protective for anxiety.

Table – 4 (b): Logistic regression results for the factors associated with anxiety

Attribute	**Anxiety**					
	B	S.E.	Sig.	OR	95% C.I. for OR	
					Lower	Upper
Age group						
<30	.744	.472	.115	2.104	.834	5.310
31-40	.095	.355	.788	1.100	.549	2.205
>41 (RC)						
Sex						
Male	-.339	.282	.229	.712	.410	1.238
Female (RC)						
Education						
SSC	.717	.601	.233	2.049	.630	6.656
HSC	.999	.474	**.035**	2.714	1.073	6.869
Graduate	1.025	.419	**.014**	2.788	1.228	6.333
Post-grad (RC)						
Religion						
Islam	-.776	.600	.196	.460	.142	1.491
Shanatan	-1.09	.645	.090	.335	.095	1.185
Christian (RC)						
Marital status						

Married	.575	.352	.103	1.777	.891	3.542
Unmarried (RC)						
Monthly income						
<30000	-.196	.534	.713	.822	.289	2.339
30001-60000	-.425	.347	.221	.654	.331	1.291
>60001 (RC)						
Residence						
Family house	1.001	.446	**.025**	2.720	1.136	6.516
Sainik line	.810	.524	.123	2.247	.804	6.279
Mess (RC)						
Type of family						
Nuclear	-.778	.250	**.002**	.459	.281	.750
Joint (RC)						
Smoking habit						
Yes	.603	.314	**.050**	1.827	.987	3.384
No (RC)						
Place of Duty at the Hospital						
E and C Dept .	.639	.419	.128	1.895	.833	4.312
Fever Clinic	-.245	.422	.561	.782	.342	1.789
Corona Ward	-.020	.303	.947	.980	.542	1.773
ICU/HDU (RC)						
Profession of the Respondent						
Doctor	-1.01	.377	**.007**	.362	.173	.758
Nurse	-1.12	.361	**.002**	.326	.161	.662
Medical Assistant	-.603	.332	.069	.547	.285	1.049
ICA/OTA (RC)						
Length of service						
<10	.737	.317	.020	2.089	1.123	3.886
11-20	.802	.334	.016	2.229	1.158	4.289
>21 (RC)						
Service in current place						
<20	-.777	.331	.019	.460	.241	.880
21-40	.068	.304	.823	1.070	.590	1.941
>41 (RC)						
Number of patient attended						
<40	.398	.313	.203	1.489	.807	2.749
41-80	.542	.312	**.049**	1.720	.933	3.169
>81 (RC)						
Over Time duty						
Yes	.943	.239	.000	2.568	1.609	4.099
No (RC)						
Affected by Corona						
Yes	.399	.252	.112	1.491	.911	2.441
No (RC)						

Results of binary logistic regression analysis of factors associated with stress among the HCWs during COVID-19 are presented in table 4(c). It was revealed that, odds for stress symptoms were 2.249 (95% CI: 0.866 – 5.844) times higher for graduate respondents, compared to the post-graduate respondents. Reside in the sainik line (OR: 3.012; 95% CI: 0.928 – 9.780), performing duty at the emergency department (OR: 2.135; 95% CI: 0.902 – 5.053), length of service for < 10 years (OR: 2.570; 95% CI: 1.207 – 5.472) and 11-20 years (OR: 3.039; 95% CI: 1.378 – 6.705) and performing overtime duty (OR: 2.214; 95% CI: 1.310 – 3.742) were significant risk factors whereas staying with the nuclear family (OR: 0.423; 95% CI: 0.249 – 0.721), being a nurse (OR: 0.364; 95% CI: 0.162 –

0.819) were protective for stress among the respondents.

Table – 4 (c): Logistic regression results for the factors associated with stress

Attribute	**Stress**					
	B	S.E.	Sig.	OR	95% C.I. for OR	
					Lower	Upper
Age group						
<30	.166	.546	.761	1.181	.405	3.445
31-40	.194	.421	.644	1.215	.533	2.770
>41 (RC)						
Sex						
Male	-.030	.319	.925	.970	.520	1.813
Female (RC)						
Education						
SSC	.512	.692	.459	1.669	.430	6.482
HSC	-.107	.573	.852	.899	.292	2.763
Graduate	.811	.487	**.050**	2.249	.866	5.844
Post-grad (RC)						
Religion						
Islam	.122	.703	.862	1.130	.285	4.480
Shanatan	-.488	.762	.522	.614	.138	2.735
Christian (RC)						
Marital status						
Married	.493	.394	.210	1.637	.757	3.542
Unmarried (RC)						
Monthly income						
<30000	.078	.608	.898	1.081	.328	3.560
30001-60000	-.283	.401	.480	.754	.344	1.652
>60001 (RC)						
Residence						
Family house	.647	.497	.192	1.910	.722	5.055
Sainik line	1.103	.601	**.049**	3.012	.928	9.780
Mess (RC)						
Type of family						
Nuclear	-.859	.272	**.002**	.423	.249	.721
Joint (RC)						
Smoking habit						
Yes	.335	.355	.345	1.397	.697	2.800
No (RC)						
Place of Duty at the Hospital						
E and C Dept	.759	.440	**.050**	2.135	.902	5.053
Fever Clinic	.171	.484	.723	1.187	.459	3.068
Corona Ward	.135	.345	.695	1.145	.582	2.252
ICU/HDU (RC)						
Profession of the Respondent						
Doctor	-.257	.398	.518	.773	.355	1.687
Nurse	-1.011	.414	**.015**	.364	.162	.819
Medical Assistant	-.342	.353	.332	.710	.355	1.419
ICA/OTA (RC)						
Length of service						
<10	.944	.386	**.014**	2.570	1.207	5.472

11-20	1.112	.404	**.006**	3.039	1.378	6.705
>21 (RC)						
Service in current place						
<20	-.619	.382	.105	.539	.255	1.139
21-40	.356	.344	.300	1.428	.728	2.800
>41 (RC)						
Number of patient attended						
<40	.635	.363	.080	1.886	.926	3.843
41-80	.401	.363	.270	1.493	.732	3.042
>81 (RC)						
Over Time duty						
Yes	.795	.268	**.003**	2.214	1.310	3.742
No (RC)						
Affected by Corona						
Yes	-.103	.291	.723	.902	.509	1.597
No (RC)						

DISCUSSION

Combined Military Hospital Dhaka rendered treatment facilities to the entitled serving and retired armed forces personnel including their families who received the first case of COVID-19 on 7 April 2020. Since than the number of infected cases among the entitled personnel were increases gradually. To control the epidemic or slows down the spread of the disease and to treat the COVID-19 infected patients, the HCWs have been extremely busy doing tremendous hard work for 24/7. In doing so, they had to face several hurdles including high occupational risk, heavy work load, scarcities/difficulties in logistic supply, long working hours which pose them under tremendous psychological pressure like anxiety, depression, stress or post-traumatic stress disorder symptoms.

The study was conducted in a tertiary level military hospital and for that the sociodemographic characteristics among the HCWs were similar to the existing rules and regulation of armed forces but somehow different from the national average in many cases.

Our study revealed that 21.6% of the respondents had mild to severe depressive symptoms, 43.1% of the respondents had mild to extremely severe anxiety symptoms and 24.1% of the respondents had mild to extremely severe stress symptoms. After the onset of COVID-19, several study conducted on HCWs to assess their mental state. A study conducted at Bangladesh by Hasan MT *et al.* revealed that about 67.72% physician suffers from anxiety and 48.5% of them found depressive. The result is not similar to our study may be due to the selection of sample and study design [9]. Similarly, many study have already been taken place in Bangladesh using validated Bangla version of DASS-21 scale and greater difference in the prevalence of depression, anxiety and stress among the respondents have been documented which is not similar to our study in terms of prevalence but HCWs who were fighting against the COVID-19 epidemic had higher depression, anxiety and stress because of the highest risk of infection with COVID-19 [10] [11] [12] [13] [14]. Compared the prevalence of depression, anxiety and stress due to Covid-19 using DASS-21 globally, the prevalence of depression, anxiety and stress is not similar than the study conducted in China (14.81% depression, 18.3% anxiety and 9.98% stress) and (13.6% depression, 13.9% anxiety and 8.6% stress) [15] [16], Italy (17.3% depression, 20.8% anxiety and 21.8% stress) [15], Portugal (3.7% depression, 2.6% anxiety and 6.1% stress) [17], Australia (62% depression, 50 anxiety and 64% stress) [18], Singapore (5.3% depression, 8.7% anxiety and 2.2% stress) [19], India (26% depression, 31.5% anxiety and 19% stress) [20], Iran (26.18% depression, 26.15% anxiety and 26.23% stress) [21]. All the dissimilarities with the national, regional and global findings may be either due to the study design or due to the selection of sample for the study or due to the presence of pre-existing mental health condition among the respondent.

It was revealed from our study that, risk of developing psychological problem (depression, anxiety and stress) among the graduate were 2.977 (95% CI: 1.181-7.509) time higher for depression, 2.788 (95% CI: 1.228-6.333) times higher for anxiety and 2.249 (95% CI: 0.866- 5.844) times higher for stress than the post-graduate respondents. It indicates that the lower the level of education the higher the chance of developing psychological problems among the HCWs. Similar finding revealed by Zhou SJ *et al.* [22] and Wang Y *et al.* [23]. At the same time opposite findings

noted by the study conducted by Liang L *et al.* [24] and Lei L *et al.* [25].

Married respondents, in contrast to the unmarried respondents was protective factor for depression (OR: 0.391, 95% CI: 0.160 – 0.953). A study conducted by Tan *et al.* reported that the severity of psychiatric symptoms in the workforce returning to the workplace was significantly associated with marital status [26]. We revealed that performing overtime duty was a risk factor for depression (OR: 1.891; 95% CI: 1.087 – 3.291), anxiety (OR: 2.568; 95% CI: 1.609 – 4.099) and stress (OR: 2.214; 95% CI: 1.310 – 3.742). This finding was similar to a study conducted by Kikuchi H *et al.* [27]. Kim. W *et al.*, Alfonso P *et al.* and Virtanen M et *al.* found the similar findings [28, 29]. We found that residing in the family accommodation (OR: 2.720; 95% CI: 1.136 – 6.516) was a risk factors for anxiety among the HCWs which is similar to the report by a literature [30]. We reveled that smoking habit (OR: 1.827; 95% CI: 0.987 – 3.384) among the HCWs were a risk factors for anxiety. In a study conducted by Rondina RD *et al.* revealed that smokers are usually anxious which is similar to our study [31]. Our study revealed that having length of service <10 years (OR: 2.089; 95% CI: 1.123 – 3.886) and 11-20 (OR: 2.229; 95% CI: 1.158 – 4.289) were a significant risk factors for anxiety among the HCWs which was similar to a study conducted by Zhu Z *et al.* [32]. It was also evident that attending >40 patients in a day (OR: 1.720; 95% CI: 0.933 – 3.169) were risk factors for anxiety which means that due to fear of being infected by the COVID-19, the health care workers became anxious as they had to stay with the patients almost all the time in a day.

We found that being a doctor (OR: 0.362; 95% CI: 0.173 – 0.758) and nurse (OR: 0.326; 95% CI: 0.161 – 0.662 for anxiety and OR: 0.364; 95% CI: 0.162 – 0.819) for stress) was a protective factor for anxiety and stress which we could not agree as the several study conducted both in home and abroad revealed that being a doctor and nurse were a risk factors for anxiety among the HCWs [24] [33]. Staying in nuclear family (OR: 0.459; 95% CI: 0.281 – 0.751) were found protective for anxiety which means after performing duty in a psychologically pressurized situation in the hospital, the family provide a sense of relief for the HCWs. Service duration in current place of posting for <20 months (OR: 0.460; 95% CI: 0.241 – 0.880) found protective for anxiety as this tertiary military hospital provide appropriate logistics among the HCWs which gave a sense of security among them. In regards to the stress, reside in the sainik line (OR: 3.012; 95% CI: 0.928 – 9.780), performing duty at the emergency department (OR: 2.135; 95% CI: 0.902 – 5.053), length of service for < 10 years (OR: 2.570; 95% CI: 1.207 – 5.472) and 11-20 years (OR: 3.039; 95% CI: 1.378 – 6.705) were significant risk factors whereas staying with the nuclear family (OR: 0.423; 95% CI: 0.249 – 0.721). We also revealed that the frontline health workers were more prone to developed anxiety and stress symptoms (for doctors OR: 0.362; 95% CI: 0.173 – 0.758 and for nurse OR: 0.326; 95% CI: 0.161 – 0.662) because of their exposure to the highest risk of infection for their close, frequent contact with patients as well as working longer hours than usual. Similar findings revealed from a study conducted by Si MY *et al.* [33] and Lai J *et al.* [34]. Our study also revealed that performing duties at the emergency and casualty department were a significant risk factors for stress among the HCWs (OR: 2.135; 95% CI: 0.902 – 5.053). Similar findings revealed by a study conducted by Vizheh M *et al.* [35]

This study has several strengths. It was the first systemic study among the HCW in CMH Dhaka to determine the psychological impact in terms of depression, anxiety and stress during the Covid-19 pandemic. Another strength of this study was good quality control, data were collected by the researcher using a pre-tested questionnaire to conduct face-to-face interviews from the HCW, large sample size and the coverage of all the groups of HCW. Despite this, our study has several limitations that should be mentioned. First, the data were collected from HCW of a military hospital which did not guarantee the representativeness of the entire population i.e. the results cannot be generalized to all HCW. Second, as a cross-sectional study, this study could only evaluate the psychological impact of HCW involved in managing Covid-19 cases without the longitudinal observations of the respondents. Third, due to time constrain, we only conducted a questionnaire interview with the respondents without any intervention. Forth, simple random sampling would be preferable in selecting the sample which was not appropriate in this particular instance. Fifth, in addition to the factors concerned in this study there may be other factors (preexisting psychological problem) that affect the psychological impact among the HCW. Finally, the possibility of selection bias may exist as the respondents were selected purposively for the study.

CONCLUSION

Psychological problems among the HCW should be focused in any public health emergencies as because they are very much under psychological and physical pressure in managing the COVID-19 patients. In our study we investigated the psychological impact among the HCWs who are engaged actively in the management of COVID-19 infection and analyzed the

influencing factors which can guide us to develop psychological intervention programs for the HCW that are tailored to address the different psychological symptoms and needs of the HCW.

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REFERENCES

1. World Health Organization: Coronavirus disease (COVID-19) pandemic. 2020; (accessed on 15 September 2020.
2. COVID-19 Pandemic Update; www.worlometer.info; 26 February 2021; Dover, Delaware, U.S.A.
3. Coronavirus COVID-19 Dashboard; MIS, DGHS; HEOC & Control Room, IEDCR, DHIS2**.** Accessed on 26 February 2021.
4. Hossain MM, Tasnim S, Sultana A, Faizah F, Mazumder H, Zou L, McKyer EL, Ahmed HU, Ma P. Epidemiology of mental health problems in COVID-19: a review. F1000Research. 2020;9.
5. De Oliveira A.M., Buchain P.C., Vizzotto A.D.B., Elkis H., Cordeiro Q. (2013) Psychosocial Impact. In: Gellman M.D., Turner J.R. (eds) Encyclopedia of Behavioral Medicine. Springer, New York, NY.
6. Temsah MH, Al-Sohime F, Alamro N, Al-Eyadhy A, Al-Hasan K, Jamal A, Al-Maglouth I, Aljamaan F, Al Amri M, Barry M, Al-Subaie S. The psychological impact of COVID-19 pandemic on health care workers in a MERS-CoV endemic country. Journal of Infection and Public Health. 2020 May 29.
7. Lovibond PF, Lovibond SH. The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the Beck depression and anxiety inventories. Behav Res Ther (1995) 33(3):335–43. doi: 10.1016/0005-7967(94)00075-U.
8. Alim SA, Kibria SM, Uddin MZ, Nessa M, Wahab MA. Translation of DASS 21 into Bangla and validation among medical students. Bangladesh Journal of Psychiatry. 2014;28(2):67-70.
9. Hasan MT, Hossain S, Safa F, Anjum A, Khan AH, Koly KN, Alam SF, Rafi MA, Podder V, Trisa TI, Nodi RN. Prevalence of anxiety and depressive symptoms among physicians during the COVID-19 pandemic in Bangladesh: a cross-sectional study. medRxiv. 2020 Jan 1.
10. Al Zubayer A, Rahman ME, Islam MB, Babu SZ, Rahman QM, Bhuiyan MR, Khan MK, Chowdhury MA, Hossain L, Habib RB. Psychological states of Bangladeshi people four months after the COVID-19 pandemic: an online survey. Heliyon. 2020 Sep 1;6(9):e05057.
11. Mamun MA, Hossain MS, Griffiths MD. Mental health problems and associated predictors among Bangladeshi students. International Journal of Mental Health and Addiction. 2019 Oct 29:1-5.
12. Banna MH, Sayeed A, Kundu S, Christopher E, Hasan MT, Begum MR, Kormoker T, Dola ST, Hassan MM, Chowdhury S, Khan MS. The impact of the COVID-19 pandemic on the mental health of the adult population in Bangladesh: a nationwide cross-sectional study. International Journal of Environmental Health Research. 2020 Aug 3:1-2.
13. Abir T, Kalimullah NA, Uchechukwu LO, 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. medRxiv. 2021 Jan 1.
14. Sadiq MS, Morshed NM, Rahman W, Chowdhury NF, Arafat SY, Mullick MS. Depression, anxiety, stress among postgraduate medical residents: A cross sectional observation in Bangladesh. Iranian journal of psychiatry. 2019 Jul;14(3):192.
1. 15.Liu Y, Wang L, Chen L, Zhang X, Bao L, Shi Y. Mental health status of pediatric medical workers in China during the COVID-19 outbreak. Frontiers in psychiatry. 2020;11.
15. Si MY, Su XY, Jiang Y, Wang WJ, Gu XF, Ma L, Li J, Zhang SK, Ren ZF, Ren R, Liu YL. Psychological impact of COVID-19 on medical care workers in China. Infectious diseases of poverty. 2020 Dec;9(1):1-3.
16. Moreira PS, Ferreira S, Couto B, Machado-Sousa M, Fernandez M, Raposo-Lima C, Sousa N, Pico-Perez M, Morgado P. Protective elements of mental health status during the COVID-19 outbreak in the Portuguese population. MedRxiv. 2020 Jan 1.
17. Newby JM, O'Moore K, Tang S, Christensen H, Faasse K. Acute mental health responses during the COVID-19 pandemic in Australia. PloS one. 2020 Jul 28;15(7):e0236562.

18. Chew NW, Lee GK, Tan BY, Jing M, Goh Y, Ngiam NJ, Yeo LL, Ahmad A, Khan FA, Shanmugam GN, Sharma AK. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. Brain, behavior, and immunity. 2020 Aug 1;88:559-65.
19. Suryadevara V, Adusumalli C, Adusumilli PK, Chalasani SH, Radhakrishnan R. Mental Health Status among the South Indian Pharmacy Students during Covid-19 Pandemic Quarantine Period: A Cross-Sectional Study. medRxiv. 2020 Jan 1.
20. Vahedian-Azimi A, Moayed MS, Rahimibashar F, Shojaei S, Ashtari S, Pourhoseingholi MA. Compare the severity of psychological distress among four groups of Iranian society in COVID-19 pandemic.
21. Zhou SJ, Zhang LG, Wang LL, Guo ZC, Wang JQ, Chen JC, Liu M, Chen X, Chen JX. Prevalence and socio-demographic correlates of psychological health problems in Chinese adolescents during the outbreak of COVID-19. European Child & Adolescent Psychiatry. 2020 Jun;29(6):749-58.
22. Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. Psychology, health & medicine. 2021 Jan 2;26(1):13-22.
23. Liang L, Ren H, Cao R, Hu Y, Qin Z, Li C, Mei S. The effect of COVID-19 on youth mental health. Psychiatric quarterly. 2020 Sep;91(3):841-52.
24. Lei L, Huang X, Zhang S, Yang J, Yang L, Xu M. Comparison of prevalence and associated factors of anxiety and depression among people affected by versus people unaffected by quarantine during the COVID-19 epidemic in Southwestern China. Medical science monitor: international medical journal of experimental and clinical research. 2020;26:e924609-1.
25. Tan W, Hao F, McIntyre RS, Jiang L, Jiang X, Zhang L, Zhao X, Zou Y, Hu Y, Luo X, Zhang Z. Is returning to work during the COVID-19 pandemic stressful? A study on immediate mental health status and psychoneuroimmunity prevention measures of Chinese workforce. Brain, behavior, and immunity. 2020 Jul 1;87:84-92
26. Kikuchi H, Odagiri Y, Ohya Y, Nakanishi Y, Shimomitsu T, Theorell T, Inoue S. Association of overtime work hours with various stress responses in 59,021 Japanese workers: Retrospective cross-sectional study. PloS one. 2020 Mar 3;15(3):e0229506.
27. Kim W, Park EC, Lee TH, Kim TH. Effect of working hours and precarious employment on depressive symptoms in South Korean employees: a longitudinal study. Occupational and environmental medicine. 2016 Dec 1;73(12):816-22.
28. Afonso P, Fonseca M, Pires JF. Impact of working hours on sleep and mental health. Occupational Medicine. 2017 Jul 1;67(5):377-82.) (Virtanen M, Ferrie JE, Singh-Manoux A, Shipley MJ, Stansfeld SA, Marmot MG, Ahola K, Vahtera J, Kivimäki M. Long working hours and symptoms of anxiety and depression: a 5-year follow-up of the Whitehall II study. Psychological medicine. 2011 Feb:1.
29. Housing And Health: An Overview Of The Literature," Health Affairs Health Policy Brief, June 7, 2018. DOI: 10.1377/hpb20180313.396577.
30. Rondina RD, Gorayeb R, Botelho C, Silva AM. A relação entre tabagismo e características sócio-demográficas em universitários. Psicologia, Saúde & Doenças. 2005 Jul;6(1):35-45.
31. Zhu Z, Xu S, Wang H, Liu Z, Wu J, Li G, Miao J, Zhang C, Yang Y, Sun W, Zhu S. COVID-19 in Wuhan: Sociodemographic characteristics and hospital support measures associated with the immediate psychological impact on healthcare workers. EClinicalMedicine. 2020 Jul 1;24:100443.
32. Si MY, Su XY, Jiang Y, Wang WJ, Gu XF, Ma L, Li J, Zhang SK, Ren ZF, Ren R, Liu YL. Psychological impact of COVID-19 on medical care workers in China. Infectious diseases of poverty. 2020 Dec;9(1):1-3
33. 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-.
34. Vizheh M, Qorbani M, Arzaghi SM, Muhidin S, Javanmard Z, Esmaeili M. The mental health of healthcare workers in the COVID-19 pandemic: A systematic review. Journal of Diabetes & Metabolic Disorders. 2020 Oct 26:1-2.