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Stress and Sleep Problems as Predictors of Mental Health among Chittagong University Students

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Abstract

University students today are facing a variety of challenges, such as stress, sleep problems, mental health issues, etc. which are hampering their academic and personal lives. To address this issue the purpose of the study was to investigate stress, sleep difficulty and mental health of university students according to gender and residential status. A convenience sample of 500 students from Chittagong University was recruited to participate in the study. Measuring instruments used in this study were Perceived Stress Questionnaire developed by Keya (2006), Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al. (1989) and adapted by Singha (2018) and General Health Questionnaire (GHQ-12) developed by Goldberg and Williams (1988) and adapted by Sorcar and Rahman (1990). Data were analyzed using mean, standard deviation, *t*-test, Pearson product moment correlation and regression. The findings indicated that female students reported higher levels of stress and sleep difficulty compared to male students. Stress and sleep difficulty were significantly positively correlated, suggesting that higher stress was associated with greater sleep difficulty. Mental health was significantly negatively correlated with both stress and sleep difficulty, indicating that higher stress and sleep difficulty were associated with poorer mental health. Multiple regression analysis revealed that both stress and sleep difficulty were significant predictors of mental health, with stress emerging as the stronger predictor. It can be suggested that, both university authorities and students should take proper interventions to reduce stress and sleep difficulty and promote mental health.

Key words: Stress, sleep difficulty, mental health

Introduction

University students face various problems, including academic and personal challenges. Factors like separation from family, entering a new environment, competition with other students, thinking about future working life and dormitory life can be considered as stressors for students. This stress may lead to anxiety or depression and students who struggle with anxiety or depression may find it difficult to relax and wind down at night, leading to insomnia or other sleep disorders[1]. In addition to affecting academic performance, sleep problems can lead to a range of physical and mental health issues, including fatigue, depression and decreased immune function. To understand the issue at our cultural context and for achieving the goal of promoting better mental health of our university students, the present study aims to investigate the relation among stress, sleep difficulty and mental health of Chittagong University students.

Stress is a natural response to challenges or changes in our environment, but excessive or prolonged stress can have negative impacts on physical, mental, and emotional well-being. Stress affects attention, memory, and problem-solving abilities[2]. In addition, stress can also impact sleep quality, leading to fatigue, irritability, and decreased motivation, which can make it challenging for students to engage in academic activities and perform at their best[3]. Sleep is an essential aspect of our lives and plays a crucial role in maintaining physical and mental well-being. University students are a population that is particularly vulnerable to sleep-related problems due to the demands of their daily life stress. Sleep deprivation can lead to decreased cognitive functioning and reduce a student's ability to concentrate, retain information, and perform well on exams[4]. Sleep-deprived students are also more likely to experience anxiety, depression, and irritability, all of which can negatively impact their mental health[5]. Good mental health equips students with the necessary coping mechanisms to deal with academic pressures and stressors effectively. Positive mental health fosters a sense of optimism, motivation, and engagement in learning. On the other hand, worse mental health conditions like depression and anxiety can disrupt

cognitive processes, making it difficult for students to concentrate, retain information, and complete tasks effectively[6].

Several studies found varying differences in case of stress in male and female university students. Graves et al.[7] investigated about gender differences in perceived stress and coping among university students and found that females indicated higher levels of stress than their male counterparts. Similarly, Brougham et al.[8] Akhtar[9] and Backović et.al[10] revealed similar type of result that female students reported feeling a large amount of stress than male. But according to Chen et. Al.[11] male students reported higher levels of stress than female. On the other hand, another study concluded more similarities existed than differences in perceived stress with male and female students[12]. As illustrated, the current literature offers inconsistent findings regarding gender relative to stress. Several previous studies have found that women have more sleep related problems than male. Palagini et al.[13] found that female students reported higher levels of sleep disturbances compared to male students. In another study both men and women showed increased sleep issues with mental health conditions, but the effect was larger for women[14]. Similarly, Tang et al.[15] and Buysse et al.[16] found that sleep difficulty score was significantly higher in females than males. Several researchers have focused on gender difference in mental health among university students, but no consistent conclusion was drawn in this respect. Female students were found significantly suffered more from stress, anxiety and depression[17,18,19]. Similarly, Cuijpers et al.[20] found that female students were more likely to have a range of mental health problems compared to male. By contrast, other researchers insisted that male students were more likely to experience depressive disorders than female students[21,22]. There were also studies which found no substantial gender effects concerning their mental health states[23].

Morran, Atiles and Trego[24] explored the differences in stress levels between residential and nonresidential college students. The results showed that non-residential students reported higher levels of stress than residential students. But Kumar et al.[25] and Kabir, et al.[26] found that residential students experienced higher stress than non-residential students. Alshahrani et al.[27] and Saat et al.[28] showed that non-residential students had more sleep difficulty than residential students. But from another study on factors affecting the sleep quality of the nursing students, the sleep difficulty of residential students was found higher than non-residential students[29]. Brett, Mathieson, & Rowley[30] investigated about wellbeing in university students according to their residential status and found that residential students reported higher loneliness and number of stressors than commuter students. Similarly, Roy et al.[31] and Kabir et al.[26] found non-residential students reported better mental health compared to residential students due to greater parental support.

Several studies found stress has negative impact on sleep quality. Such as Kim et al.[32] conducted research on the relationship between chronic stress and insomnia symptoms in Korean adults. Result showed higher levels of chronic stress were associated with increased risk of sleep difficulties. Gaultney[1] found that various stressors of students like high academic demands, heavy workloads, tight deadlines create stress and stress creates sleep difficulty. Moreover, social stressors are also found a common concern for university students, which can lead to sleep difficulty[33]. Previous studies have established that stress can lead to mental health problems. For example, stress has been found associated with an increased risk of anxiety, depression, and other mental health disorders[34]. Lee et al.[35] investigated about stress and anxiety symptoms in adults and found that exposure to stressors was associated with increased risk of depression and anxiety. A study by Liu et al.[36] found that academic stress was a significant predictor of depression and anxiety among students. A study by Karyotaki et al.[37] found that social stress, such as bullying and peer pressure, was associated with increased risk of depression and anxiety. It is apparent from previous literatures that sleep difficulty is related to mental health. Zochil & Thorsteinsson[38] investigated about poor sleep, mental health, and help-seeking intention of university students in Australia. They found 84.6% students who experienced sleep deprivation suffered severe or extremely severe depression (18.0%), anxiety (20.5%), or stress (14.6%). The prevalence of depression, anxiety, and/or stress were found higher among students when linked with sleep deprivation[39]. Khir et al.[40] found significant relationship between sleep difficulty and mental health dimensions (depression, anxiety and stress) among the students in Malaysia.

University students spend a critical period accompanied by several challenges and numerous stresses. Their transition to higher education can be challenging due to increased academic demands, social pressures, financial concerns, changes in their living environment, etc. All of these factors contribute to create stress. This stress disrupts their various physical and mental health issues including sleep quality[41]. Sleep difficulties are commonly associated with poor academic performance, emotional distress, anxiety, and depression, all of which contribute to a decline in overall mental health[40]. So both stress and sleep difficulty can exacerbate anxiety, depression and various mental health issues of students. But often our students are unware and don't realize that high stress levels and poor sleep quality are taking negative impact on their health and well-being. Therefore, addressing stress and promoting healthy sleep habits should be a priority for university students in order to maintain their physical and mental health, as well as their academic success. On the other hand, though stress, sleep quality and mental health are considerable issues that has attracted globally attention in research context, interest in research on this issue in Bangladesh remained quite scarce. In Bangladesh, where young adults face unique social, academic, and economic pressures, systematic research examining these interrelated factors is still limited. Recognizing this research gap, the present study aims to investigate the relationship among stress, sleep difficulty and mental health of university students. Understanding the relations among the variables can help to promote better health and well-being, improve academic performance, and support the development of effective interventions to help our students. There are many factors exist that can influence stress, sleep difficulty, and mental health of students. Among them gender and residential status are important enough to study.

Considering these above issues, the present study was designed (a) to investigate whether study variables (stress, sleep difficulty and mental health) of students vary according to gender and residential status; (b) to investigate whether there is any relation among stress, sleep difficulty and mental health and (c) to investigate whether mental health can be predicted by stress and sleep difficulty.

Materials and Methods

Target Population

The target population of the study was the students of Chittagong University.

Participants

The sample of the present study comprised of 500 university students from different faculties and academic year. They were selected using convenience sampling method. Among them 244 (48.8%) were male and 256 (51.2%) were female. In case of residential status, among 500 participants 244 (48.8%) were residential students and remaining 256 (51.2%) were non-residential. Age of the respondents ranged from 19-27 years (mean = 22.36 years, SD = 1.73 years). A demographic and personal information questionnaire was used to collect data about participant's age, gender, residential status, academic year etc.

Instruments

The following instruments were used in the present study:

PSQ (Perceived Stress Questionnaire)

The Perceived Stress Questionnaire was developed by Keya[42]. It is a 20 items Likert type scale. 15 questions are positive and 5 questions (7, 9, 10, 11, & 12) are negative. There are five alternatives for each question. The scoring of positive items is *not at all (0), a little bit (1), a moderate amount (2), quite a bit (3), and a great deal (4)* and the scoring system for negative items is just opposite of the scoring system of positive items. The scale scores range from 0 to 80. High scores reflect high perceived stress. The alpha value of the entire scale was determined which was highly acceptable (α'= 0.77). Reliability was determined using test-retest method and temporal stability was established (r = 0.73). For testing validity 'contrast group' method was followed[43]. The PSQ was administered on different group of people (those who have evicted and those have not been evicted from their shelter) showed significant differences on perceived level of stress. Evicted people were more stressed than non-evicted people. This scale can differentiate the stressed and non-stressed groups. Therefore, the PSQ demonstrates known-groups construct validity.

Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) is a self-report questionnaire that assesses sleep difficulty over a one-month time interval. It was developed by Buysse et al.[16] and adapted in Bangla by Singha[44]. The questionnaire has been used in many settings, including research and clinical activities, and has been used in the diagnosis of sleep disorders. It consists of 18 individual items, which are grouped into seven components. The items include both open-ended and Likert-type response formats. For scoring, the response options of all items within each component were categorized and converted to a uniform 0–3 scale. In this way, the final score of each component ranges from 0 to 3. After calculating the scores of all seven components separately, they are summed to yield one global score, which ranges from 0 to 21, where "0" indicates no difficulty and "21" indicates severe difficulty. Thus, a global PSQI score is taken from the survey, with lower scores correlating to better sleep quality. The Bangla version of the Pittsburgh Sleep Quality Index demonstrated good reliability and validity. Internal consistency was acceptable (Cronbach's α = .71), split-half reliability was .69, and test–retest reliability over 15 days was strong (r = .84). Component matrix analysis showed that 18 items had high construct validity. Linguistic validity, assessed by correlating scores from the original and Bangla versions, was excellent (r = .92). These results indicate that the Bangla version is a reliable and valid instrument for research and clinical use.

Mental Health Questionnaire

Mental health of the respondents was measured using the General Health Questionnaire (GHQ-12) developed by Goldberg and Williams[45]. It was first translated into Bangla by Sorcar and Rahman[46] and since then, researchers have used it to assess the mental health of people. Later Islam et al.[47] validated the instrument. It has 12 items and each item of the scale consists of a question asking whether the respondent has recently experienced a particular symptom of behavior rated on 4-point Likert scale. Among the 12 items, 6 were positive (1, 3, 4, 7, 8, 12) and 6 were negative (2, 5, 6, 9, 10, 11). Responses are given weights of 0, 1, 2 and 3 respectively for *"not at all", "somewhat", "to a considerable extent" and "to a great extent"* for positive items and negative items in the reverse order from 3-0. Total score of the scale ranges from 0-36 with higher score indicating better mental health. Islam et al.[47] investigated the latent structure, item quality, and differential item functioning of the scale. A split-half exploratory factor analysis supported a unidimensional structure, confirmed by a bifactor model with the best fit (CFI = .96; TLI = .99; SRMR = .02; RMSEA = .06) in confirmatory factor analysis. The scale demonstrated excellent reliability (ordinal α = .96; McDonald's Omega Total. = .97) and known-group validity (clinical vs. nonclinical subgroups, t = 290.21, p < .001; Cohen's d = 1.46).

Design

A cross-sectional survey research design was followed for conducting the present study.

Procedure

For collecting relevant data from the participants under study, the scales were administered to them individually. Along with written instructions within the questionnaires, the participants were instructed verbally to make it sure that they had understood the task. Then they were requested to answer the questions sincerely and honestly. After accomplishment of their task, the answered questionnaires were collected from them and they were given thanks for their sincere cooperation.

Data analysis

The data were analyzed by using mean, standard deviation, *t*-test, Pearson Product Moment correlation and regression. All statistical analyses were carried out using the statistical program SPSS version 26.0 for windows.

Results and Discussion

From Table 1, *t*- tests indicate that gender has significant effect on stress and sleep difficulty. Mental health did not vary according to gender. Stress, sleep difficulty and mental health did not vary according to residence. Female students (M= 32.66, SD= 12.39) showed more stress than male students (M= 30.05, SD= 10.05). Female students (M= 8.29, SD= 3.78) showed more sleep difficulty than male students (M= 7.64, SD= 3.45).

Table 1 Differences in Stress, Sleep Difficulty and Mental Health Based on Gender and Residential Status

Variable	Group	*N*	*M*	*SD*	*df*	*t*
Stress	Male	244	30.05	10.05	498	-2.584*
	Female	256	32.66	12.39		
	Residential	244	31.25	12.29	498	-0.264
	Non-residential	256	31.50	10.43		
Sleep Difficulty	Male	244	7.64	3.95	498	-2.002*
	Female	256	8.29	3.78		
	Residential	244	8.08	3.93	498	0.512
	Non-residential	256	7.91	3.83		
Mental Health	Male	244	21.89	6.37	498	0.947
	Female	256	21.16	6.43		
	Residential	244	21.13	6.57	498	-1.000
	Non-residential	256	21.71	6.55		

*p<0.05 (2-tailed)

Results of correlation shown in table-2 indicate that stress and sleep difficulty was significantly positively correlated (r = 382, p<0.01). It indicates that higher stress levels are associated with greater sleep difficulty. Stress was found significantly negatively correlated with mental health (r = -.588, p<0.01). It means, higher stress is associated with poorer mental health. Sleep difficulty was found significantly negatively correlated with mental health (r = -.473, p<0.01). It reveals that, more sleep problems are associated with poorer mental health.

Table 2 Correlation among Stress, Sleep Difficulty and Mental Health

Variables	1	2	3
1. Stress	-		
2. Sleep difficulty	0.382**	-	
3. Mental health	-.588**	-.473**	-

** p<0.01(2-tailed)

Results from Tables 3 and 4 show that the overall regression model was significant, F (2, 497) = 178.617, p < .001, and indicated that 41.8% of the variance in mental health was explained by the combined linear effects of stress and sleep difficulty (R^2 = .418). As shown in Table 3, stress was a significant negative predictor of mental health (β = –.477, t = –12.90, p < .001), indicating that higher levels of stress were associated with poorer mental health. Sleep difficulty was also a significant negative predictor (β = –.290, t = –7.85, p < .001), suggesting that greater sleep difficulties were related to lower mental health. The selected statistics in Table 4 further indicate that stress alone accounted for 34.6% of the variance in mental health (R^2 = .346), and adding sleep difficulty to the model explained an additional 7.2% of the variance (R^2 change = .072, p = .01). These results suggest that while stress is the stronger predictor, sleep difficulty contributes significantly to predicting mental health beyond the effects of stress.

Table 3 Stepwise Multiple Regression Analysis of Mental Health on Stress and Sleep Difficulty

Independent variables	β	*t*	Sig
Stress	-.477	-12.898	.000
Sleep Difficulty	-.290	-7.848	.000

F (2,497) = 178.617, p<.001

Table 4 Selected Statistics from Regression of Mental Health on Stress and Sleep Difficulty

Independent variables	*R*	R^2	R^2 Change	Sig.
Stress	.588	.346	.346	.01
Stress&Sleep Difficulty	.647	.418	.072	.01

The first objective of the present study was to investigate whether stress, sleep difficulty and mental health of students vary according to gender and residential status. Results indicate that, gender has significant effect on stress and sleep difficulty. Mental health did not vary according to gender. Stress, sleep difficulty and mental health did not vary according to residential status. Female students showed more stress than male. The finding is consistent with the several previous findings[7,8,9,10]. Previous epidemiological researches show that, females and males responded to stress differently as a consequence of their differential sensitivity to events. For instance, during stressful situation, women manifest more emotion-focused coping and less problem-focused coping styles, which indicate an increased risk of stress in women with respect to men[10]. Furthermore, self-concepts of traditional masculinity and femininity can affect their attitudes and behaviors towards life experiences. This in turn, lead to their differential internalizing and externalizing problems which make women more prone to perceive stress. On the other hand, biologically, females are often more sensitive to stress due to hormonal variations, particularly in response to cortisol, which can amplify stress reactions.

Female students showed more sleep difficulty than male. The finding is consistent with the previous findings[13,14,15,16]. The high prevalence of stress and affective disorders in females have increased the risk of poor sleep quality[1]. In our society female students face more social pressure, family obligations, demands of fulfilling multiple roles. These stresses are associated with overall poor sleep quality and higher sleep latency in women. Additionally, biological events mediated by hormones and physiological changes can impact sleep quality among girls.

The second objective of the present study was to investigate whether there is any relation among stress, sleep difficulty and mental health of students. Results indicate that, stress and sleep difficulty was significantly positively correlated. The finding supports the studies of Kim et al.,[32] Gaultney[1] and Hershner and Chervin[33]. Poor sleep quality can result in decreased academic performance, increased anxiety levels, decreased physical health and these can lead to stress[1]. On the other hand, when students are stressed, falling asleep becomes a challenge due to an active mind and disruptive stress hormones. Stressed individuals are more likely to experience racing thoughts, worry, and anxiety at bedtime, making it harder to fall asleep or maintain restful sleep. Thus stress makes it hard to sleep, and lack of sleep makes stress worse.

Sleep difficulty was found significantly negatively correlated with mental health. The finding is consistent with the previous findings[38,39,41]. Poor sleep disrupts the production of mood-regulating neurotransmitters like serotonin and dopamine, contributing to anxiety and depression[48]. Furthermore, the frustration and exhaustion associated with poor sleep can make individuals less resilient to stress, making them more susceptible to mental health challenges[39]. Difficulties in falling or staying asleep can lead to fatigue, irritability, reduced concentration, and increased vulnerability to stress and mood disturbances, all of which can negatively impact mental health. Poor mental health can also exacerbate sleep difficulties, creating a vicious cycle[38]. Students experiencing stress, anxiety, or depression may have racing thoughts, worry, or emotional tension that make it harder to fall asleep or stay asleep.

Stress was found significantly negatively correlated with mental health. Moreover, the final objective of the present study was to investigate whether mental health can be predicted by stress and sleep difficulty. Results indicate that, both stress and sleep difficulty were the significant predictors of mental health. The strongest predictor of mental health was found stress, which alone explained 34.6% of variance of mental health. The finding is also in agreement with previous findings[34,35,36,37]. Chronic stress triggers the release of hormones like cortisol, which can disrupt crucial brain

functions like memory, emotion regulation, and sleep. This disruption can contribute to worse mental health conditions like anxiety, depression, and even cognitive decline[49]. Psychologically, stressed students are more likely to experience anxiety, worry, and negative thinking patterns, which can reduce resilience and coping abilities. Poor mental health can also make individuals more susceptible to stress. When students experience conditions such as anxiety, depression, or low emotional resilience, they may have a harder time coping with daily challenges and demands. This reduced coping ability can make even minor stressors feel overwhelming, intensifying their overall stress levels.

The present study contributes to the existing literature in the Bangladeshi context by providing empirical evidence that stress and sleep difficulties among our university students are closely interrelated, and both factors exert negative impacts on overall mental health. Furthermore, it highlights a gender disparity, showing that female students are particularly more vulnerable to these challenges. This finding underscores the importance of considering gender-specific factors in mental health research and interventions, and it adds to the growing evidence on the differential psychological challenges faced by female students in Bangladesh. These provide context-specific insights that are valuable for policymakers, educators, and mental health professionals working with Bangladeshi students. But low sample size, limited sampling area, non-probability sampling technique and limited demographic variables are the major limitations of the study. it is imperative to conduct additional research by including higher sample size, diverse sampling area, and various demographic variables for better understanding and generalization. Moreover, future research can explore other factors (e.g., coping strategies, social support, academic pressure) that may moderate or mediate the relationship between stress, sleep, and mental health.

The present study demonstrates that stress and sleep difficulties are closely linked and negatively affect mental health among university students in Bangladesh, with female students being particularly vulnerable. Based on these findings, it may be beneficial for students to adopt strategies that support stress management and healthy sleep habits. Likewise, universities could consider providing resources and support, such as counseling services or workshops on stress and sleep management, to help mitigate these challenges.

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