Prevalence of mental health symptoms and its effect on insomnia among healthcare workers who attended hospitals during COVID-19 pandemic: A survey in Dhaka city

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Abstract

**Background:** During the COVID-19 pandemic, the high workload, risk of infection, and safety issues for family members may pose a threat to the mental health of healthcare workers (HCWs) working in hospital settings. The study aimed to find out the prevalence of anxiety, depression, and insomnia symptoms were among HCWs, as well as the factors related to these mental health issues.

**Methods:** We conducted an online survey of HCWs employed in Dhaka city from June 6 to July 6, 2020. Symptoms of anxiety, depression, and insomnia were measured using the Generalized Anxiety Disorder, the depression module of the Patient Health Questionnaire, and the Insomnia Severity Index, respectively. The related factors of anxiety, depression, and insomnia symptoms were identified using three regression models.

**Results:** This research included responses from 294 HCWs (mean± standard deviation age: 28.86±5.5 years; 43.5% were female). Anxiety, depression, and insomnia symptoms were found in 20.7%, 26.5%, and 44.2% of HCWs, respectively. The variable financial difficulties was commonly found as an associated factor for anxiety, depression, and insomnia symptoms. Female HCWs were more prone to mental health symptoms and insomnia compared to male HCWs (Adjusted odds ratio- AOR=2.20, 95% CI=1.27 – 3.79). The depression symptoms among HCWs were found to be a factor for insomnia (AOR=6.321, 95% CI=3.158 – 12.650).

**Conclusion:** In the current pandemic, the high prevalence of mental health symptoms among HCWs indicates that this occupational group being associated with increased mental distress. Increasing financial support for HCWs and providing support to female workers in care facilities could help to alleviate the burden of mental illness. Supportive, training, and educational strategies, particularly through knowledge and communication platforms, could be recommended to the care facilities, which can reduce the burden of mental health symptoms among HCWs.

1. Introduction

Coronavirus disease (COVID-19) has a large negative psychological effect and mental health issues worldwide due to its high morbidity and mortality rates (Brooks et al., 2020; Sasaki, Kuroda, Tsuno, & Kawakami, 2020). The unexpectedly rapid spread of COVID-19 endowed HCWs with increased work burden, lack of personal protective equipment, high risk of exposure and contracting the diseases, as well as increased mortality amongst HCWs (Barranco & Ventura, 2020; Gan, Lim, & Koh, 2020; Herron, Hay-David, Gilliam, & Brennan, 2020). HCWs were forced to continue their duties amid the COVID-19 pandemic to provide healthcare services for both COVID 19 and non-COVID patients potentially leading to causing enormous psychological distress (Chew et al., 2020; Di Tella, Romeo, Benfante, & Castelli, 2020). There have already been reports of HCWs committing suicide due to COVID-19-related stress (Rahman & Plummer, 2020).
A systematic review and meta-analysis suggested that the prevalence of anxiety, depression, and insomnia symptoms among HCWs during this pandemic were 23.2%, 22.8%, and 38.9% respectively (Pappa et al., 2020). Bangladesh is dealing with a major outbreak of COVID-19, which has overburdened the country’s healthcare facilities. The capital Dhaka has a higher death rate among the general population and HCWs than other cities in Bangladesh. The high workload, continuous exposure, risk of infection, ethical decisions regarding rationing resources amongst patients, and safety concerns for family members threaten the mental health of HCWs currently working both in COVID-19 and non-COVID settings. The study aimed to determine the prevalence of mental health symptoms and insomnia among HCWs working in hospital settings in the Dhaka city area, as well as to identify associated factors of these symptoms.

2. Methods

2.1 Study design and participants

From June 6 to July 6, 2020, an online cross-sectional study was conducted among healthcare workers in Dhaka, Bangladesh following the CHERRIES checklist for online surveys (Eysenbach, 2004). Given that social distancing was practised during the COVID 19 pandemic, the questionnaire was generated using Google forms and sent to participants via online platforms such as email, WhatsApp, and Facebook. This technique has been found suitable in previous similar studies in Asia and other parts of the world during the COVID-19 pandemic (Şahin, Aker, Şahin, & Karabekiroğlu, 2020a; Xiaoming et al., 2020). In the first section of the questionnaire, there was a text with details about the demographic information. All the participants were required to give informed consent for participation and collection and analysis of their data by ticking the “Yes, I agree and hereby give my informed consent” box on the online form before partaking in the online questionnaire. While approximately 500 HCWs were invited conveniently, only 409 subjects filled out and returned the form giving an 80% response rate. To prevent more than one response from a participant, we have used the “Requires sign-in” option when adjusted the settings of Google Form. However, only HCWs working in a hospital in the Dhaka metropolitan area were included, and HCWs who were not working in any hospital settings were excluded from the study. Finally, responses from 294 HCWs were included for further analysis. Data were entered for analysis in a password-encrypted personal computer with a new unidentifiable code number after removing participants’ names and registration digits to ensure confidentiality.

2.2 Ethical Approval

Ethical approval was taken from the Ethical Review Committee (ERC) of Uttara Adhunik Medical College and Hospital and the Institutional Review Board (IRB) of North South University (NSU-IRB 4578). Participants or the public WERE NOT involved in the design, or conduct, or reporting, or dissemination plans of our research.

2.3 Sociodemographic, clinical, and occupational factors
Detailed data on sociodemographic, and clinical factors such as age, gender, living status, family size, and family member aged above 50 years, resident type, history of chronic disease, and maintaining isolation were collected. Data on occupation, technical job title, service category, and current working position were also recorded. Participants were also asked to answer yes/no questions to provide information on whether they were facing financial difficulties due to the impact of COVID-19.

### 2.4 Anxiety disorder symptoms

The Generalized Anxiety Disorder 2-item (GAD-2) was used to identify participants experiencing symptoms of general anxiety disorder. GAD-2 in the screening of generalized anxiety is a valid and frequently used scale, and a cutoff point $\geq 3$ is recommended (Jordan, Shedden-Mora, & Lö We, 2017; Löwe et al., 2010).

### 2.5 Depression symptoms

The Patient Health Questionnaire 9-item depression module (PHQ-9) was used to measure depressive symptoms. A scale ranging from 0 to 3 was used to score each of the nine items. The total score ranges from 0 to 27. The total score suggests different levels of depressive symptoms: minimal/no symptoms (0–4), mild (5–9), moderate (10–14), severe (15–21), and very severe (22–27). However, in this study, cut-off point $\geq 10$ was used to classify participants as having depressive symptoms (Islam, Akter, Sikder, & Griffiths, 2020; Kroenke & Spitzer, 2002).

### 2.6 Insomnia symptoms

Finally, to measure the severity of insomnia the Insomnia Severity Index (ISI) was used. Each item is wreathed on a 0–4 scale, and the total score ranges from 0 to 28. A cumulative score of $\geq 8$ is considered as having symptoms of insomnia (Morin, Belleville, Bélanger, & Ivers, 2011; Zhang et al., 2020). A higher score suggests more intense Insomnia symptoms.

### 2.7 Data analysis

Descriptive analysis was done to determine the statistics of sociodemographic, economic, clinical, and occupation-related factors of the participants. Continuous variables were presented as mean and standard deviation while the categorical variables were displayed in number and percentage.

To find out factors associated with anxiety, depression, and insomnia symptoms, a univariate analysis has been performed. All significant levels were set at 0.05 alphas in this study.

Three multiple regression models were run to assess the predictability of the sociodemographic, economic, clinical, and occupational factors that were statistically significant in the univariate analysis. GAD-2, PHQ-9, and ISI scores were used as dependent variables for the first, second, and third regression model, respectively. Another multiple regression model was employed to find an association between
mental health symptoms and insomnia. The Statistical Package for the Social Science (SPSS) software version 20.0, SPSS Inc., Chicago, IL, USA was used for the present study.

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### 3. Results

#### 3.1 Characteristic of the participants

The study included responses from 294 HCWs (mean± standard deviation age: 28.86±5.5 years and 43.5% of were female). Among all the participants, 37.4% were medical doctors, 9.5% dentists, 27.9% rehabilitation workers (physiotherapist, occupational therapist, speech therapist, and physiotherapy assistant), 9.5% nurses, and 15.7% medical technologists. Among the HCW, 17% had a chronic disease,
55.8% reported financial problems. Table 1 displays the full result. However, the Cronbach’s alpha value for the items of anxiety scores, depression scores and insomnia scores in this study were 0.70, 0.80, and 0.90, respectively, which indicates an excellent internal consistency.

### 3.2 Factors associated with anxiety, depression, and insomnia symptoms

Anxiety, depression, and insomnia symptoms were found to be prevalent in 20.7%, 26.5%, and 44.2% of the participants, respectively. However, the descriptive analysis found that the age group was associated with depression scores (p= 0.002) and insomnia scores (p= 0.001) scores. Our data shows that, more females reported anxiety (p= 0.021), depression (p=0.038) and insomnia symptoms (p= 0.010) than male workers. In addition, Being single was also associated with high prevalence of anxiety (p= 0.001), depression (p= <0.001) and insomnia symptoms (p= <0.001) among the HCWs. Furthermore, the financial burden also contributed to the increased incidences of depressive (p=0.001) and insomnia (p= <0.001) symptoms among the HCWs. Table 2 demonstrated details.

### 3.3 Predictors of anxiety, depression, and insomnia symptoms

To find the predictors, independent variables that have been found statistically significant in the descriptive analysis were included in the regression models separately for generalized anxiety, depression and insomnia symptoms. Table 4 shows that the single living status (Adjusted Odds Ratio, AOR = 2.628, p = 0.004), being dentists (AOR= 3.449, p= 0.031), nurses (AOR= 4.712, p= 0.009) and medical technologists (AOR= 3.382, p= 0.021) had statistically significantly predict generalized depression. Table 5 shows that single living status (AOR= 2.421, p= 0.014) and facing financial problems (AOR= 2.380, p= 0.004) were the statistically significant risk factors for developing symptoms of depression. Finally, for insomnia symptoms, the significant predictors were female gender (AOR= 2.196, p= 0.005), single living status (AOR= 1.892, p= 0.046) and financial hardships (AOR= 3.100, p= <0.001) (Table 6).

### 3.4 Association between mental health symptoms and insomnia

Mental health symptoms, that is, generalized anxiety and depression were strongly associated with insomnia, however, the depression symptoms among HCWs were found to be a factor for insomnia (AOR=6.321, 95% CI=3.158 – 12.650). Details can be found in table 3 and 7.

### 4. Discussion

Our findings revealed a high prevalence of anxiety, depression, and insomnia symptoms among HCWs working in hospital settings in Dhaka, Bangladesh, during the COVID-19 pandemic. Financial hardship and being a female worker were statistically important factors in increasing mental health symptoms. Further, depression was the independent predictor of insomnia symptoms among HCWs. A high number of young (aged 18 to 25 years) reported anxiety and insomnia. Our results are in agreement with studies conducted in Asia among HCWs during this pandemic (Muller et al., 2020; Qi et al., 2020). Furthermore, another study conducted in Bangladesh among the general population suggested that more younger
adults reported poorer mental wellbeing during the pandemic time (Ali, Ahsan, Khan, Khan, & Hossain, 2020). Another study conducted in Europe also suggested that in the COVID-19 pandemic, a higher number of younger adults were suffering from anxiety and insomnia than older adults (Solomou & Constantinidou, 2020).

Our study findings indicated that the prevalence of depression, anxiety, and insomnia was significantly higher amongst females and single HCWs. Similar to our findings, previous studies conducted among HCWs amidst the COVID-19 pandemic also revealed that the female and single HCWs had more frequently reported anxiety and depression symptoms (Di Tella et al., 2020; Giusti et al., 2020; Şahin, Aker, Şahin, & Karabekiroğlu, 2020b). A review also has shown that the prevalence of anxiety and depression among Asian female and single HCWs during the COVID-19 pandemic was higher than their male counterparts (Spoorthy, Pratapa, & Mahant, 2020). Other studies conducted amid pandemic time also found a higher prevalence of insomnia among female and single HCWs (Lai et al., 2020; Muller et al., 2020; Qi et al., 2020).

An enormous financial threat to the world population has been imposed as an impact of the COVID-19 pandemic. Results from our study indicated that financial difficulties caused by the COVID 19 pandemic in Bangladesh played a crucial role when predicting insomnia and all the mental health problems in HCWs we have measured. The mental health impact of financial hardships among HCWs during this pandemic time is yet to be evaluated elaborately. However, the previous study showed a highly significant association between financial hardship and mental health among Bangladeshi professionals (Mamun et al., 2020). On the other hand, in line with similar studies (Lai et al., 2020; Que et al., 2020), we found junior HCWs more frequently presented with poor mental health. Besides, research conducted among the European general population during the COVID 19 pandemic found poorer mental health in females, younger adults, and those who were with severe financial difficulties (Skapinakis et al., 2020). Nonetheless, further evaluation is warranted to find in-depth predicting nature of the financial issues raised due to the COVID-19 pandemic to the mental health of sufferers.

Additionally, our study found that a high number of nurses complained about mental health problems. Usually, nurses are at the highest risk of infection because of their close, frequent contact with patients, and longer working hours. Thus, the nature of the job could explain the higher prevalence of mental health problems among nurses during the overwhelming pressure at the pandemic time. Similarly, a study with a large sample size conducted in Europe also found a higher prevalence of mental health problems among nurses (Rossi et al., 2020).

We found a highly significant association between anxiety, depression and insomnia. However, depression was predicting insomnia independently, that is, insomnia was more than six times higher among HCWs demonstrating depression symptoms. In line with our findings, a population-based study among 19-69-year-old adults suggested that anxiety and depression are strongly associated with insomnia (Oh, Kim, Na, Cho, & Chu, 2019). A systematic review and meta-analysis also confirmed that insomnia is more prevalent among the population with depression (Li, Wu, Gan, Qu, & Lu, 2016). Since
insomnia is highly prevalent among different groups of population amid the COVID-19 pandemic (Jahrami et al., 2021), further studies are required to determine the association between pandemic related anxiety, depression and stress with insomnia symptoms among professional working groups specially HCWs.

4.1 Limitations

The study has some limitations that need to be addressed. Firstly, the limitations of cross-sectional studies cannot be ruled out in this research. Secondly, there might have been the introduction of selection bias as that HCWs without internet access, and those who might have been busy in their work duties might not have participated in the study. Finally, mental health state is a subject to be changed over time (Bertolote, 2008). In this study, HCWs were not asked about their mental health before the COVID-19 pandemic has been started. However, a longitudinal study monitoring and comparing the changes in the mental health status of HCWs during the pandemic would provide better insights into the mental health status of the HCWs working in the hospital settings. Besides, a larger sample size study to compare the mental health of frontline HCWs with the rest is also warranted.

5. Conclusion

The high prevalence of mental health problems among HCWs during the current pandemic suggests that the HCW community working at hospitalized settings in Dhaka city is have been exposed to increased levels of mental stress, potentially resulting in anxiety, depression and, insomnia. Arrangement for financial assistance for HCWs and support for female care workers in facilities could help to relieve the mental stress from healthcare workers. Supportive, training, and instructional interventions, especially through information and communication channels, may be recommended to care facilities to help HCWs cope with mental health symptoms. Further, online mindfulness and relaxation therapy are considered helpful for the HCWs to cope with anxiety and depression during the pandemic time (Sidi, 2020).

Abbreviations

HCW= Healthcare Workers
WHO= World Health Organization
GAD= Generalized Anxiety Disorder
PHQ= Patient Health Questionnaire
ISI= Insomnia Severity Index

Declarations
Ethical approval:
We conducted the study according to the guidelines laid down in the Declaration of Helsinki and the Institutional Review Board (IRB) of North South University (NSU-IRB 4578) approved all procedures involving human subjects. Data participants gave informed consent to participate in this study by accessing the online survey. Patients or the public WERE NOT involved in the design, or conduct, or reporting, or dissemination plans of our research.

Informed consent:
Online informed consent has been taken from all participants with full disclosure and purpose of the study. The voluntary nature of participation also has been disclosed before taking the interview.

Consent to Publish:
Not applicable.

Availability of data:
Data are available upon reasonable request. The data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of interest:
The authors declare that they have no conflict of interests.

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Author’s contributions:
MA participated in study conception, design, formal statistical analysis, and coordination of the manuscript. ZU, NFA, MZH, MB, SAK, and AH reviewed and helped to draft the manuscript. ZU supervised the study. NFA edited English language usage, grammar, and spelling. All authors read and approved the final manuscript.

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Tables

Table 1: Descriptive data of socio-demographic, clinical, financial, and occupation-related factors:
| Factors                          | Mean (SD) | n (%) | Range       |
|---------------------------------|-----------|-------|-------------|
| Age                             | 28.86 (5.5) |       | 19-50       |
| **Gender**                      |           |       |             |
| Male                            | 164 (55.8) |       |             |
| Female                          | 128 (43.5) |       |             |
| Others                          | 2 (0.7)   |       |             |
| **Marital status**              |           |       |             |
| Never married                   | 152 (51.7) |       |             |
| Married                         | 140 (47.6) |       |             |
| Others                          | 2 (0.7)   |       |             |
| **Number of family member living with** | 4.31 (1.9) | 0-13  |             |
| Yes                             | 183 (62.2) |       |             |
| No                              | 111 (37.8) |       |             |
| **Resident type**               |           |       |             |
| Rented                          | 128 (43.5) |       |             |
| Own                             | 132 (44.9) |       |             |
| Government/free quarter         | 12 (4.1)  |       |             |
| Hostel/Mess                     | 22 (7.5)  |       |             |
| **Chronic disease**             |           |       |             |
| Yes                             | 50 (17.0)  |       |             |
| No                              | 244 (83.0) |       |             |
| **Isolation from family member**|           |       |             |
| Yes                             | 89 (30.3)  |       |             |
| No                              | 205 (69.7) |       |             |
| **Facing financial problem**    |           |       |             |
| Yes                             | 168 (55.8) |       |             |
| No                              | 130 (44.2) |       |             |
| **Occupation**                  |           |       |             |
| Medicine                        | 110 (37.4) |       |             |
| Dental                          | 28 (9.5)   |       |             |
| Rehabilitation                  | 82 (27.9)  |       |             |
| Nursing                         | 28 (9.5)   |       |             |
| Medical Technology              | 46 (15.7)  |       |             |
| **Technical title**             |           |       |             |
| Senior                          | 87 (19.6)  |       |             |
| Intermediate                    | 172 (58.5) |       |             |
| Junior                          | 35 (11.9)  |       |             |
| **Employer**                    |           |       |             |
| Medical college                 | 69 (23.5)  |       |             |
| General Hospital                | 29 (9.9)   |       |             |
| Clinic                          | 56 (19.0)  |       |             |
| Private chamber                 | 66 (22.4)  |       |             |
| Others                          | 74 (25.2)  |       |             |
| **Service categories**          |           |       |             |
| Government                      | 48 (16.3)  |       |             |
| Private                         | 167 (56.8) |       |             |
| Self-employed and others        | 79 (26.9)  |       |             |
| **Current working position**    |           |       |             |
| Frontline                       | 12 (4.1)   |       |             |
| Second-line                     | 31 (10.5)  |       |             |
| General duties  | 138 (46.9) |
|----------------|------------|
| Working from home | 113 (38.4) |
| GAD-2 score     | 1.54 (1.52) | 0-6  |
| PHQ-9 score     | 6.75 (5.0)  | 0-27 |
| ISI score       | 7.69 (6.1)  | 0-28 |

Table 2 Descriptive analysis: association between socio-demographic, clinical, financial and occupation-related factors and anxiety, depression, and insomnia
| Factor                      | GAD-2 ≥3 | PHQ-9 ≥10 | ISI ≥8 |
|-----------------------------|----------|-----------|--------|
|                             | Yes (n/%) | No (n/%)  | p-value |
|                             | Yes (n/%) | No (n/%)  |
|                             | p-value   | Yes (n/%) | No (n/%) |
|                             | p-value   | Yes (n/%) | No (n/%) |
| Total (294)                 | 61 (20.7) | 233 (79.3) | 0.233  | 78 (26.5) | 216 (73.5) | 0.002  | 130 (44.2) | 164 (55.8) | 0.001  |
| **Age group**               |          |           |        |          |           |        |          |           |        |
| 18-25                       | 25 (28.1)| 64 (71.9)  |        | 34 (38.2)| 55 (61.8)  |        | 52 (58.4)| 37 (41.6)  |        |
| 26-30                       | 23 (17.8)| 106 (82.2)|        | 34 (26.4)| 95 (73.6)  |        | 56 (43.4)| 73 (56.6)  |        |
| 31-40                       | 11 (17.7)| 51 (82.3)  |        | 6 (9.7)  | 56 (90.3)  |        | 15 (24.2)| 47 (75.8)  |        |
| >40                         | 2 (14.3) | 12 (85.7)  |        | 4 (28.6) | 10 (71.4)  |        | 7 (50)   | 7 (50)     |        |
| **Gender**                  |          |           |        |          |           |        |          |           |        |
| Male                        | 34 (20.7)| 130 (79.3)|        | 39 (23.8)| 125 (76.2)|        | 61 (37.2)| 103 (62.8)|        |
| Female                      | 25 (19.5)| 103 (80.5)|        | 37 (28.9)| 91 (71.1) |        | 67 (52.3)| 61 (47.7) |        |
| Others                      | 2 (100)  | 0 (0.0)   |        | 2 (100)  | 0 (0.0)   |        | 2 (100)  | 0 (0.0)   |        |
| **Marital status**          |          |           |        |          |           |        |          |           |        |
| Single                      | 43 (27.9)| 111 (72.1)|        | 56 (36.4)| 98 (63.6) |        | 84 (54.5)| 70 (45.5) |        |
| Married                     | 18 (12.8)| 122 (87.1)|        | 22 (15.7)| 118 (84.3)|        | 46 (32.9)| 94 (67.1) |        |
| **Family size**             |          |           |        |          |           |        |          |           |        |
| Small                       | 7 (16.7) | 35 (83.3)  |        | 9 (21.4) | 33 (78.6) |        | 19 (45.2)| 23 (54.8) |        |
| Medium                      | 43 (21.8)| 154 (78.2)|        | 54 (27.4)| 143 (72.6)|        | 83 (42.3)| 114 (57.9)|        |
| Large                       | 11 (20)  | 44 (80)   |        | 15 (27.3)| 40 (72.3) |        | 28 (50.9)| 27 (49.1) |        |
| **Family member aged over 50 years** |          |           |        |          |           |        |          |           |        |
| Yes                         | 40 (21.9)| 143 (78.1)|        | 53 (28.9)| 130 (71.1)|        | 83 (45.4)| 100 (54.6)|        |
| No                          | 21 (18.9)| 90 (81.1) |        | 25 (22.5)| 86 (77.5)|        | 47 (42.3)| 64 (57.7) |        |
| **Resident type**           |          |           |        |          |           |        |          |           |        |
| Rented                      | 25 (19.5)| 103 (80.5)|        | 31 (24.2)| 97 (75.8) |        | 59 (46.1)| 69 (53.9) |        |
| Own                         | 29 (22)  | 103 (78)  |        | 38 (28.8)| 94 (71.2) |        | 56 (42.4)| 76 (57.6) |        |
| Gov./Free                   | 3 (25)   | 9 (75)    |        | 2 (16.7)| 10 (83.3) |        | 6 (50)   | 6 (50)     |        |
| Hostel/Mess                 | 4 (18.2) | 18 (81.8) |        | 7 (31.8)| 15 (68.2) |        | 9 (40.9) | 13 (59.1) |        |
| **Chronic disease**         |          |           |        |          |           |        |          |           |        |
| Yes                         | 11 (22)  | 39 (78)   |        | 14 (28) | 36 (72)   |        | 23 (46) | 27 (54)   |        |
| No                          | 50 (20.5)| 194 (79.5)|        | 64 (26.2)| 180 (73.8)|        | 107 (43.9)| 13756.1 |        |
| Isolation from family member|          |           |        |          |           |        |          |           |        |
|                             | 0.162    | 0.860     |        | 0.869    |          |        |          |           |        |
|       | Yes |                |                |                |                |                |                |
|-------|-----|----------------|----------------|----------------|----------------|----------------|----------------|
| Yes   | 14 (15.7) | 75 (84.3) | 23 (25.8) | 66 (74.2) | 40 (44.9) | 49 (55.1) |
| No    | 47 (23.2) | 156 (76.8) | 55 (26.8) | 150 (73.2) | 90 (43.9) | 115 (56.1) |
| Facing financial problem | 0.150 | 0.001 | <0.001 |       |       |       |
| Yes   | 39 (23.8) | 125 (76.2) | 56 (34.1) | 108 (35.9) | 92 (56.1) | 72 (43.9) |
| No    | 22 (16.9) | 108 (83.1) | 22 (16.9) | 108 (83.1) | 38 (29.2) | 92 (70.8) |

Table 2 (continue)
| Factor          | GAD-2 ≥3 | PHQ-9 ≥10 | ISI ≥8 |
|-----------------|----------|-----------|--------|
|                 | Yes (n/%) | No (n/%)  | p-value| Yes (n/%) | No (n/%)  | p-value| Yes (n/%) | No (n/%)  | p-value |
| **Occupation**  |          |           |        |           |           |        |           |           |        |
| Medicine        | 22 (20)  | 88 (80)   | 0.018  | 28 (28)   | 82 (82)   | 0.813  | 52 (47)   | 58 (52.7) | 0.830   |
| Dental          | 8 (28.6) | 20 (71.4) |         | 10 (35.7) | 18 (64.3) |        | 14 (50)   | 14 (50)   |        |
| Rehabilitation  | 8 (9.8)  | 74 (90.2) |         | 20 (24.4) | 62 (75.6) |        | 34 (41.5) | 48 (58.5) |        |
| Nursing         | 9 (32.1) | 19 (67.9) |         | 7 (25)    | 21 (75)   |        | 11 (39.3) | 17 (60.7) |        |
| Medical technology | 14 (30.4) | 32 (69.6) |         | 13 (28.3) | 33 (71.7) |        | 19 (41.3) | 27 (58.7) |        |
| **Technical title** |          |           | 0.005  |           |           | 0.165  |           |           | 0.151   |
| Senior          | 10 (11.5)| 77 (87.5) |         | 18 (20.7) | 69 (79.3) |        | 33 (37.9) | 54 (62.1) |        |
| Intermediate    | 38 (22.1)| 134 (77.9)|         | 47 (27.3) | 125 (72.7) |       | 77 (44.8) | 95 (55.2) |        |
| Junior          | 13 (37.1)| 22 (62.9) |         | 13 (37.1) | 22 (62.9) |        | 20 (57.1) | 15 (42.9) |        |
| **Employer**    |          |           | 0.258  |           |           | 0.704  |           |           | 0.799   |
| Medical college | 12 (17.4)| 57 (82.6) |         | 17 (24.6) | 52 (75.4) |        | 27 (39.1) | 42 (60.9) |        |
| General hospital| 10 (34.5)| 19 (65.5) |         | 9 (31)    | 20 (69)   |        | 12 (41.4) | 17 (58.6) |        |
| Clinic          | 13 (23.2)| 43 (76.8) |         | 15 (26.8) | 41 (73.2) |        | 24 (42.1) | 32 (57.1) |        |
| Private chamber | 10 (15.2)| 56 (84.8) |         | 14 (21.8) | 52 (78.8) |        | 31 (47)   | 35 (53)   |        |
| Others          | 16 (21.6)| 58 (78.4) |         | 23 (31.1) | 51 (68.9) |        | 36 (48.6)| 38 (51.4) |        |
| **Service categories** |          |           | 0.861  |           |           | 0.11   |           |           | 0.418   |
| Government      | 10 (20.8)| 38 (79.2) |         | 11 (22.9) | 37 (77.1) |        | 18 (37.5) | 30 (62.5) |        |
| Private         | 33 (19.8)| 134 (80.2)|         | 39 (23.4) | 128 (76.6) |      | 73 (43.7) | 94 (56.3) |        |
| Self-employed   | 18 (22.8)| 61 (77.2) |         | 28 (35.4) | 51 (64.6) |        | 39 (49.3)| 40 (50.7) |        |
| **Current working position** |          |           | 0.286  |           |           | 0.091  |           |           | 0.004   |
| Frontline       | 2 (16.7) | 10 (83.3) |         | 3 (25)    | 9 (75)    |        | 5 (41.7)  | 7 (58.3)  |        |
| Second-line     | 5 (16.1) | 26 (83.9) |         | 8 (25.8)  | 23 (74.2) |        | 10 (32.3) | 21 (67.7) |        |
| General duties  | 24 (17.4)| 114 (82.6)|         | 28 (20.3) | 110 (79.7)|        | 50 (36.2) | 88 (63.8) |        |
| Work from home  | 30 (26.5)| 83 (73.5)|         | 39 (34.5) | 74 (65.5) |        | 65 (57.5)| 48 (42.5) |        |
Table 3: Descriptive analysis: Association between mental health symptoms and insomnia

| Mental Health Symptoms       | Insomnia symptoms | p-value |
|-----------------------------|-------------------|---------|
| Generalized anxiety disorder|                   |         |
| No                          | 146 (62.7)        | 87 (37.3)| <0.001 |
| Yes                         | 18 (29.5)         | 43 (70.5)|         |
| Depression symptoms         |                   |         |
| No                          | 147 (68.1)        | 69 (31.9)| <0.001 |
| Yes                         | 17 (21.8)         | 61 (78.2)|         |

Table 4: Multivariate logistic regression analysis of the variables with anxiety disorder

| Variables    | Odds Ratio | 95% Confidence Interval | p-value |
|--------------|------------|-------------------------|---------|
| Gender       |            |                         |         |
| Female       | Reference  |                         |         |
| Male         | 1.065      | 0.550 - 2.063           | 0.851   |
| Marital Status|           |                         |         |
| Single       | 2.628      | 1.367 - 5.052           | 0.004   |
| Married      | Reference  |                         |         |
| Occupation   |            |                         |         |
| Medicine     | Reference  |                         |         |
| Dental       | 3.449      | 1.119 - 10.628          | 0.031   |
| Rehabilitation| 2.333      | 0.962 - 5.657          | 0.061   |
| Nursing      | 4.712      | 1.463 - 15.182          | 0.009   |
| Medical technology| 3.382 | 1.198 - 9.548 | 0.021 |
| Technical title |            |                         |         |
| Senior       | Reference  |                         |         |
| Intermediate | 0.646      | 0.290 - 1.437           | 0.284   |
| Junior       | 1.796      | 0.758 - 4.251           | 0.183   |

Table 5: Multivariate logistic regression analysis of the variables with depression symptoms
| Variables                        | Odds Ratio | 95% Confidence Interval | p-value |
|--------------------------------|------------|-------------------------|---------|
| **Age group**                   |            |                         |         |
| 18-25                           | Reference  |                         |         |
| 26-30                           | 0.818      | 0.424 - 1.582           | 0.551   |
| 31-40                           | 0.378      | 0.128 - 1.117           | 0.078   |
| >40                             | 1.283      | 0.309 - 5.339           | 0.731   |
| **Gender**                      |            |                         |         |
| Female                          | Reference  |                         |         |
| Male                            | 0.684      | 0.384 - 1.219           | 0.198   |
| **Marital Status**              |            |                         |         |
| Single                          | 2.421      | 1.198 - 4.891           | 0.014   |
| Married                         | Reference  |                         |         |
| **Facing financial problem**    |            |                         |         |
| Yes                             | 2.380      | 1.318 - 4.296           | 0.004   |
| No                              | Reference  |                         |         |

Table 6: Multivariate logistic regression analysis of the variables with insomnia symptoms

| Variables                        | Odds Ratio | 95% Confidence Interval | p-value |
|--------------------------------|------------|-------------------------|---------|
| **Age group**                   |            |                         |         |
| 18-25                           | Reference  |                         |         |
| 26-30                           | 0.794      | 0.418 - 1.509           | 0.482   |
| 31-40                           | 0.552      | 0.223 - 1.362           | 0.197   |
| >40                             | 1.340      | 0.344 - 5.221           | 0.673   |
| **Gender**                      |            |                         |         |
| Female                          | 2.196      | 1.272 - 3.791           | 0.005   |
| Male                            | Reference  |                         |         |
| **Marital Status**              |            |                         |         |
| Single                          | 1.892      | 1.011 - 3.540           | 0.046   |
| Married                         | Reference  |                         |         |
| **Facing financial problem**    |            |                         |         |
| Yes                             | 3.100      | 1.814 - 5.298           | < 0.001 |
| No                              | Reference  |                         |         |
| **Current working position**    |            |                         |         |
| Frontline                       | Reference  |                         |         |
| Second line                     | 0.723      | 0.162 - 3.235           | 0.672   |
| General duties                  | 0.755      | 0.207 - 2.756           | 0.671   |
| Work from home                  | 1.067      | 0.286 - 3.974           | 0.923   |

Table 7: Multivariate logistic regression analysis of the mental health symptoms with insomnia symptoms
| Mental health symptoms | Odds Ratio | 95% Confidence Interval | p-value |
|------------------------|------------|------------------------|---------|
| Generalized anxiety    |            |                        |         |
| No                     | Reference  |                        |         |
| Yes                    | 1.498      | 0.708 – 3.170           | 0.291   |
| Depression symptoms    |            |                        |         |
| No                     | Reference  |                        |         |
| Yes                    | 6.321      | 3.158 – 12.650          | <0.001  |