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Anxiety and depressive symptoms among physicians during the COVID-19 pandemic in Bangladesh: a cross-sectional study

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Abstract

Objectives. In addition to risking their physical well-being, frontline physicians are enduring significant emotional burden both at work and home during the coronavirus disease 2019 (COVID-19) pandemic. This study aims to investigate the levels of anxiety and depressive symptoms and to identify associated factors among Bangladeshi physicians during the COVID-19 outbreak.

Methods and design. A cross-sectional study using an online survey following a convenience sampling technique was conducted between April 21 and May 10, 2020. Outcomes assessed included demographic questions, COVID-19 related questions, and the Hospital Anxiety and Depression Scale (HADS).

Results. The survey was completed by 412 Bangladeshi physicians. The findings revealed that, in terms of standardized HADS cut-off points, the prevalence of anxiety and depressive symptoms among physicians was 67.72% and 48.5% respectively. Risk factors for higher rates of anxiety or depressive symptoms were: being female, physicians who had experienced COVID-19 like symptoms during the pandemic, those who had not received incentives, those who used self-funded personal protective equipment (PPE), not received adequate training, lacking perceived self-efficacy to manage COVID-19 positive patients, greater perceived stress of being infected, fear of getting assaulted/humiliated, being more connected with social media, having lower income levels to support the family, feeling more agitated, less than 2 h of leisure activity per day and short sleep duration. All these factors were found to be positively associated with anxiety and depression in unadjusted and adjusted statistical models.

Conclusions. This study identifies a real concern about the prevalence of anxiety and depressive symptoms among Bangladeshi physicians and identifies several associated factors during the COVID-19 pandemic. Given the vulnerability of the physicians in this extraordinary period whilst they are putting their own lives at risk to help people infected by COVID-19, health authorities should address the psychological needs of medical staff and formulate effective strategies to support vital frontline health workers.

Introduction

The unprecedented and unpredictable nature of the coronavirus disease 2019 (COVID-19) pandemic has triggered a focus on the psychological and mental health problems of the health care staff involved (Greenberg *et al.*, 2020; Vindegaard and Benros, 2020). Physicians being key frontline workers are among the most affected of health care staff professions. A cross-sectional study based on an investigation involving 34 hospitals in China reported that frontline healthcare workers often experienced depressive symptoms, anxiety, sleep disturbances, and distress whilst managing patients with COVID-19 (Lim *et al.*, 2015). The situation is

similar in many countries and particularly challenging in low-resource settings (Greenberg *et al.*, 2020).

The first case of COVID-19 in Bangladesh was announced on 8 March 2020 and the first death was documented on 18 March 2020 (Hasan *et al.*, 2020; Islam *et al.*, 2021). Over time, the number increased to 1 950 124 as reported on 17th March 2022 with a death toll of 29 112 patients whilst the total number of affected physicians was 3182 with a tragic loss of 190 doctors (BMA, 2021; DGHS, 2021). In Bangladesh, a severe dearth in resources and support has been observed since the initial phase of the pandemic for front line physicians (Khan *et al.*, 2020). Hasan *et al.* (2020) expressed the concerns of Bangladeshi physicians in terms of infecting their own families, considering the tradition of congested, multifamily accommodation with limited quarantine opportunities. They also described, in addition to risking their own physical well-being, that frontline physicians are enduring significant emotional burdens both at work and at home (Hassan *et al.*, 2021).

Therefore, it is essential to identify and characterize the mental health difficulties experiencing by the Bangladeshi physicians during the pandemic in such a challenging setting. There is a few published evidence on mental health issues among Bangladeshi physicians related to COVID-19, generating relatively little knowledge on a matter of severe concern (Khatun *et al.*, 2021; Rahman *et al.*, 2021; Repon *et al.*, 2021). This is especially pertinent with the uncertainty surrounding an outbreak of such unparalleled magnitude in Bangladesh & similar low resource countries. Therefore, this study aims to investigate the levels of anxiety and depressive symptoms and to identify associated factors among Bangladeshi registered physicians during the COVID-19 outbreak.

Materials and methods

Study design, participants and sampling techniques

A cross-sectional study was conducted among Bangladeshi registered physicians from April 21 to May 10, 2020, when the COVID-19 pandemic and the enforced lockdown was in its initial phase in the country. To be eligible, the respondents had to be adults (>18 years), Bangladeshi registered physicians, able to read and understand English, and to be living in Bangladesh at the time of the COVID19 outbreak. The Sample size was calculated from prevalence estimate using following formula: $n = (z^2 p(1-p)/d^2)$, where, where n = number of samples; $z = 1.96$ for 95% confidence level (CI), p = 'best guess' for prevalence and d = precision of the prevalence estimate. However, a recent study by Al Banna *et al.* (2020) reported that the prevalence of anxiety symptoms and depressive symptoms among general population was 33.7% and 57.9% during COVID-19 pandemic in Bangladesh (Al Banna *et al.*, 2020). We assumed that the psychological difficulties might be 50% among the physicians of Bangladesh and so the calculated sample size was 384 participants. Assuming 15% non-response rate we calculated the sample size as 442. We approached to 442 physicians & 412 provided consent for participation.

We used convenience sampling method to identify & recruit appropriate participants. Considering the risky data collection inside the hospital setting amid the pandemic, an online survey was posted on closed social media (Facebook) groups of registered physicians of Bangladesh and open request was placed by the team of investigators to complete the survey. Also, five volunteers

(medical doctors) from different medical institutions were employed to circulate details of the survey among their professional networks in addition to regular posting in social media groups. They were instructed to be inclusive, open and to circulate details of the survey periodically for maximum reach. Email addresses of the participants were collected upon proper clarification and informed, written consent was obtained. There was more reach of physician in these groups than different hospitals or regions as we followed an online data collection method amid the pandemic.

Data collection tool

Data were collected using a structured online questionnaire created in Google form (in English). The questionnaire had 3 parts: (i) demographic questions, (ii) COVID19-related questions, (iii) Hospital Anxiety and Depression Scale (HADS; higher scores on the subscales indicate higher levels of depression and anxiety symptoms) (Zigmond and Snaith, 1983).

The HADS is widely used self-reported scale developed by Zigmond and Snaith (1983) consisting of 14 questions including 2 subscales (i.e. 7-item anxiety and 7-item depression) with a four-point Likert scale ranging from 0 to 3 and the overall scores ranging from 0 to 21 for each subscale (Repon *et al.*, 2021). The cutoff (>8) utilized to screen for symptoms for anxiety and depression for each subscale was the same as used previously in the Bangladeshi population (Chowdhury *et al.*, 2017; Tasnim *et al.*, 2021). In our study, we have found the good reliability of the HADS scale for assessing the anxiety and depression where the Cronbach's α of the anxiety and depression subscales were 0.85 and 0.76, respectively, and overall Cronbach's α of the HADS scale was 0.88.

Statistical analysis

All statistical analyses were carried out using SPSS (version 25.0). Frequency distribution with percentage was used to present categorical variables while mean with standard deviation (s.d.) was used to present continuous variables. Chi-square (χ^2) test was used to determine any difference between groups. Both bivariate and multiple logistic regression models were used to find out the predictors of anxiety and depressive symptoms among Bangladeshi physicians during COVID-19 pandemic. Statistical significance level was set at p-value <0.05 and 95% confidence interval (CI).

Ethics

The study was conducted following the Checklist for Reporting Results of Internet ESurveys (CHERRIES) guideline (Eysenbach, 2004). The authors ensured that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The study was approved by the Ethical Review Committee, Shaheed Suhrawardy Medical College, Dhaka, Bangladesh (ShSMC/Ethical/2020/12).

Results

A total of 412 participants (response rate 93.21%) took part in the study and completed the survey. Most physicians were female

(55.8%), the majority were aged between 25 and 34 years (76.2%), and most were unmarried (55.6%). More than half of the study participants (52.9%) reported having an income of 40000 BDT (365 GBP) per month or less (see Table 1).

The study showed that females (75.2%) suffered more from anxiety than males (58.2%) which was statistically significant ($p < 0.001$). Similarly, depression was more prevalent among females (53.9% v. 41.8% male, $p = 0.014$). Addition to that, respondents (77.8%) experiencing COVID-19 symptoms were suffering from anxiety than those not experiencing symptoms of COVID-19 (65.7%) that was statistically significant ($p = 0.017$). Anxiety was more prevalent among respondents those feel that they were not provided with training about COVID-19 (71.9%) than respondents those feel that they were provided enough training about COVID-19 (61.3%) and it was found statistically significant ($p = 0.025$). Moreover, respondents those were not ready to deal a COVID-19 positive patient suffered more from anxiety (74.8% v. 60.4% respondents ready to deal a COVID-19 positive patient, $p = 0.002$).

Furthermore, depression was also more prevalent among respondents not ready to deal a COVID-19 positive patient (56.7% v. 40.1% respondents ready to deal a COVID-19 positive patient, $p = 0.001$). Anxiety was more common among respondents severely tensed about being infected by COVID-19 (81.60% v. 31.70% respondents not tensed at all or minimally tensed, $p < 0.01$). In the same way, depression was also seen to be common among respondents severely tensed about being infected by COVID-19 (57.10% v. 26.80% respondents not tensed at all or minimally tensed, $p < 0.01$). However, variables such as receiving treatment for other diseases, and having knowledge about someone tested positive for COVID-19 had no statistically significant relationship with anxiety or depression (see Table 2).

The study also showed that respondents checking news updates more than four times a day, having hard time staying away from media (e.g. TV, newspaper etc.), having less than 2 h

of leisure, being unable to earn enough to support the family, facing any obstacles or humiliation by regulatory forces (e.g. Police, Rapid Action Battalion etc.) on the way to work from home and vice versa, being agitated more easily than usual, being agitated with human contact had higher occurrence of either anxiety or depression or both in some cases (see Table 2).

Regression analysis showed that, females were about 2.5 times more likely to be in anxiety than males ($p < 0.01$). Addition to that, respondents experiencing COVID-19 had higher odds to suffer from depression than respondents not experiencing COVID-19 symptoms (OR 1.63; 95% CI 1.10–2.42). Furthermore, it was seen that respondents spending less than 2 h a day for leisure activity were about 4 times more likely to suffer from depression than respondents spending 4 to 6 h for leisure activity ($p < 0.01$). Moreover, respondents those felt agitated by human contact had higher likelihood for anxiety (AOR = 2.68; 95% CI 1.23–5.81) and depression (AOR = 2.78; 95% CI 1.50–5.16) than those not feeling any changes by human contact. Similarly, respondents being unable to give maximum concentration on job after this pandemic, having fear of getting assaulted or humiliated on the way to work or home, having no positive outcome or impact on life through this pandemic, having hard time to stay away from social media (e.g. Facebook, Twitter, Instagram etc.), sleeping less than 6 h had significant association with higher odds of both anxiety and depression (Table 3).

Apart from these, respondents being moderately or severely tensed about being infected by COVID-19, not getting any incentives for patient treatment, feeling that they had not been provided with enough training about COVID-19, not being ready to deal a COVID-19 patient, having news updates from various sources (e.g. TV news, social media, online or offline newspapers etc.) and having sleep disturbances from occasionally to always had significant association with higher odds of either anxiety or depression or both in some cases. (Table 3)

Discussion

This cross-sectional study investigated the prevalence of anxiety and depressive symptoms in registered Bangladeshi physicians amid the COVID-19 pandemic, and to identify the factors associated with these psychological issues. To the best of our knowledge, very few previous studies have taken place among physicians in context of Bangladesh to determine the level of anxiety and depression and their contributing factors related to this pandemic.

Our findings revealed that, in terms of HADS cut-off points, the prevalence of anxiety and depression among registered physicians was 67.72% and 48.54% respectively. Several factors were found to be associated with this higher prevalence of depression and anxiety. For instance, among female gender, physicians who had experienced symptoms of COVID-19, not received incentives/only received compliments, reliance on self-funded personal protective equipment (PPE), inadequate training, lacking perceived self-efficacy while helping COVID positive patients, greater perceived stress of being infected, fear of getting assaulted/humiliated, use of social media, lower income level to support family, feeling more agitated, being agitated while contacting other people, less than 2 h of leisure activity a day, assuming no positive outcome/impact in life, sleep disturbance, and short sleep duration were found to be positively associated with physicians' anxiety and depression symptoms in the unadjusted and in the adjusted statistical models.

Table 1. Sociodemographic characteristics of the study participants

Variables	Frequency	Percentage
Gender		
Male	182	44.2
Female	230	55.8
Age		
≤24 years	67	16.3
25–34 years	314	76.2
≥35 years	31	7.5
Marital status		
Married	173	42.0
Unmarried	229	55.6
Divorced/separated	10	2.4
Income ($n = 268$)* 144 participants didn't provided info on their income		
≤20 000	125	30.3
21 000–40 000	93	22.6
41 000–70 000	31	7.5
≥70 000	19	4.6

Table 2. Factors associated with anxiety and depression among physicians in Bangladesh

Variables	Anxiety		χ^2 value (<i>p</i> value)	Depression		χ^2 value (<i>p</i> value)
	Yes (% in row)	No (% in row)		Yes (% in row)	No (% in row)	
Demographic factors						
Age						
≥35 years	17 (54.8)	14 (45.2)	2.90 (0.235)	15 (48.4)	16 (51.6)	0.02 (0.990)
25–34 years	218 (69.4)	96 (30.6)		153 (48.7)	161 (51.3)	
≤24 years	44 (65.7)	23 (34.3)		32 (47.8)	35 (52.2)	
Gender						
Female	173 (75.2)	57 (24.8)	13.39 (<0.001)**	124 (53.9)	106 (46.1)	6.01 (0.014) *
Male	106 (58.2)	76 (41.8)		76 (41.8)	106 (58.2)	
Marital status						
Married	114 (65.9)	59 (34.1)	2.36 (0.272)	84 (48.6)	89 (51.4)	0.06 (1.000)
Unmarried	156 (68.1)	73 (31.9)		111 (48.5)	118 (51.5)	
Divorced/separated	9 (90.0)	1 (10.0)		5 (50.0)	5 (50.0)	
Income (n = 268)						
≤20 000	89 (71.2)	36 (28.8)	1.19 (0.754)	58 (46.4)	67 (53.6)	1.32 (0.724)
21 000–40 000	60 (64.5)	33 (35.5)		40 (43.0)	53 (57.0)	
41 000–70 000	22 (71.0)	9 (29.0)		17 (54.8)	14 (45.2)	
≥70 000	13 (68.4)	6 (31.6)		9 (47.4)	10 (52.6)	
Health and COVID-19 related factors						
Receiving treatment for other diseases						
None	227 (67.4)	110 (32.6)	3.67 (0.476)	160 (47.5)	177 (52.5)	4.91 (0.313)
Chronic NCDs	13 (65.0)	7 (35.0)		9 (45.0)	11 (55.0)	
Pregnant mother	7 (100.0)	0 (0.0)		6 (85.7)	1 (14.3)	
Lung diseases	22 (68.8)	10 (31.3)		18 (56.3)	14 (43.8)	
Other infectious diseases	10 (62.5)	6 (37.5)		7 (43.8)	9 (56.3)	
Tested positive for COVID-19						
No	274 (67.8)	130 (32.2)	0.10 (0.753)	3 (37.5)	5 (62.5)	0.40 (0.725)
Yes	5 (62.5)	3 (37.5)		197 (48.8)	207 (51.2)	
Experienced symptoms of COVID-19						
Yes	21 (77.8)	6 (22.2)	6.30 (0.017) *	18 (66.7)	9 (33.3)	3.82 (0.148)
No	237 (65.7)	124 (34.3)		171 (47.4)	190 (52.6)	
Maybe	21 (87.5)	3 (12.5)		11 (45.8)	13 (54.2)	
Knowledge about someone tested positive for COVID-19						
None	66 (63.5)	38 (36.5)	1.17 (0.558)	49 (47.1)	55 (52.9)	0.27 (0.873)
Family member/Friends	86 (68.8)	39 (31.2)		63 (50.4)	62 (49.6)	
Other known person (like patients)	127 (69.4)	56 (30.6)		88 (48.1)	95 (51.9)	
Exposure to COVID-19 patients during pandemic						
Yes	36 (70.6)	15 (29.4)	0.22 (0.640)	22 (43.1)	29 (56.9)	0.68 (0.409)
No	243 (67.3)	118 (32.7)		178 (49.3)	183 (50.7)	
Got incentives for patient treatment						
N/A	28 (62.2)	17 (37.8)	11.58 (0.002)	24 (53.3)	21 (46.7)	3.60 (0.308)
No nothing yet	208 (68.6)	95 (31.4)		145 (47.9)	158 (52.1)	

(Continued)

Table 2. (Continued.)

Variables	Anxiety		χ^2 value (<i>p</i> value)	Depression		χ^2 value (<i>p</i> value)
	Yes (% in row)	No (% in row)		Yes (% in row)	No (% in row)	
Just got commitments	29 (85.3)	5 (14.7)		20 (58.8)	14 (41.2)	
Yes, got incentives	14 (46.7)	16 (53.3)		11 (36.7)	19 (63.3)	
Got PPE						
N/A	29 (64.4)	16 (35.6)	6.59 (0.159)	26 (57.8)	19 (42.2)	9.81 (0.044)*
No	99 (73.9)	35 (26.1)		72 (53.7)	62 (46.3)	
Got it but not enough in number	39 (56.5)	30 (43.5)		23 (33.3)	46 (66.7)	
Got it but not qualified enough to protect	86 (68.8)	39 (31.2)		62 (49.6)	63 (50.4)	
Yes	26 (66.7)	13 (33.3)		17 (43.6)	22 (56.4)	
Source of PPE						
N/A	51 (68.0)	24 (32.0)	7.44 (0.059)	35 (46.7)	40 (53.3)	12.30 (0.006)**
Self-funded	95 (76.6)	29 (23.4)		76 (61.3)	48 (38.7)	
Govt. and/or Hospital	101(61.6)	63 (38.4)		70 (42.7)	94 (57.3)	
Local people/NGOs/Sponsored	32 (65.3)	17 (34.7)		19 (38.8)	30 (61.2)	
Got enough training about COVID-19						
Yes	100 (61.3)	63 (38.7)	5.00 (0.025)*	78 (47.9)	85 (52.1)	0.05 (0.820)
No	179 (71.9)	70 (28.1)		122 (49.0)	127 (51.0)	
Ready to deal a COVID-19 positive patient						
Yes	122 (60.4)	80 (39.6)	9.72 (0.002)**	81 (40.1)	121 (59.9)	11.31 (0.001)**
No	157 (74.8)	53 (25.2)		119 (56.7)	91 (43.3)	
Level of tension of getting infected by COVID-19						
No/minimal	13 (31.70)	28 (68.30)	45.77 (<0.01)**	11 (26.80)	30 (73.20)	14.99 (<0.01)**
Moderate	106 (60.60)	69 (39.40)		77 (44.00)	98 (56.00)	
Severe	160 (81.60)	36 (18.40)		112 (57.10)	84 (42.90)	
Level of tension about family members of being infected by COVID-19						
No/minimal	9 (52.90)	8 (47.10)	15.69 (<0.01)*	6 (35.30)	11 (64.70)	3.68 (0.159)
Moderate	34 (49.30)	35 (50.70)		28 (40.60)	41 (59.40)	
Severe	236 (72.40)	90 (27.60)		166 (50.90)	160 (49.10)	
Belief and behavioral question						
Number of times check the daily news/updates						
≤3 times	134 (61.50)	84 (38.50)	8.27 (<0.01)**	99 (45.40)	119 (54.60)	1.82 (0.178)
≥4 times	145 (74.70)	49 (25.30)		101 (52.10)	93 (47.90)	
Find difficult to stay away from media (TV/Newspaper etc.)						
No	61 (44.2)	77 (55.8)	53.29 (<0.001)*	47 (34.1)	91 (65.9)	17.67 (<0.001)**
I am not sure	48 (75.0)	16 (25.0)		34 (53.1)	30 (46.9)	
Yes	170 (81.0)	40 (19.0)		119 (56.7)	91 (43.3)	
Source of news						
TV news (Online on Fb page, YouTube/Offline)	178 (70.4)	75 (29.6)	6.82 (0.033) *	123 (48.6)	130 (51.4)	2.74 (0.254)
Social Media	77 (68.8)	35 (31.3)		59 (52.7)	53 (47.3)	
National/Int. news websites /Newspaper (Online/offline)	24 (51.1)	23 (48.9)		18 (38.3)	29 (61.7)	

(Continued)

Table 2. (Continued.)

Variables	Anxiety		χ^2 value (<i>p</i> value)	Depression		χ^2 value (<i>p</i> value)
	Yes (% in row)	No (% in row)		Yes (% in row)	No (% in row)	
Leisure activity						
Spending time with family and doing household task	39 (69.6)	17 (30.4)	2.73 (0.435)	33 (58.9)	23 (41.1)	3.74 (0.291)
SBSB (Facebook and other social platforms)	36 (69.2)	16 (30.8)		22 (42.3)	30 (57.7)	
Studying	24 (80.0)	6 (20.0)		16 (53.3)	14 (46.7)	
Multiple of the above	180 (65.7)	94 (34.3)		129 (47.1)	145 (52.9)	
Daily leisure time						
<2 h	34 (77.3)	10 (22.7)	3.77 (0.288)	30 (68.2)	14 (31.8)	10.47 (0.015)*
2–4 h	64 (64.0)	36 (36.0)		46 (46.0)	54 (54.0)	
>6 h	123 (69.9)	53 (30.1)		88 (50.0)	88 (50.0)	
4–6 h	58 (63.0)	34 (37.0)		36 (39.1)	56 (60.9)	
Hard to stay away from social media (Facebook, twitter, Instagram etc.)						
Yes	197 (73.5)	71 (26.5)	11.76 (<0.01)**	140 (52.2)	128 (47.8)	4.19 (0.041)*
No	82 (56.9)	62 (43.1)		60 (41.7)	84 (58.3)	
Think COVID-19 situation has had any positive outcome or impact on life						
Yes	78 (60.5)	51 (39.5)	10.80 (<0.01)**	50 (38.8)	79 (61.2)	20.38 (<0.01)**
No	110 (78.0)	31 (22.0)		90 (63.8)	51 (36.2)	
Maybe	91 (64.1)	51 (35.9)		60 (42.3)	82 (57.7)	
Earn enough to support family during this pandemic						
Yes	112 (59.6)	76 (40.4)	11.76 (<0.01)**	81 (43.1)	107 (56.9)	6.38 (0.041)*
No, I am unable	117 (77.0)	35 (23.0)		86 (56.6)	66 (43.4)	
I am not sure	50 (69.4)	22 (30.6)		33 (45.8)	39 (54.2)	
Have enough supplies of food in home for family to feed on						
Yes	171 (66.3)	87 (33.7)	0.68 (0.711)	118 (45.7)	140 (54.3)	2.70 (0.259)
No	32 (71.1)	13 (28.9)		26 (57.8)	19 (42.2)	
Maybe	76 (69.7)	33 (30.3)		56 (51.4)	53 (48.6)	
Faced obstacles/humiliation while getting into or back from work by regulatory forces (ex: Police, army, RAB etc.)						
Yes	57 (79.2)	15 (20.8)	6.61 (0.037)*	39 (54.2)	33 (45.8)	1.10 (0.576)
No	194 (64.2)	108 (35.8)		143 (47.4)	159 (52.6)	
I do not remember	28 (73.7)	10 (26.3)		18 (47.4)	20 (52.6)	
Am afraid of getting assaulted /humiliated on the way to hospital or home						
Yes	138 (79.3)	36 (20.7)	18.52 (<0.01)**	98 (56.3)	76 (43.7)	7.30 (<0.01)**
Not at all or N/A	141 (59.2)	97 (40.8)		102 (42.9)	136 (57.1)	
Able to give your maximum concentration on study after the pandemic						
No/minimal	26 (74.30)	9 (25.7)	26.22 (<0.01)**	21 (60.00)	14 (40.00)	11.61 (<0.01)**
May be	143 (79.90)	36 (20.10)		100 (55.90)	79 (44.10)	
Yes	110 (55.60)	88 (44.40)		79 (39.90)	119 (60.10)	
Had sleep disturbances in last 4 weeks						
Never	24 (39.3)	37 (60.7)	50.95 (<0.01)**	16 (26.2)	45 (73.8)	37.70 (<0.01)**
Occasionally	65 (57.5)	48 (42.5)		41 (36.3)	72 (63.7)	

(Continued)

Table 2. (Continued.)

Variables	Anxiety		χ^2 value (<i>p</i> value)	Depression		χ^2 value (<i>p</i> value)
	Yes (% in row)	No (% in row)		Yes (% in row)	No (% in row)	
Sometimes	77 (72.6)	29 (27.4)		57 (53.8)	49 (46.2)	
Often	73 (81.1)	17 (18.9)		54 (60.0)	36 (40.0)	
Always	40 (95.2)	2 (4.8)		32 (76.2)	10 (23.8)	
Daily average sleep duration in last 4 weeks						
6–8 h	112 (61.9)	69 (38.1)	11.38 (<0.01)**	73 (40.3)	108 (59.7)	13.12 (<0.01)**
Less than 6 h	105 (78.9)	28 (21.1)		81 (60.9)	52 (39.1)	
More than 8 h	62 (63.3)	36 (36.7)		46 (46.9)	52 (53.1)	
Being agitated more easily than usually were						
Yes	145 (86.3)	23 (13.7)	63.19 (<0.01)**	115 (68.5)	53 (31.5)	54.20 (<0.01)**
Maybe	68 (70.8)	28 (29.2)		45 (46.9)	51 (53.1)	
No	66 (44.6)	82 (55.4)		40 (27.0)	108 (73.0)	
How is human contact making you feel?						
No change, like before	68 (44.4)	85 (55.6)	67.84 (<0.01)**	42 (27.5)	111 (72.5)	50.42 (<0.01)**
Agitated	191 (84.5)	35 (15.5)		145 (64.2)	81 (35.8)	
Better than before	20 (60.6)	13 (39.4)		13 (39.4)	20 (60.6)	

Worldwide, throughout the pandemic front-line physicians are not only at the risk of physical challenges but also of experiencing significant mental health and psychosocial issues. (Chen *et al.*, 2020; Kang *et al.*, 2020). In line with our findings, an estimated 50.4% and 44.6% healthcare staffs self-reported anxiety and depression respectively in a cross-sectional survey in China (Lai *et al.*, 2020). On the other hand, a significantly lower prevalence of anxiety and depression (14.5% and 8.9% respectively) have been found in a Singapore-based study involving physicians (Tan *et al.*, 2020). The variances between study results could be explained by methodological differences, level of resources available in each of those countries and the subsequent demands on physicians and adoption of different scales and cut-off scores in different surveys, as well as true differences.

One Iranian study utilized the same research instrument (HADS) as our study. In line with our study findings, more than 68% of doctors and nurses had experienced anxiety symptoms, whereas depressive symptoms were reported approximately 52% (Hassannia *et al.*, 2020). Overall, a recent systematic review and meta-analysis quantified the cumulative prevalence of anxiety and depression experienced by medical staff during COVID-19 by pooling data from 13 studies with a reported 23.2% anxiety and 22.8% depression (Pappa *et al.*, 2020). The disproportionately higher prevalence of anxiety and depression (67.72% and 48.54% respectively) among Bangladeshi physicians could be described by the extreme shortage and mal-distribution of health workforce, (Ahmed *et al.*, 2011) coupled with significantly higher rates of infection and death among health professionals, extended working hours, ultimate shortage of PPE, lack of adequate training, and social assault/humiliation.

As expected, Bangladeshi female physicians experienced higher psychological distress than their male counterparts during this pandemic. This finding agrees with the established gender gap for more frequent anxious and depressive symptoms among

women (Alexander *et al.*, 2007; Albert, 2015). In parallel with Wang *et al.* (2021) study findings, where three-fold higher anxiety disorder was observed among women (Wang *et al.*, 2021), the current study identified females suffering from anxiety symptoms 2.5 times greater than their counterparts. Biological mechanisms and hormonal influences may demonstrate the relationship of higher perceived psychological distress in women (Albert, 2015). Although age and associated physical and mental comorbidities are identified as major predisposing factors for anxiety and depression among doctors (Guo *et al.*, 2020; Kisely *et al.*, 2020; Özdin and Bayrak Özdin, 2020), surprisingly, we found no statistically significant differences between depression symptoms and anxiety levels and the above-mentioned variables, which warrants future research.

Our study revealed that, less than 6 h of sleep compared to normal sleep duration (6–8 h) and any level of sleep disturbances experienced in the past four weeks in comparison to no sleep disturbance, were linked to prevalence of anxiety and depressive symptoms. A survey conducted by Wang *et al.* (2020) among Chinese pediatric physicians, found independent association between sleep disturbances and depression, however, anxiety revealed statistically non-significant relationship, although physicians with sleep problems reported higher anxiety than their counterparts (Wang *et al.*, 2020). Another study exhibited similar findings that represented Taiwanese local physicians during SARS pandemic (Chen *et al.*, 2005). Moreover, depression, but not anxiety, was found approximately 4 times higher among physicians those spent less than 2 h on leisure activities than that of 4–6 h in this current study.

Following COVID-19 outbreak, physicians took initiatives to support the strained health sector and struggled to protect the health of the public (Xiao, 2020), however, they became the foremost victims of this pandemic concerning the exaggerated psychological pressure of varying factors. For example, direct

Table 3. Odds of binary logistic regression of predictive study variables with anxiety and depression among physicians in Bangladesh

Variables	Anxiety				Depression			
	Unadjusted estimates		Adjusted estimates		Unadjusted estimates		Adjusted estimates	
	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value
Age								
≥35 years	0.64 (0.27–1.51)	0.305	0.31 (0.07–1.31)	0.112	1.04 (0.61–1.76)	0.886	0.79 (0.24–2.63)	0.696
25–34 years	1.19 (0.68–2.08)	0.547	1.60 (0.69–3.72)	0.278	1.03 (0.44–2.40)	0.954	1.14 (0.57–2.29)	0.712
≤24 years	1.00				1.00			
Gender								
Female	2.18 (1.43–3.31)	<0.001**	2.55 (1.29–5.03)	0.007 (<0.01) **	1.63 (1.10–2.42)	0.014*	1.16 (0.68–1.96)	0.588
Male	1.00				1.00			
Experienced symptoms of COVID-19								
Yes	1.83 (0.72–4.66)	0.204	1.41 (0.37–5.43)	0.614	2.22 (0.97–5.08)	0.058*	2.28 (0.80–6.45)	0.122
Maybe	3.66 (1.07–12.52)	0.038	4.47 (0.87–22.88)	0.073	0.94 (0.41–2.15)	0.884	0.74 (0.25–2.23)	0.594
No	1.00				1.00			
Got incentives for patient treatment								
N/A	1.88 (0.74–4.80)	0.186	2.15 (0.29–16.27)	0.457	1.97 (0.77–5.08)	0.159	1.27 (0.27–6.05)	0.768
No nothing yet	2.50 (1.17–5.34)	0.018	5.55 (1.60–19.27)	0.007 (<0.01) **	1.59 (0.73–3.44)	0.245	1.64 (0.57–4.75)	0.358
Just got commitments	6.63 (2.02–21.78)	0.002 (<0.01) **	14.61 (2.16–98.91)	0.006 (<0.01) **	2.47 (0.90–6.77)	0.079	1.55 (0.40–5.97)	0.521
Yes, got incentives	1.00				1.00			
Getting PPE								
N/A	0.91 (0.37–2.24)	0.831	0.50 (0.06–4.38)	0.533	1.77 (0.75–4.21)	0.196	5.06 (0.99–25.90)	0.052*
No	1.41 (0.66–3.05)	0.377	0.42 (0.10–1.76)	0.235	1.50 (0.73–3.08)	0.266	1.10 (0.41–3.00)	0.849
Got it but not enough in number	0.65 (0.29–1.47)	0.302	0.30 (0.07–1.26)	0.099	0.65 (0.29–1.45)	0.290	0.43 (0.15–1.23)	0.116
Got it but not qualified enough to protect	1.10 (0.51–2.37)	0.803	0.21 (0.05–0.85)	0.028	1.27 (0.62–2.63)	0.512	0.83 (0.32–2.12)	0.697
Yes	1.00				1.00			
Source of PPE								
N/A	1.13 (0.53–2.42)	0.755	1.27 (0.27–5.84)	0.763	1.38 (0.66–2.87)	0.387	0.46 (0.13–1.61)	0.221
Self-funded	1.74 (0.85–3.58)	0.132	1.18 (0.40–3.52)	0.765	2.50 (1.27–4.93)	0.008 (<0.01) **	2.27 (0.92–5.61)	0.077
Govt. and/or Hospital	0.85 (0.44–1.66)	0.637	0.61 (0.22–1.70)	0.342	1.18 (0.61–2.26)	0.627	1.10 (0.47–2.58)	0.824
Local people/ NGOs/Sponsored	1.00				1.00			

Got enough training about COVID-19								
No	1.61 (1.06–2.45)	0.026*	1.55 (0.79–3.04)	0.199	1.05 (0.71–1.55)	0.820	0.98 (0.57–1.68)	0.934
Yes	1.00				1.00			
Ready to deal a COVID-19 positive patient								
No	1.94 (1.28–2.96)	0.002 (<0.01) **	1.08 (0.52–2.22)	0.839	1.95 (1.32–2.89)	0.001**	1.23 (0.70–2.15)	0.474
Yes	1.00				1.00			
Level of tension of getting infected by COVID-19								
Moderate	3.31 (1.60–6.83)	0.001**	4.07 (1.26–13.11)	0.019*	2.14 (1.01–4.55)	0.047*	1.94 (0.70–5.43)	0.206
Severe	9.57 (4.52–20.28)	<0.001**	9.69 (2.79–33.70)	<0.001**	3.64 (1.72–7.67)	0.001**	2.32 (0.78–6.87)	0.128
No/minimal	1.00				1.00			
Level of tension about family members of being infected by COVID-19								
Moderate	0.86 (0.30–2.50)	0.787	0.24 (0.05–1.21)	0.083	1.25 (0.42–3.78)	0.690	1.00 (0.23–4.32)	0.990
Severe	2.33 (0.87–6.23)	0.091	0.45 (0.10–2.10)	0.308	1.90 (0.69–5.27)	0.216	0.98 (0.24–3.96)	0.980
No/minimal	1.00				1.00			
Number of times check the daily news /updates								
≥4 times	1.86 (1.22–2.83)	0.004 (<0.01) **	1.28 (0.65–2.52)	0.475	1.31 (0.89–1.92)	0.178	1.08 (0.63–1.87)	0.783
≤3 times	1.00				1.00			
Hard to stay away from social media (facebook, twitter, instagram etc.)								
Yes	5.37 (3.32–8.68)	<0.001**	2.84 (1.38–5.83)	0.005 (<0.01) **	2.53 (1.62–3.95)	<0.001**	1.17 (0.63–2.17)	0.613
I am not sure	3.79 (1.96–7.31)	<0.001**	3.89 (1.44–10.50)	0.007 (<0.01) **	2.19 (1.20–4.02)	0.011*	2.07 (0.93–4.58)	0.073
No	1.00				1.00			
Source of news								
TV news (Online on Fb page, YouTube/Offline)	2.27 (1.21–4.28)	0.011*	1.71 (0.61–4.80)	0.311	1.52 (0.81–2.88)	0.195	0.96 (0.40–2.32)	0.930
Social Media	2.11 (1.05–4.24)	0.036*	1.49 (0.47–4.71)	0.496	1.79 (0.90–3.60)	0.100	1.00 (0.39–2.58)	0.999
National/Int. news websites/Newspaper (Online/offline)	1.00				1.00			
Daily leisure time								
<2 h	1.99 (0.88–4.54)	0.100	1.23 (0.36–4.22)	0.743	3.33 (1.56–7.13)	0.002 (<0.01) **	4.18 (1.50–11.64)	0.006 (<0.01) **
2–4 h	1.04 (0.58–1.88)	0.891	1.06 (0.41–2.74)	0.908	1.33 (0.75–2.35)	0.337	1.23 (0.58–2.61)	0.588
>6 h	1.36 (0.80–2.32)	0.257	0.96 (0.40–2.30)	0.923	1.56 (0.93–2.60)	0.091	1.09 (0.55–2.17)	0.801
4–6 h	1.00				1.00			
Hard to stay away from social media (facebook, twitter, instagram etc.)								
Yes	2.10 (1.37–3.22)	0.001**	1.45 (0.72–2.93)	0.295	1.53 (1.02–2.31)	0.041*	1.15 (0.64–2.08)	0.640

(Continued)

Table 3. (Continued.)

Variables	Anxiety				Depression			
	Unadjusted estimates		Adjusted estimates		Unadjusted estimates		Adjusted estimates	
	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value	OR (95% CI)	p Value
No	1.00				1.00			
Think COVID-19 situation has had any positive outcome or impact on life								
No	2.32 (1.36–3.95)	0.002 (<0.01) **	2.35 (0.99–5.62)	0.054*	2.79 (1.70–4.57)	<0.001**	2.65 (1.38–5.10)	0.003 (<0.01) **
Maybe	1.17 (0.71–1.91)	0.539	0.80 (0.36–1.75)	0.572	1.16 (0.71–1.88)	0.559	0.87 (0.46–1.63)	0.656
Yes	1.00				1.00			
Earn enough to support family during this pandemic								
No, I am unable	2.27 (1.41–3.66)	0.001**	0.73 (0.33–1.63)	0.448	1.72 (1.12–2.65)	0.014*	0.89 (0.48–1.64)	0.704
I am not sure	1.54 (0.86–2.75)	0.143	1.26 (0.51–3.12)	0.528	1.12 (0.65–1.93)	0.689	0.87 (0.42–1.81)	0.713
Yes	1.00				1.00			
Faced obstacles/humiliation while getting into or back from work by regulatory forces (ex: Police, army, RAB etc.)								
Yes	2.12 (1.14–3.92)	0.017*	1.41 (0.55–3.61)	0.469	1.31 (0.79–2.20)	0.299	0.90 (0.45–1.79)	0.762
I do not remember	1.56 (0.73–3.33)	0.252	1.40 (0.44–4.49)	0.569	1.00 (0.51–1.97)	0.998	0.81 (0.33–1.98)	0.643
No	1.00				1.00			
Am afraid of getting assaulted /humiliated on the way to hospital or home								
Yes	2.64 (1.68–4.13)	<0.001**	1.95 (0.97–3.89)	0.060	1.72 (1.16–2.55)	0.007 (<0.01) **	1.21 (0.71–2.05)	0.479
Not at all or N/A	1.00				1.00			
Able to give your maximum concentration on study after the pandemic								
No/minimal	2.31 (1.03–5.19)	0.042*	1.88 (0.54–6.59)	0.325	2.26 (1.09–4.71)	0.029*	2.36 (0.90–6.22)	0.082
May be	3.18 (2.01–5.04)	<0.001**	2.25 (1.07–4.70)	0.031*	1.91 (1.27–2.87)	0.002 (<0.01) **	1.40 (0.80–2.46)	0.237
Yes	1.00				1.00			
Had sleep disturbances in last 4 weeks								
Occasionally	2.09 (1.11–3.94)	0.023*	2.01 (0.77–5.28)	0.157	1.60 (0.81–3.19)	0.179	1.28 (0.54–3.06)	0.580
Sometimes	4.09 (2.10–7.98)	<0.001**	5.69 (2.12–15.27)	0.001**	3.27 (1.65–6.50)	0.001**	2.67 (1.11–6.39)	0.028*
Often	6.62 (3.17–13.83)	<0.001**	4.34 (1.44–13.07)	0.009 (<0.01) **	4.22 (2.08–8.58)	<0.001**	1.93 (0.76–4.93)	0.169
Always	30.83 (6.81–139.60)	<0.001**	29.63 (3.23–272.29)	0.003 (<0.01) **	9.00 (3.62–22.38)	<0.001**	4.00 (1.25–12.77)	0.019*
Never	1.00				1.00			
Daily average sleep duration in last 4 weeks on average								
Less than 6 h	2.31 (1.38–3.86)	0.001**	1.27 (0.57–2.83)	0.567	2.31 (1.46–3.64)	<0.001**	1.55 (0.83–2.89)	0.170
More than 8 h	1.06 (0.64–1.76)	0.819	1.14 (0.52–2.52)	0.738	1.31 (0.80–2.15)	0.287	1.54 (0.81–2.91)	0.186
6–8 h	1.00				1.00			

Getting agitated more easily than usually								
Yes	7.83 (4.54–13.53)	<0.001**	2.19 (0.91–5.28)	0.080	5.86 (3.60–9.54)	<0.001**	2.16 (1.10–4.21)	0.024*
Maybe	3.02 (1.75–5.21)	<0.001**	1.61 (0.70–3.75)	0.265	2.38 (1.39–4.09)	0.002 (<0.01)**	1.25 (0.63–2.50)	0.527
No	1.00				1.00			
How is human contact making you feel?								
Agitated	6.82 (4.22–11.04)	<0.001**	2.68 (1.23–5.81)	0.013*	4.73 (3.03–7.40)	<0.001**	2.78 (1.50–5.16)	0.001**
Better than before	1.92 (0.89–4.14)	0.095	1.30 (0.43–3.95)	0.641	1.72 (0.79–3.76)	0.176	1.51 (0.57–3.99)	0.411
No change, like before	1.00				1.00			

contact with COVID positive patients, suspected patients hiding medical history, concern about inadequate PPE, extended working hours, infection of colleagues, separation from family, fear of infecting family members, physical fatigue, and medical violence may in turn accelerate their existing stress level (Dai *et al.*, 2020; Godlee, 2020; Kang *et al.*, 2020; Liu *et al.*, 2020). Along with these, Lu *et al.* (2020) emphasized on worrying about being infected, duty in the isolation ward, feeling lonely due to detachment from the loved ones, being frustrated with unsatisfactory results on work, and the fear of an uncontrollable epidemic, leading to psychological distress (Lu *et al.*, 2020). The level of anxiety and depressive symptoms even more prominent among Bangladeshi doctors, contributed by several factors, such as self-funded PPE, absence of incentives, lack of proper training to deal with COVID patients, perceived stress of being infected, and fear of getting assaulted/humiliated while returning home from workplace. Addressing the above-mentioned factors by the policymakers and organizational authorities are paramount to excel the strength of HCWs and support their mental well-being to reach to their highest level of aspirations to serve the humanity.

This study provides concerning findings on anxiety and depressive symptoms among Bangladeshi physicians during COVID-19 pandemic, however we cannot overlook the limitations. The cross-sectional nature of the study design could not establish causal relationship between the dependent and independent variables. This study was carried out by conducting a web-based survey, which might generate sampling bias by excluding the physicians who do not have access to internet or inactive in social medias, and thus limit the generalizability of the findings. Besides, self-reported responses on anxiety and depression symptoms only provided subjective data which may greatly differ from objective data, leading to response bias. Finally, although we tried to address major risk factors, several relevant variables, such as residence status (urban or rural), having children, domestic violence, moral dilemma to manage such complex patients and information on physician's work hours or perceived workloads were not included in the survey.

Despite these limitations, our study has several clear public health implications. Our results suggest vulnerability of Bangladeshi physicians for anxiety and depressive symptoms during the pandemic which should be closely monitored. Previous studies emphasized on alarmingly higher rates of 'physician burnout', characterized by emotional exhaustion, depersonalization, and low personal accomplishments (West *et al.*, 2018) and alternatively increased risk of suicidal ideation and suicidal attempts in physicians (Rothenberger, 2017). Moreover, Montemurro reported suicides in India and Italy during this pandemic, as physicians experienced helplessness, acute psychological stress, and utmost fear of dying (Montemurro, 2020). As physician's psychological health and patient safety and satisfaction are inextricably linked (Panagioti *et al.*, 2018), promotion of mental well-being of physician is paramount and there is an urgent call for personal, social, and policy-level interventions before it is too late. Given the importance of the risk factors associated with physician's anxiety and depression symptoms identified in this study, provision of adequate PPE, proper training before deployment in the isolation ward, additional incentives, and on-going monitoring and remote psychological support may aid in reducing physician's psychological strain.

Conclusion

This study reports a real concern about the prevalence of anxiety and depression symptoms with identification of associated factors

among Bangladeshi physicians during the COVID-19 pandemic. Such mental health difficulties are higher than normal scenario. Given the vulnerability of the physicians and other health care staff in this extraordinary condition whilst they are shouldering the overwhelming weight of the epidemic, fighting social stigma and putting their lives at risk to help the affected, health authorities should be addressing their psychological needs and formulate effective strategies, standard operating procedures (SOPs) and appropriate interventions to support these frontline fighters at such difficult times.

Data. Data will be available upon reasonable request.

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