

ORIGINAL RESEARCH

Anxiety and Sleep Disturbances among Nurses Working at COVID-19 Dedicated Hospitals in Bangladesh



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Abstract

Background: The coronavirus disease (COVID-19) pandemic has exposed nurses to conditions that threaten their health, well-being, and ability to work. While the physical health of nurses has received more attention, there has been limited focus on the long-term psychological effects. In Bangladesh, there is very limited research on anxiety and sleep disturbances among nurses during the COVID-19 pandemic.

Purpose: This study aimed to assess the relationship among anxiety, sleep disturbances, and sociodemographic factors in nurses working at COVID-19 dedicated hospitals in Bangladesh.

Methods: A descriptive correlational study was conducted among 102 nurses selected using a convenience sampling technique from two dedicated COVID-19 hospitals. The self-administered Anxiety Scale and Medical Outcome Study Sleep Scale were used to collect data. Both descriptive and inferential statistics were used. Descriptive statistics included frequency, percentage, mean, standard deviation, minimum, and maximum. Pearson product-moment correlation (r), t -tests, and ANOVA were used for inferential analyses.

Results: About two-fifths (40.2%) of the nurses reported mild to moderate levels of anxiety, and the majority (84.3%) experienced sleep disturbances. A significant positive correlation ($r=0.54$, $p=0.000$) was found between anxiety and sleep disturbances. There was a significant relationship between nurses' age and anxiety ($p=0.000$), marital status ($p=0.000$), family type ($p=0.000$) highest professional education ($p=0.000$), working duration ($r=-0.38$, $p=0.000$), COVID-19 positive history ($p=0.016$), training ($p=0.000$), and presence of comorbidity ($p=0.008$). Additionally, age ($p=0.000$), marital status ($p=0.020$), family type ($p=0.000$) highest professional education ($p=0.000$), working duration ($r=0.363$, $p=0.000$), training ($p=0.002$), and presence of comorbidity ($p=0.015$) were also significantly associated with sleep disturbances.

Conclusion: The findings indicate that age, gender, education, family type, marital status, training, and comorbidity were significantly associated with increased levels of anxiety and sleep disturbances. These results highlight the importance of addressing these sociodemographic factors in mental health interventions to better support the well-being of frontline nurses during the pandemic.

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1. Introduction

Coronavirus disease 2019 (COVID-19) has become the first global pandemic of the 21st century (Andersen et al., 2020). It spread rapidly, bringing pressure and challenges to frontline nursing staff all over the world (Sun et al., 2020). This virus exposed nurses to a condition that threaten their health, well-being, and ability to work (Arnetz et al., 2020). During COVID-19 pandemic, psychological health problems including anxiety, depression, and sleep disturbances among nurses increased (Que et al., 2020). Anxiety and sleep disturbances are common mental health problems and have a great impact on the psychophysical health of nurses, not only affecting professional performance and patient safety but also the risk of developing long-term, serious physical and mental health problem (Ferreira et al., 2021). This problem among frontline nurses

during the COVID-19 outbreak deserves attention. Also, the highly stressful work environment, constant exposure to the COVID-19 virus, long working hours, emotional toll, quarantine, inadequate PPE supply, and continuous witnessing of patients' suffering may increase the risk of heightened anxiety and sleep disturbances (Pappa et al., 2020).

Sleep disturbances during the pandemic have been referred to as COVID-insomnia (Hurley, 2020). Sleep disturbances encompass a wide range of sleep complaints, such as difficulty in initiating sleep (DIS), difficulty in maintaining sleep (DMS), early morning awakenings (EMA), non-restorative sleep (NRS), and poor sleep quality (Kalmbach et al., 2017; Liu et al., 2017). Previous studies reported that the prevalence of sleep disturbances among nurses during the COVID-19 pandemic was 34.8% (Salari et al., 2020) and 43% (Al Maqbali et al., 2021). In Bangladesh, the prevalence of insomnia symptoms among healthcare workers was 44.2% (Al Maqbali et al., 2021). Sleep disturbances not only influence nurses' health, but also affects nursing quality and even the psychological health and treatment process of patients (Dong et al., 2017). They also increase risk of stroke, obesity, diabetes, cancer, osteoporosis, and cardiovascular disease (Abrams, 2015). Sleep disturbances also cause a persistent and progressive decline of sleep quality and may lead to mental illnesses, such as anxiety and depression, as well as suicidal behaviors (Oh et al., 2019).

Although sleep disturbances are a prevalent issue among nurses during the COVID-19 pandemic, they are only one facet of the broader mental health challenges, with anxiety also emerging as a significant and pervasive concern. Anxiety is a universal experience which may be an appropriate response to a range of situations. Anxiety is the feelings of worry and tension about an uncertain outcome which may interfere with daily and occupational activities (Maharaj et al., 2019). Several studies reported that the prevalence of anxiety among nurses was 22.8% to 23.7% (Salari et al., 2020), 27% to 28.1% (Santabárbara et al., 2021), 37% (Al Maqbali et al., 2021) and 28.4% (Zheng et al., 2021), respectively. In Bangladesh anxiety during COVID-19 among nurses is 51.8% (Chowdhury et al., 2021). Anxiety has a great impact on the psychophysical health of nurses, affecting professional performance and patient safety (Simonetti et al., 2021). High anxiety levels during the COVID-19 pandemic have been strongly associated with functional impairments, alcohol or drug coping, negative religious coping, extreme hopelessness, and passive suicidal ideation (Lee, 2020).

The relationship between anxiety and sleep disturbances is multifaceted and bidirectional (Richards et al., 2019). Sleep disturbances are common in anxiety disorders and can exacerbate symptoms (Cox & Olatunji, 2016), while anxiety can also lead to sleep problems. Specific patterns of sleep disturbance vary across different anxiety disorders, and both psychological and neurobiological mechanisms are involved (Richards, 2019). Although many previous studies exist on the mental health impacts of the COVID-19 pandemic, there is limited research focusing specifically on anxiety and sleep disturbances among nurses in during COVID-19 in Bangladesh. This gap highlights a need for targeted research to understand these issues in the specific COVID-19 context in Bangladesh, to inform a tailored support strategies and improve overall well-being of the nurses. Therefore, this study aimed to assess the relationship among anxiety, sleep disturbances and socio-demographic factors among nurses working at COVID-19 dedicated hospitals in Bangladesh.

2. Methods

2.1. Research design

A descriptive correlational study was used to observe, describe, and understand the extent of the relationship between anxiety, sleep disturbances, and sociodemographic factors among nurses working at COVID-19 dedicated hospitals in Bangladesh.

2.2. Setting and samples

The settings of the study consisted of two purposively selected COVID-19 dedicated hospitals in Bangladesh. These hospitals were chosen purposively, and the percentage of respondents was selected proportionally according to the number of nursing staff. Both hospitals were government-specialized COVID-19 facilities, where the majority of COVID-19 patients were admitted, and a large number of nurses were involved in the COVID-19 units. It was expected that nurses from these hospitals would adequately represent nurses from other COVID-19 dedicated hospitals in Bangladesh.

The samples were conveniently selected considering time limitations, shifting duties, departments, quarantine, and the risk of COVID-19 infection, while strictly maintaining the following inclusion criteria: nurses who had worked in the COVID-19 unit for at least two consecutive rotations and were free from COVID-19 symptoms. The exclusion criteria included nurses who were on leave during the time of data collection and those who were unwilling to provide information. The sample size was estimated using G*Power analysis with a significance level (α) of 0.05, an expected power of 0.80 ($1-\beta$), and an estimated population effect size of 0.3 (f^2) to detect a meaningful difference or relationship. The calculated sample size was 82 (Faul et al., 2007). To account for a potential dropout or attrition rate, an additional 20% of the sample was added, resulting in a total sample size of 102, calculated using the formula: $N_d = N / (1-d)$ where N is the sample size before considering drop-out, d is the expected drop-out rate, and N_d is the final sample size (Kang, 2021).

2.3. Measurements and data collection

The instruments consisted of three sections: (1) Socio-demographic questionnaire, (2) Self-Rating Anxiety Scale (SAS), and (3) Medical Outcomes Study (MOS) Sleep Scale. The socio-demographic questionnaire consisted of two parts: (1) Socio-demographic characteristics, which included 8 items: age, gender, religion, marital status, family type, highest professional education, monthly family income (in Bangladeshi Taka [BDT]), and working experience as a registered nurse, and (2) COVID-19-related information of the nurses, which included 7 items: current working area in the COVID-19 unit, working duration in the COVID-19 unit, training on COVID-19, availability of PPE, COVID-19 positive history, hospitalization due to COVID-19 infection, and comorbidities.

The Self-Rating Anxiety Scale (SAS) was developed by Zung (1971). The scale consists of 20 items, including 5 reverse-scored items (5, 9, 13, 17, 19), rated on a 4-point Likert scale ("a little of the time" to "most of the time"). The total scores range from 20 to 80; each item score is multiplied by 1.25 to obtain a standard score ranging from 25 to 100 for classifying anxiety levels. The categories are: ≤ 44 (Normal), 45–59 (Mild to Moderate), 60–74 (Marked to Severe), and ≥ 75 (Extreme Anxiety Level) (Dunstan & Scott, 2020). The researchers used the original instrument, which shows strong correlations with clinical diagnoses of anxiety disorders and with other established anxiety measures such as the Hamilton Anxiety Rating Scale ($r=0.68$) and the State-Trait Anxiety Inventory ($r=0.74$). These correlations indicate that the SAS effectively captures the construct of anxiety as understood in clinical settings. In this study, the instrument demonstrated good internal consistency, with a Cronbach's alpha of 0.83.

The Medical Outcomes Study (MOS) Sleep Scale, developed by Hays and Stewart (1992), includes 12 items that assess various aspects of sleep quality. The first item evaluates sleep latency, asking how long it takes to fall asleep, with responses ranging from 0–15 minutes to more than 60 minutes, each assigned a numerical score from 1 to 5, later recalibrated to a 0–100 scale. The second item measures total sleep duration, asking respondents how many hours they sleep, with 7–8 hours considered optimal (scored as 1) and less or more than that considered suboptimal (scored as 0). The remaining 10 items assess sleep disturbances, daytime sleepiness, and sleep interference, using a 6-point Likert scale with responses inverted for reverse-scored items. After responses are converted into numerical indices, they are recalibrated to a 0–100 scale, with higher scores indicating greater sleep disturbances. For sleep duration, the scoring system is binary (0 or 1), reflecting optimal or suboptimal sleep. The final composite score is calculated by averaging the recalibrated scores, with higher scores indicating worse sleep quality. The instrument used in this study demonstrated strong internal consistency, with a Cronbach's alpha of 0.86.

After obtaining permission from the authors, the Self-Rating Anxiety Scale (SAS) and MOS Sleep Scale English version were translated from English into Bengali by the researchers. Then, the Bengali versions were back-translated into English by a bilingual Bangladeshi translator. Finally, an English expert evaluated both the original questionnaires and the English versions to ensure the equivalence of the two versions. There was no difference between both versions of the English questionnaire. The researcher then used the Bangla version for data collection. The researcher conducted a pilot study on a sample of 20 individuals from other COVID-19 dedicated hospitals, ensuring that this sample was entirely excluded from the main study. The pilot study assessed the validity and reliability of the Self-Rating Anxiety Scale (SAS) and the Medical Outcomes Study (MOS) Sleep Scale. The content validity scores were 0.84 for SAS and 0.81 for

MOS, indicating that the tools adequately represented their intended domains. Reliability, measured by Cronbach's alpha, was 0.88 for SAS and 0.85 for MOS, demonstrating good internal consistency. Data were collected using a self-administered questionnaire. A printed copy of the questionnaire along with a consent form was provided in sealed envelopes to minimize contact, and a collection box was placed outside the COVID units, including Triage, General Ward, ICU, HDU, CCU, Cabin, Isolation, and Post-COVID-19 ward. The researcher delivered the questionnaires while maintaining all safety protocols. Participants completed the questionnaire, which took a maximum of 10-15 minutes, and placed it into the box with the envelope. The researcher collected the completed forms from the box the next day. Data collection took place from July 2021 to June 2022.

2.4. Data analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 21. Descriptive statistics, including frequency (f), percentage (%), mean (M), and standard deviation (SD), were used to describe the sociodemographic characteristics of the nurses. The SAS and MOS Sleep Scale are Likert-type scales, and the data collected were treated as numerical data for analysis. The Shapiro-Wilk test was conducted to assess the normality of the data. The results showed that the data for both scales were normally distributed, with $p > 0.17$ for the SAS scale and $p > 0.13$ for the MOS Sleep Scale, indicating normal distribution. Based on these findings, parametric tests were selected for the analysis. Inferential statistics such as Pearson product-moment correlation (r), independent sample t-test (t), and analysis of variance (ANOVA) (F) were used to examine the relationships among the study variables.

2.5. Ethical considerations

This study received approval from the Institutional Review Board of the National Institute of Advanced Nursing Education and Research (NIANER) (IRB No: Exp.NIA-S-2000/121). Permission for data collection was obtained from the directors of the hospitals where the study took place, and the nursing superintendents of those hospitals were verbally informed. The researcher then communicated with the participants while strictly maintaining safety protocols and physical distancing, introduced themselves, and explained the purpose, benefits, risks, and participants' rights to withdraw from the study. Written informed consent was obtained from nurses who met the inclusion criteria and agreed to participate. Privacy, confidentiality, and anonymity of the participants were strictly maintained during data collection.

3. Results

3.1. Socio-demographic characteristics of participants

As shown in Table 1, the mean age of the nurses was 34.51 years (SD = ± 6.76 ; Range: 24–55 years). Most of the nurses were female (73.53%), Muslim (78.53%), and married (86.87%). More than half of the nurses (54.90%) lived in nuclear families, and 44.10% held only a diploma in nursing. The average monthly family income of the participants was 63,098.04 BDT (SD = $\pm 33,472.17$; Range: 28,000–200,000), and the average working experience as a registered nurse was 12.98 years (SD = ± 6.68 ; Range: 4–33 years).

Furthermore, the majority of the nurses (55.88%) worked in general COVID-19 wards. The average duration of working in COVID-19 units was 35.21 days (SD = ± 16.75 ; Range: 22–117 days). More than half of the nurses (58.83%) did not receive training in caring for COVID-19 patients, although most of them (77.45%) reported having sufficient personal protective equipment (gown, shoe cover, goggles, mask). About 60% of the nurses tested positive for COVID-19, and among them, 50.81% were admitted to the hospital for treatment. Approximately 52.95% of the nurses reported having comorbidities (Table 1).

3.2. Level of anxiety and sleep disturbances

Table 2 describes the levels of anxiety and sleep disturbances among the participants. Most of the participants (56.87%) had mild to moderate levels of anxiety. On the other hand, the majority of participants (84.3%) experienced sleep disturbances.

Table 1. Sociodemographic characteristics of participants (n=102)

Variables	Categories	Frequency (f)	Percentage (%)	Mean±SD
Age (years)	(Min-Max) (24-55)			34.51±6.76
	<30 years	36	35.30	
	30-40 years	49	48.03	
	>40 years	17	16.67	
Gender	Male	27	26.47	
	Female	75	73.53	
Religion	Muslims	80	78.43	
	Hindu	22	21.57	
Marital status	Married	88	86.27	
	Unmarried	14	13.73	
Family types	Nuclear	56	54.90	
	Extended	46	45.10	
Highest professional education	Diploma	45	44.10	
	B.Sc.	38	37.25	
	MPH/MSN	19	18.65	
Monthly family income (BDT)	(Min-Max) (28000-200000)			63,098.04±33,472.17
	<50000	53	51.96	
	50000-100000	42	41.18	
	>100000	7	6.86	
Working experience as a registered nurse (years)	(Min- Max) (4-33)			12.98± 6.68
	<10 years	44	43.1	
	10-20 years	43	42.2	
	>20 years	15	14.7	
Current working area	General COVID-19 ward	57	55.88	
	COVID-19 ICU	33	32.35	
	COVID-19 Emergency	12	11.77	
Working duration in COVID-19 unit (days)	<30	38	37.3	
	30-50	33	32.4	
	>50	31	30.3	
Training on COVID-19	Yes	42	41.17	
	No	60	58.83	
Availability of PPE	Yes	79	77.45	
	No	23	22.55	
COVID-19 positive history	Yes	61	59.80	
	No	41	40.20	
Hospitalized for COVID-19 infection	Yes	31	50.81	
	No	30	49.19	
Comorbidities	Yes	54	52.95	
	No	48	47.05	

The levels of anxiety and sleep disturbances among the participants are presented in Table 2.

Table 2. Level of anxiety and sleep disturbances (n=102)

Variables	Frequency (f)	Percentage (%)
Anxiety		
Normal	30	29.41
Mild to Moderate anxiety	58	56.87
Marked to severe anxiety	13	12.74
Extreme anxiety	1	0.98
Sleep Disturbances		
No Sleep disturbances	16	15.7
Sleep disturbances	86	84.3

3.3. Relationship among socio-demographic characteristics, anxiety and sleep disturbance

Table 3 presents the analysis of the relationships between demographic and health-related variables with anxiety and sleep disturbance scores among participants. Significant differences in anxiety levels are observed across age groups (<30, 30–40, >40 years). Older participants (>40) have the highest mean anxiety score (55.35 ± 5.92), followed by those aged 30–40 (50.60 ± 9.82), with the youngest group (<30) having the lowest (44.58 ± 7.64). This is supported by a significant F-value of 10.292 and a p-value of 0.000, indicating age is a significant factor in anxiety levels. Similarly, sleep disturbance scores increase with age, with the oldest group (>40) having the highest score (71.24 ± 11.48). The differences across age groups are statistically significant ($F = 10.755, p = 0.000$).

Table 3. The relationship among socio-demographic characteristics, anxiety and sleep disturbance of the participants (n=102)

Variables	Categories	Anxiety			Sleep disturbance		
		M $\pm$ SD	t/F/r	p-value	M $\pm$ SD	t/F/r	p-value
Age (Min-Max) (24-55) years	<30	44.58 $\pm$ 7.64	10.292 ^F	0.000	49.52 $\pm$ 18.02	10.755 ^F	0.000
	30-40	50.60 $\pm$ 9.82			61.96 $\pm$ 17.73		
	>40	55.35 $\pm$ 5.92			71.24 $\pm$ 11.48		
Marital status	Married	50.31 $\pm$ 9.24	2.976 ^t	0.004	60.81 $\pm$ 18.23	2.364 ^t	0.020
	Unmarried	42.64 $\pm$ 6.78			48.46 $\pm$ 17.63		
Family types	Nuclear	52.46 $\pm$ 9.47	4.124 ^t	0.000	67.96 $\pm$ 13.07	6.015 ^t	0.000
	Extended	45.36 $\pm$ 7.54			48.35 $\pm$ 18.66		
Highest professional education	Diploma	45.00 $\pm$ 7.64	10.144 ^F	0.000	50.62 $\pm$ 17.70	9.913 ^F	0.000
	B.Sc.	52.18 $\pm$ 9.64			65.95 $\pm$ 16.37		
	MPH	53.52 $\pm$ 8.31			65.56 $\pm$ 17.11		
Working duration (Min-Max)(22-117) days			-0.385 ^{*r}	0.000		-0.363 ^{*r}	0.000
Training on COVID-19	Yes	45.35 $\pm$ 7.98	-3.774 ^t	0.000	52.51 $\pm$ 17.72	-3.134 ^t	0.002
	No	52.00 $\pm$ 9.24			63.74 $\pm$ 17.85		
COVID-19 positive history	Yes	51.06 $\pm$ 9.81	2.442 ^t	0.016	61.95 $\pm$ 18.11	1.908 ^t	0.059
	No	46.58 $\pm$ 7.85			54.89 $\pm$ 18.63		
Comorbidities	Yes	51.53 $\pm$ 9.02	2.696 ^t	0.008	49.89 $\pm$ 13.17	2.464 ^t	0.015
	No	46.70 $\pm$ 9.03			41.19 $\pm$ 14.20		
Anxiety					2.46 $\pm$.465	0.540 ^{**r}	0.000
Sleep disturbance					3.60 $\pm$.731		

Note. M=Mean, SD=Standard deviation r= Pearson product moment correlation, t=Independent t test, F= One way ANOVA

Married participants have significantly higher anxiety scores (50.31 ± 9.24) compared to unmarried participants (42.64 ± 6.78), as indicated by a t-value of 2.976 and a p-value of 0.004. Married participants also report higher sleep disturbance (60.81 ± 18.23) than unmarried participants (48.46 ± 17.63), with this difference being significant ($t = 2.364, p = 0.020$). Meanwhile, participants from nuclear families exhibit higher anxiety (52.46 ± 9.47) compared to those from extended families (45.36 ± 7.54), with a significant t-value of 4.124 and a p-value of 0.000. Similarly, sleep disturbance is significantly higher in nuclear family participants (67.96 ± 13.07) compared to those from extended families (48.35 ± 18.66), with a t-value of 6.015 and a p-value of 0.000.

Furthermore, participants with higher education levels (B.Sc. and MPH) show significantly higher anxiety scores compared to those with only a diploma, with an F-value of 10.144 and a p-value of 0.000. The same trend is observed for sleep disturbance, where those with higher education levels report higher scores, with an F-value of 9.913 and a p-value of 0.000. Working duration (in days) shows a negative correlation with both anxiety ($r = -0.385, p = 0.000$) and sleep disturbance ($r = -0.363, p = 0.000$), indicating that longer working durations are associated with lower anxiety and sleep disturbance levels.

Participants who received training on COVID-19 have significantly lower anxiety scores (45.35 ± 7.98) compared to those who did not receive training (52.00 ± 9.24), with a t-value of -3.774 and a p-value of 0.000. Training on COVID-19 also correlates with lower sleep disturbance scores (52.51 ± 17.72 vs. 63.74 ± 17.85), with a significant t-value of -3.134 and a p-value of 0.002.

Participants with a history of COVID-19 infection show higher anxiety scores (51.06 ± 9.81) compared to those without such a history (46.58 ± 7.85), with a significant t-value of 2.442 and a p-value of 0.016. While participants with a history of COVID-19 infection have higher sleep disturbance scores (61.95 ± 18.11), this difference is not statistically significant ($t=1.908$, $p=0.059$).

Participants with comorbidities exhibit higher anxiety (51.53 ± 9.02) compared to those without (46.70 ± 9.03), with a significant t-value of 2.696 and a p-value of 0.008. Similarly, those with comorbidities report higher sleep disturbance scores (49.89 ± 13.17) compared to those without (41.19 ± 14.20), with a significant t-value of 2.464 and a p-value of 0.015. Finally, a significant positive correlation is observed between anxiety and sleep disturbance ($r=0.540$, $p=0.000$), indicating that higher anxiety levels are associated with greater sleep disturbances.

4. Discussion

The aim of this study was to assess the relationship among anxiety, sleep disturbances, and sociodemographic characteristics among nurses working at COVID-19 dedicated hospitals in Bangladesh. The study found moderate to severe levels of anxiety, and more than 80% of participants had sleep disturbances. A significant relationship was found among demographic factors, anxiety, and sleep disturbances. Older age, being married, living in a nuclear family, and having higher education levels were associated with higher anxiety and sleep disturbance scores. Additionally, those without COVID-19 training, with a history of COVID-19 infection, or with comorbidities also reported higher anxiety and sleep disturbances. Notably, longer working duration was linked to lower anxiety and sleep disturbance levels. Finally, a strong positive correlation was observed between anxiety and sleep disturbances, indicating that higher anxiety is associated with greater sleep issues.

The study found that nurses of older age experienced higher anxiety levels. This finding is consistent with studies conducted in Ethiopia and Turkey (Kibret et al., 2020; Şahin & Kulakaç, 2022), which also reported increased anxiety among older nurses. However, it contrasts with a Chinese study (Han et al., 2020), where age did not show a significant effect on anxiety. The differences in these findings might be attributed to variations in cultural attitudes towards aging, the level of support from healthcare institutions, and distinct pandemic experiences in different countries. The findings in this study suggest that older nurses, with more experience and heightened awareness of risks, may experience increased anxiety due to greater responsibilities and prolonged exposure to the pandemic's challenges.

Similarly, the study also found that married nurses reported higher anxiety than unmarried nurses. This aligns with findings from Ethiopia and Jordan (Alnazly et al., 2021; Kibret et al., 2020), where marital status was a significant factor contributing to anxiety levels. Married nurses may be more concerned about the safety and well-being of their families, in addition to managing both professional and household responsibilities.

The study's finding regarding nuclear family status, which showed higher anxiety levels among nurses from nuclear families compared to those from extended families, aligns with the findings of Han et al. (2020). This may be because nuclear families are more common and face unique stressors, such as living with vulnerable family members, caring for young children, and having limited quarantine space. In the absence of extended family support, these stressors can accumulate, potentially leading to greater psychological strain during crises like the COVID-19 pandemic.

Higher education levels were also associated with higher anxiety scores in this study, which is consistent with research conducted in China (Chew et al., 2020). Higher educated nurses may possess a deeper understanding of the risks and heightened responsibility, which could contribute to increased anxiety. Additionally, the study found that nurses with comorbidities had significantly higher anxiety scores. This finding aligns with research from Ethiopia (Kibret et al., 2020), as nurses with underlying health conditions may have heightened fear regarding their personal risk of contracting severe illness, thus increasing their anxiety.

Related to sleep disturbances, this study found that older nurses experienced more sleep disturbances, similar to studies conducted in Bangladesh, India, and China (Al Maqbali, 2021; Dong et al., 2021; Zou et al., 2021). Older nurses may have greater health vulnerabilities and higher levels of anxiety about their well-being, which, in turn, affects their ability to sleep. Married nurses also reported more sleep disturbances, as they juggle additional stressors, including concerns about their spouse and children, as well as the burden of managing household

responsibilities along with professional duties. This compounded stress contributes to disrupted sleep, a pattern similarly observed in Bangladesh, India, and China.

In this study, more experienced nurses were also found to have greater sleep disturbances. This finding aligns with studies conducted in various countries (Al Maqbali, 2021; Dong et al., 2021; Zou et al., 2021), where experienced nurses face increased patient loads, higher expectations from colleagues and superiors, and greater responsibilities, all of which disrupt sleep. Furthermore, the present study also highlighted that sleep disturbances were more pronounced in nurses working shorter durations in COVID-19 units, a finding that contrasts with a study conducted in China (Yang et al., 2021). In the Bangladeshi context, nurses work long shifts, including 15 consecutive days, followed by quarantine. This extended duration might help nurses build coping mechanisms, improve their knowledge of COVID-19 management, and reduce anxiety, which could contribute to better sleep quality.

The study also observed that nurses who had received training on COVID-19 had lower levels of sleep disturbance. This finding supports the idea that training equips nurses with better management skills and coping strategies. Although no evidence was found in the literature to support this, a possible explanation is that training helps nurses feel more prepared, reducing stress and improving sleep quality. Additionally, the study found that nurses with a history of COVID-19 infection experienced more sleep disturbances, consistent with studies from China (Liu et al., 2021). This can be attributed to the fear of health deterioration, the stigma associated with being infected, and the impact of illness on their professional roles and families. Furthermore, nurses with comorbidities had higher levels of sleep disturbances, a finding supported by previous studies (Gold et al., 2020; Sanyaolu et al., 2020). Nurses with comorbid conditions may experience heightened health-related anxiety, and the stress of managing both their conditions and pandemic-related demands can disrupt their sleep.

The study also identified a strong positive correlation between anxiety and sleep disturbances, which is consistent with findings among Italian nurses (Simonetti et al., 2021). Possible explanation may be shared stressors during the COVID-19 pandemic, such as increased workload and uncertainty, which elevated anxiety and disrupted sleep among nurses across countries.

5. Implications and limitations

The findings of this study have important implications for nursing practice, particularly in managing the mental health and well-being of nurses working in high-stress environments such as COVID-19 hospitals. The elevated anxiety and sleep disturbances observed among older nurses, those with higher education, and those in nuclear families suggest the need for targeted mental health interventions for these groups. Providing COVID-19 training has been shown to reduce anxiety and improve sleep, highlighting the importance of continuous education and preparedness in mitigating stress. Additionally, strategies to support nurses with comorbidities and those with a history of COVID-19 infection should be prioritized to prevent the exacerbation of anxiety and sleep disturbances. Implementing comprehensive mental health support, including stress management and counseling services, could help reduce anxiety and improve sleep quality, ultimately enhancing the overall well-being and performance of nursing staff.

This study has several limitations. The cross-sectional design limits causal inferences between anxiety and sleep disturbances. The sample, drawn from only two COVID-19 hospitals in Bangladesh, may not fully represent nurses in other settings. Reliance on self-reported measures could introduce response bias. Additionally, the sample size, though adequate, may not capture the full diversity of experiences among nurses. Lastly, the findings reflect a specific period of the pandemic, which may not account for changes over time.

6. Conclusion

Anxiety and sleep disturbances are common mental health problems among nurses during the COVID-19 crisis. This study found that older age, gender, higher education, marital status, lack of training, and the presence of comorbidity were associated with anxiety and sleep disturbances. Older nurses and those with comorbidities face heightened anxiety and sleep disturbances, while gender and marital status also play a role. Based on the study findings, several recommendations are proposed. First, targeted mental health support should be provided for older, married nurses and those in nuclear families, including counseling and stress management

programs. Regular and comprehensive COVID-19 training programs are essential to reduce anxiety and improve sleep among nurses. Additionally, nurses with comorbidities should receive extra health monitoring and mental health resources. Adjusting workload and shifts to allow adequate rest can help mitigate anxiety and sleep disturbances. Finally, ongoing psychological support services should be readily available to all nurses, particularly during high-stress periods, to ensure their well-being. A future qualitative study is also recommended.

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Author contribution

Conceptualization: SM; Methodology: SM, MNA; Formal analysis and discussion: SM, MNA, MKA, SK; Investigation: SM; Writing: MKA, SK; Supervision: MNA.

Conflict of interest

There are no potential conflicts of interest to declare.

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