The Chittagong Univ. J. B. Sci. 8(1&2): 135-146, 2013

SLEEP DEPRIVATION, MENTAL HEALTH AND ANXIETY OF CHITTAGONG UNIVERSITY STUDENTS

ABDUR RAHMAN*, MD. NURUL ISLAM, KAMRUN NAHAR AND BIPLOB KUMAR DEY[1]
Department of Psychology, University of Chittagong, Chittagong-4331, Bangladesh

ABSTRACT

Proper quality and quantity of sleep is an inevitable part for better cognitive and overall performance of students. Previous research shows that sleep deprivation affects both physical and mental state of the students. In this context, no literature is available in the perspective of Bangladesh. The main focus of this research was to obtain a deeper insight of the negative effects of sleep deprivation on mental health and anxiety of Chittagong University students. Purposively selected and readily available 200 respondents constituted the sample of the study. An adapted Bengali version of General Health Questionnaire (GHQ-12) (Sorcar and Rahman 1989) and the Anxiety Scale developed by Deeba and Begum (2004) were used for data collection. Data were analyzed using descriptive statistics, independent sample t-test and Pearson Product Moment Correlation. It was found that sleep deprivation has significant adverse effect on both mental health (t=9.51, df=198, p<0.01) and anxiety (t=10.00, df=198, p<0.01). Sleep deprived students showed significantly lower mental health and significantly greater anxiety than sleep non-deprived students. Sleep duration was found positively correlated with mental health. Anxiety was found negatively correlated with sleep duration and mental health. Effective interventions against sleep deprivation are necessary to improve students' anxiety and mental health status.

Key Words: Sleep deprivation, mental health, anxiety

INTRODUCTION

Sleep plays a vital role in good physical, mental health and well-being throughout our life. During sleep, our body is working to support healthy brain function and maintain our physical health (National institute of health in USA 2012). In children and teens, sleep also helps support their growth and development. Insufficient sleep can lead to fatigue accumulation and many adverse effects on our health. But many of us including students suffer for sleep deprivation. The most common causes of sleep deprivation are those related to contemporary lifestyle and work-related factors; thus the condition affects a considerable number of people. Quality and quantity of sleep can have a strong impact on student's memory and learning. Considering the adverse effect of sleep deprivation on student population the present study tries to find out the relationships among sleep deprivation, mental health and anxiety of Chittagong University students.

* Corresponding author email: arahman@cu.ac.bd

Induced or perceived lack of sleep is commonly called sleep deprivation. As a general rule, the average adult needs around 8 hours of sleep a night. If one needs 7 hours of sleep to feel rested, but only obtain 5 hours, he/she will have a 2-hour sleep deprived. So, sleep deprivation means not getting the amount of sleep that one requires for his/her optimal functioning (Psychlopedia 2016). Carskadon and Dement (1981) defined sleep deprivation as sleep duration of less than 5 to 6 hours for several consecutive nights. People who are exposed to sleep loss usually experience a decline in cognitive performance and changes in mood (Alhola and Kantola 2007). Traditionally, clinicians treating patients with severe psychiatric disorders have viewed insomnia and other sleep disorders as symptoms. But studies in both adults and children suggest that sleep problems may raise risk for, and even directly contribute to, the development of some psychiatric disorders and worse mental health (Harvard medical school 2009).

According to the World Health Organization (WHO 2014), mental health is a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, and can work productively and fruitfully. The university years of an individual are emotionally and intellectually more demanding than almost any other stage of education. At this stage, an individual faces a great deal of pressures and challenges that pose a variety of physical, social and emotional difficulties and as a result they become more vulnerable for developing mental health problems (Benton *et al.* 2003).

The link between sleep deprivation and mood has been seen over and over by researchers and doctors. For example, people with sleep deprived have found greater levels of depression and anxiety than those who sleep normally (National Sleep Foundation in USA 2016). Dement (1960) described anxiety as one of the most important consequences of sleep deprivation. Anxiety is a feeling of fear, uneasiness, and worry, usually generalized and unfocused as an overreaction to a situation that is only subjectively seen as menacing (Turk *et al.* 1998). Some of the more common symptoms of anxiety disorders are feelings of fear or dread, trembling, restlessness, fatigue and problems in concentration, muscle tension, rapid heart rate, dizziness, perspiration and shortness of breath (Physiopedia 2017).

University students are known for their variable sleep schedules. They are noted for obtaining insufficient sleep during the week and for sleeping long hours during the weekend (Lack 1986). Symptoms of sleep deprivation in students include: Constant yawning, the tendency to doze off when not active for a while; for example, when watching television, sleepy grogginess experienced all day long (sleep inertia) including class time, poor concentration and mood changes. Poor sleep quality, sleep difficulties, and daytime functioning can lead to significantly greater psychosocial distress (Buysse *et al.* 1989).

Brown *et al.* (2001) investigated *about* prevalence *of* delayed sleep phase syndrome *in* university students. They found that only 11% of the students surveyed met the criteria for good sleep quality. The rest of the 89 % sample had moderate-to-severe sleep complaints. Coren (1994) showed at least two thirds of college students reported occasional sleep disturbances and about one third of those reported regular, severe sleep difficulties in a study

of the prevalence of self-reported sleep disturbances in young adults. The National Sleep Foundation in U.S. (2016) showing that university-aged students got an average of less than 6 hours of sleep each night. In the study, 70.6% of students reported obtaining less than 8 hours of sleep, and up to 27% of students may be at risk for at least one sleep disorder.

Hoque (2015) investigated major mental health problems of 150 Bangladeshi university students. Result of the study revealed that most of the university students commonly experienced anxiety. Among the respondents, 24% of the students experienced both anxiety and depressive episodes. 60% students experienced anxiety, depression and panic episodes. Kaoru *et al.* (2008) studied about the relationship of sleep duration and mental health with electrocardiographic findings in Okinawa, Japan. The result suggested that the mental health condition has a strong association with sleep duration, which was found to be a risk factor for abnormal ECG findings. Pilcher *et al.* (1997) studied about the relationship of sleep with health, well-being, and sleepiness in college students. They found that poor sleep quality was correlated with increased physical health complaints and to increased feelings of anxiety, depression, anger, fatigue, and confusion. Furthermore, poor sleepers reported a decrease in positive affect and a decrease in satisfaction with life. Jean *et al.* (1998) studied mood states and sleepiness in college students and found sleep deprived students experienced substantially greater negative mood states as well as depression, anxiety, general cogn tive difficulties (eg, poor problem solving and attention difficulties) and increased use of drugs and alcohol. A longitudinal study of 943 children found that symptoms of sleep disturbance in early childhood were associated with the presence of anxiety disorders over 20 year's later (Gregory *et al.* 2005).

Partial sleep deprivation (less than 6 hours of sleep per night) found lead to deficits in attention, concentration, memory and critical thinking, along with decreased mental health (Parmaggiani *et al.* 1994). Even students who regularly obtain 8 hours of sleep per night but shift their sleep schedule by more than 2 hours may experience attention, concentration, reasoning and psychomotor difficulties (Taub and Berger 1973). Ban and Lee (2001) studied sleep duration, subjective sleep disturbances and associated factors among university students in Korea. In their study, insufficient sleep was suggested as a risk factor for minor psychiatric disorders, lower life satisfaction and academic deterioration. Trockel *et al.* (2000) studied sleep habits, academic performance and several other health-related variables of 243 residential university students. The researchers concluded that there were significant relationships between lower GPAs and lower mental health with sleep deprivation.

University students have to face a lot of new challenges in a new environment. For many residential university students, this may be the first time they live away from their parents. They move from the emotional and social support of their families. Lack of adequate social and emotional support, lot of academic pressures and new adjustment problem may lead to poor physical and psychological consequences such as; sleep deprivation, poor mental health, anxiety, depression etc. Adequate Sleep is a biological necessity for the normal functioning of humans. But, for some students, due to new living and social experiences, new freedom from parental supervision and new academic demands

adequate sleep is often neglected. Lack of sleep may lead to them many negative consequences; such as, decreased physical health, mental health, mood swings, irritability, concentration problems, anxiety, depression and life dissatisfaction. Students, who are in psychological distress and having poor mental health like anxiety, may receive a lower grade on academic activities, lower academic self-efficacy and less effective time management. Furthermore, these negative consequences can be exacerbated by use of drugs and alcohol. These facts are sufficiently strong enough to support the importance of research on the interface among sleep deprivation, mental health and anxiety of university students. In our country there seems no study relating to the relationship among sleep deprivation, mental health and anxiety of university students. The knowledge of the relationship among these variables potentially aid the students to understand the importance of obtaining the recommended seven to eight hours of sleep each night and of doing so routinely. Treating their sleep disorder may help alleviate symptoms of their mental health problems and anxiety in order to enjoy a healthy student life.

Considering the above facts, the present study was designed (a) to find out the mental health, anxiety and sleep deprivation status of the students; (b) to investigate whether mental health and anxiety of the students varies in relation to sleep deprivation and (c) to investigate whether there is any relation among sleep duration, mental health and anxiety.

MATERIALS AND METHODS

Sample

The sample of the present study constituted of 200 university students. Among them 100 (50%) were sleep deprived and remaining 100 (50%) were sleep non-deprived. Each group again consisted of 50 males and 50 females. The samples were taken from different academic sessions and different departments of Chittagong University.

Measuring Instruments

The following instruments were used in the present study:

Demographic and Personal Information Form including a checklist
Mental Health Questionnaire (GHQ-12)
Anxiety Scale

Demographic and Personal Information Form with checklist

A demographic and personal information form was used to collect data about participant's age, gender, residential status, sleep duration. A short checklist was used which contained sleep quality and quantity related information to determine sleep deprived students.

Mental Health Questionnaire

Mental health of the respondents was measured using the General Health Questionnaire (GHQ-12) developed by Goldberg (1972) and adapted in Bengali by Sorcar and Rahman (1989). It has 12 items and each item consists of a question asking whether the respondent has recently experienced a particular symptom rated on a four-point scale.

Among the 12 items, 6 were positive and 6 were negative. 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 range from 0-36 with higher score indicating better mental health. Goldberg (1972) showed that the full scale exhibited high internal consistency (r = 0.65) and good test-retest reliability (r = 0.73) over a period of six months. All variables of the scale also correlated highly with one another. Goldberg (1978) provided evidence of validity of GHQ as shown by its linear association with independent clinical assessments (typically r = 0.70 or greater) and its sensitivity and specificity in discriminating between individual with and without mental health problem. The reliability of the Bengali version was measured by parallel form method which was found to be satisfactory (r = 0.69).

Anxiety Scale

The Anxiety Scale developed by Deeba and Begum (2004) was used to measure anxiety of the respondents. The scale consists of 36 items and it is a Likert type scale. All the items of the scale are positive. There are five alternatives for each question. The scoring of items is 0 for Never Occurs, 1 for Mildly Occurs, 2 for Moderately Occurs, 3 for Severely - Occurs and 4 for Profoundly Occurs. Total anxiety score of any individual was obtained from the sum total of scores of all the 36 items. The scale scores range from 0 to 144. Larger total score indicates higher anxiety. There are four levels of severity norm; namely- mild (27-54), moderate (55-66), severe (67-77) and profound (78- above). The cut-off score for screening an individual as anxious or non-anxious of the scale is 47.5. The split-half reliability (r= 0.91), Cronbach-alpha reliability (0.94) and the test-retest reliability (r=0.68) indicate that the scale has a good reliability. The scale has also good content validity, criterion-related validity (r= 0.31 to r= 0.62) and construct validity (r= 0.39 to r= 0.78).

Design

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

Procedure

Respondents were told that the sole purpose of the investigation was academic. Before administration of the questionnaires, necessary rapport was established with respondents. Then the demographic and personal information form including checklist, Mental Health Questionnaire and Anxiety Scale were administered to respondents and requested a silent reading at the instruction provided with the scales before starting to answer. All possible clarifications were made to the problems if faced by the respondents. There was no time limit for the respondents to answer all the items of the scale. After completing of their tasks the answered questionnaires were collected from them and they were given thanks for their sincere co-operation.

RESULTS

The data were analyzed by using mean, standard deviation, independent sample t-test and Pearson Product Moment correlation. All statistical analyses were carried out using the statistical program SPSS version 16.0 for windows.

TABLE 1: DESCRIPTIVE STATISTICS OF MENTAL HEALTH AND SLEEP DURATION OF PARTICIPANTS.

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Mental health	200	1	33	16.34	4.83
Sleep duration	200	4	11	6.52	1.59

Table 1 shows that the minimum and maximum mental health score of students were 1 and 33; and mean score was 16.34 (SD=4.83). Minimum and maximum sleep duration of students were 4 hours and 11 hours; and mean score was 6.52 (SD=1.59).

TABLE 2: DESCRIPTIVE STATISTICS OF ANXIETY AND NUMBER OF PARTICIPANTS ACCORDING TO SEVERITY NORM OF ANXIETY.

N	Minimum	Maximum	Mean	Std. Deviation	Mild(n)	Moderate(n)	Severe(n)	Profound(n)
200	7	120	47.67	25.26	64	41	28	19

Table 2 shows that the minimum and maximum anxiety score of students were 7 and 120; and mean score was 47.67 (SD=25.26). Considering the severity norm of the anxiety scale, 64 participants were found mildly anxious, 41were found moderately anxious, 28 were found severely anxious and 19 were found profoundly anxious. Considering the cut-off score for screening norm (47.5) of anxiety scale, 103 students were found as anxious.

TABLE 3: MENTAL HEALTH AND ANXIETY SCORE ACCORDING TO SLEEP DEPRIVATION.

Variables	Group	N	Mean ($\bar{x}$)	SD	df	t
Mental health	Sleep deprived	100	12.17	5.78	198	9.51*
	Non-deprived	100	20.07	5.94		
Anxiety	Sleep deprived	100	62.47	21.48	198	10.00*
	Non-deprived	100	33.32	19.68		

*p<0.01

The t-test of table 3 shows that sleep deprivation significantly effect on both mental health and anxiety of students. Mean mental health score of sleep deprived students was 12.17 (SD= 5.78) and non-deprived students was 20.07 (SD=5.94). Mean anxiety

score of sleep deprived students was 62.47 (SD= 21.48) and non-deprived students was 33.32 (SD=19.68).

TABLE 4: INTER CORRELATION CO-EFFICIENT AMONG ANXIETY, MENTAL HEALTH AND SLEEP DURATION.

Variable	Sleep duration	Mental Health	Anxiety
Sleep duration	-	-	-
Mental health	0.37*	-	-
Anxiety	-0.34*	-0.65*	-

*p<0.01(2-tailed)

Table 4 shows that, the correlation coefficient of sleep duration with mental health was 0.37, the correlation coefficient of sleep duration with anxiety was -0.34 and the correlation coefficient of mental health with anxiety was -0.65 with an alpha level of p<0.01.

DISCUSSION

The first objective of the present study was to find out the mental health, anxiety and sleep deprivation status of Chittagong University students. Table 1 was used for the descriptive statistics of mental health and sleep duration of participants. It shows that the minimum and maximum mental health score of students were 1 and 33; and mean score was 16.34 (SD=7.83). Considering the range of the mental health scale (0-36) and the midpoint score (18), the mean score of the students (16.34) was found below the scale midpoint. So, it can be said that the overall mental health status of Chittagong University students was not found satisfactory.

From table 1 minimum and maximum sleeping hour of students were found 4 (9%) and 11 (0.5%); and mean score was found 6.52 (SD=1.59). From further descriptive statistics, 9 % students were found getting only 4 hours of sleep, 22 % found getting only 5 hours of sleep, 21% found getting only 6 hours of sleep. 52% of all students were found sleep deprived according to their sleeping quantity and quality. This finding is supported by the previous studies (Coren 1994, Brown et al. 2001, The National Sleep Foundation in U.S. 2016). So our university students were found at high risk of sleep deprivation.

Table 2 was used for the descriptive statistics of anxiety and number of participants according to severity norm. It shows that the minimum and maximum anxiety score of students were 7 and 120; and mean score was 47.67 (SD=25.26). Considering the severity norm of the anxiety scale, 64 participants were found mildly anxious, 41 were found moderately anxious, 28 were found severely anxious and 19 were found profoundly anxious. Considering the cut-off score for screening norm (47.5) of anxiety scale, 103 students (52% of all participants) were found as anxious. This finding is supported by the findings of Hoque (2015).

The second objective of the study was to investigate whether mental health and anxiety varies according to sleep deprivation. Table 3 shows that, sleep deprivation

significantly effect on both mental health and anxiety of students. Sleep non-deprived students showed significantly greater mental health (Mean= 20.51, SD=7.26) than sleep deprived students (Mean= 12.17, SD=5.94). Sleep deprived students showed significantly greater anxiety (Mean = 62.47, SD=21.48) than sleep non-deprived students (Mean = 33.32, SD=19.68). These findings are supported by the previous findings of Kaoru *et al.* (2008), Parmaggiani *et al.* (1994), Ban and Lee (2001), Trockel, Barnes and Egget (2000), Pilcher *et al.* (1997) and Jean *et al.* (1998).

From various previous researches it was proved that sleep deprivation hampers students' physiological functioning and affects psychological wellbeing (Ban and Lee 2001, Buysse *et al.* 1989; Dement, 1960; Jean *et al.* 1998; Kaoru *et al.* 2008, and Pilcher *et al.* 1997). Sleep deprivation leads to lower alertness and poor concentration in students' daily activities. It's more difficult for them to focus and pay attention. This hampers students' ability to perform tasks that require logical reasoning or complex thought. Sleep deprivation also impairs their judgment. Making decisions is more difficult for them because they can't assess situations as well as pick the right behavior. Moreover; sleep deprivation affects their ability to learn in two ways; they can't focus accurately and it's more difficult to pick up information while reading books, so they can't learn efficiently. It also affects their memory, which is essential to learning. For these reason, sleep deprived students cannot give attention in their class lectures, forget their important tasks and they get slow in work. So they cannot finish their task in time which is negatively impact on their academic achievement and images to their teachers. Moreover; lack of sleep can alter their mood significantly (Peri 2013). It causes irritability and anger and may lessen their ability to cope with stress. All these impacts lead them to poor mental health and greater anxiety.

The third objective of the study was to investigate whether there is any relation among sleep duration, mental health and anxiety. Results from table 4 support and strengthen the previous findings from table 3. Table 4 shows that the significant correlation coefficient of sleep duration with mental health was 0.37. It indicates that there is a positive relationship between the two variables, which means that greater amount of sleep improve mental health. The significant correlation coefficient of sleep duration with anxiety was -0.34. It means that the two variables negatively correlated with each other. That is, if sleep duration increases, lessen the level of anxiety or at reverse. The significant correlation coefficient of mental health with anxiety was -0.65 which also indicates a negative relationship between mental health and anxiety. That is, the better the mental health the lower the level of anxiety.

The present study finds sleep deprivation as an important influencing factor for mental health and anxiety of Chittagong University students. There are many causes for sleep deprivation in university students. Sometimes students have to complete a large volume of study work to meet their various coursework requirements, in addition to regular examinations and assignments. A common delay and short sleep pattern becomes apparent in most of them, especially during the time of midterm and final exams and when project and thesis deadlines loom overhead. Then they sacrifice sleep in order to continue their work or studying, memorize everything they need to in order to secure a good grade in a short time.

But ultimately sleep deprivation in students can lead to lower GPAs because sleep affects concentration, memory and the ability to learn (Trockel *et al.* 2000).

Many students tend to allow themselves to be sleep deprived throughout the week because they generally believe they can make up for the sleep on the weekend when they get a break from their classes. Individual factors such as poor sleep hygiene practice associated with inadequate sleep knowledge could lead to reduced sleep quality among the university students. Moreover, inappropriate naps in the evening or irregular naps might be the contributing factors for the delay in bedtime, sleep loss and impairment of daytime functioning among the students (Tsui and Wing 2009). External factors including the early starting time of morning classes are associated with shorter sleep length on weekdays and compensatory sleep during weekends. Instead of regularly going to bed at a well organized schedule, some students prefer to stay up late to socialize with others, watch television, engage in social networks like facebook, read a book or gossip to others. Some other students' habits are disruptive; for example, drinking coffee or smoking cigarettes close to bedtime stimulates the nervous system and makes sleep less likely. Sleep also may be disrupted for a range of environmental reasons; for example, because the bedroom is too hot or cold or because of noisy neighbors or a snoring bed partner (Better health channel 2017).

The results of the present study may be used to identify groups of students those are found most vulnerable and in need of assistance for their sleep deprivation. Proper counseling and guidance service towards effective interventions against sleep deprivation is necessary to improve students' anxiety and mental health status. This study had some limitations too. The sample size was relatively small and participants were not drawn randomly which is not sufficient to make valid generalization. Future research can be carried out on a large scale sample.

REFERENCES

ALHOLA, P. AND KANTOLA, P.P. (2007). Sleep deprivation: Impact on cognitive performance. *Neuropsychiatric Disease and Treatment* **3**(5): 553-567.

BAN, D.J. AND LEE, T.J. 2001. Sleep duration, subjective sleep disturbances and associated factors among university students in Korea. *Journal of Korean Medical Science* **16:** 475–480.

BENTON, S.A., ROBERTSON, J.M., TSENG, W., NEWTON, F.B. AND BENTON, S.L. 2003. Changes in counseling center client problems across 13 years. *Professional Psychology: Research and Practice* **34**: 66-72.

BETTER HEALTH CHANNEL, 2017. Sleep deprivation. Retrieved from https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/sleep-eprivation?viewAsPdf=true

BROWN, F.C., BUBOLTZ, W.C. *AND* SOPER, B. 2001. Prevalence of delayed sleep phase syndrome in university students. College Student Journal **35:** 472–476.

BUYSSE, D J., REYNOLDS, C.F.I., MONK, T.H., BERMAN, S.R. AND KUPFER, D.J. 1989. The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research* **28**:193–213.

CARSKADON, M. AND DEMENT, W.C. 1981. Cumulative effects of sleep restriction on daytime sleepiness. *Psychophysiology* **18**: 107-13.

COREN, S. 1994. The prevalence of self-reported sleep disturbances in young adults. *International Journal of Neuroscience* **79**: 67–73.

DEEBA, F. AND BEGUM, R, 2004. Development of Anxiety Scale for Bangladeshi Population. *Bangladesh Psychological Studies* **14**: 39-54.

DEMENT, W. 1960. The effect of dream deprivation. *American Association for the Advancement of Science* **131**(3415): 1705-7.

GOLDBERG, D. 1972. *The detection of psychiatric illness by questionnaire: A technique for the identification and assessment of non-psychotic psychiatric illness*. Oxford University Press, London.

GOLDBERG, D. 1978. *Manual of the general health questionnaire.* NFER (National Foundation for Educational Research) Publishing, Windsor, UK:

GREGORY, A.M., CASPI, A., ELEY, T.C., MOFFITT, T.E., CONNOR, T.G. AND POULTON, R. 2005. Prospective longitudinal associations between persistent sleep problems in childhood and anxiety and depression disorders in adulthood. *Journal of Abnormal Child Psychology* **33**: 157-163.

HARVARD MEDICAL SCHOOL, 2009. Sleep and mental health. Harvard health publications. Retrieved from http://www.health.harvard.edu/newsletter_article/Sleep-and-mental-health.

HOQUE, R. 2015. Major Mental Health Problems of Undergraduate Students in a Private University of Dhaka, Bangladesh. *European Psychiatry* **30:** 28-31.

JEAN, L.G., VON, G.H., ZIZI, F. AND NUNES, J. 1998. Mood states and sleepiness in college students: Influence of age, sex, habitual sleep and substance use. *Perceptual and Motor Skills* **87**: 507–512.

KAORU, I., TOMOKO, M., TOORU, T., TAKAMOTO, U., NOBUO T., HIROTERU, O. AND SHINJI, F. 2008. *Environmental Health Preventive Medicine* **13**(4): 227–233. doi:10.1007/s12199-008-0035-z

LACK, L.C. 1986. Delayed sleep and sleep loss in university students. *Journal of American College Health* **35**: 105–110.

NATIONAL INSTITUTE OF HEALTH, 2012. U.S. Department of Health and Human Service. Why Is Sleep Important? Retrieved from https://www.nhlbi.nih.gov/health/health-topics/topics/sdd/why

NATIONAL SLEEP FOUNDATION, 2016. Key Messages/Talking Points. Retrieved from https://sleepfoundation.org/sites/default/files/Drowsy%20DrivingKey%20Messages%20and%20Talking%20Points.pdf.

PARMAGGIANI, P.L. 1994. The autonomic nervous system in sleep. In: Kryger, M. H., Roth, T. and Dement, W. C., eds. *Principles and Practice of Sleep Medicine*. Philadelphia, Saunders 194–203.

PERI, C. 2013. What Lack of Sleep Does to Your Mind. Web Md. Retrieved from http://www.webmd.com/sleep-disorders/features/emotions-cognitive#3

PHYSIOPEDIA, 2017. Generalized Anxiety Disorder. Retrieved from http://www.physiopedia.com/Generalized_Anxiety_Disorder.

PILCHER, J.J., GINTER, D.R. AND SADOWSKY B. 1997. Sleep quality versus sleep quantity: Relationships between sleep and measures of health, well being and sleepiness in college students. *Journal of Psychosomatic Research* **42**:583–596.

PSYCHLOPEDIA, 2016. sleep debt. Retrived from https://psychlopedia.wikispaces.com/sleep

SORCAR, N.R. AND RAHMAN, A. 1989. Occupational stress and mental health of working women. *UGC report*, Dhaka, 9.

TAUB, J.M. AND BERGER, R.J. 1973. Performance and mood following variations in the length and timing of sleep. *Psychophysiology* **10**: 559–570.

TROCKEL, M.T., BARNES, M.D. AND EGGET, D.L. 2000. Health-related variables and academic performance among first-year college students: Implications for sleep and other behaviors. *Journal of American College Health* **49**: 125-131.

TSUI, Y.Y. AND WING, Y.K. (2009). A Study on the Sleep Patterns and Problems of University Business Students in Hong Kong, *Journal of American College Health* **58**(2): 167-176. DOI:10.1080/07448480903221418

TURK, C.L., HEIMBERG, R.G., ORSILLO, S.M., HOLT, C.S., GITOW, A. AND STREET, L.L. 1998. An investigation of gender differences in social phobia. *Journal of Anxiety Disorders* **12**(3): 209-23.

WORLD HEALTH ORGANIZATION 2014. Mental Health: New Understanding, New Hope. Retrieved from https://en.wikipedia.org/wiki/Mental_health.

Manuscript received on 20.01.2017; Accepted on 14.05.2017

The Chittagong University Journal of Biological Sciences, Vol. 8 (1 & 2). Page No.135-146