Poor Quality of Sleep and its Relationship with Depression in First Year Medical Students.

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Abstract

Introduction: High incidence of depression has been reported in undergraduate medical students. Sleep disturbance has been associated with depressive symptoms and higher body mass index (BMI). This study evaluated the relationship between sleep disturbance measured by Pittsburgh Sleep Quality Index (PSQI) and Epworth sleepiness scale (ESS) with BMI and depression measured by Beck Depression Inventory (BDI) in 1st year medical students. *Method*: Following Institutional Ethics Committee approval, 1st year medical students who volunteered for study and gave written informed consent (n=73) were administered PSQI, ESS & BDI questionnaires after seven months of admission. Height and weight were measured by standard method. Scores of PSQI, BDI and BMI were calculated and their interrelationship was measured statically. *Results*: Poor quality of sleep (PSQI score greater or equal to five) and depression (BDI score eleven or greater) was seen in majority of students (64 and 60 % respectively). BMI was not significantly correlated with PSQI, ESS or BDI scores .There was significant positive correlation between PSQI and BDI (Pearson correlation, r = 0.410, P < 0.001), higher the BDI scores higher the PSQI scores. *Conclusions*: Poor sleep quality and depressive symptoms were observed in majority of 1st year medical students. Sleep quality and depressive symptoms were interrelated. Prevention and treatment strategies should target sleep as a factor that can potentially influence the development and course of Depression leading to poor academic performance. There is an urgent need to address this issue.
Keywords: PSQI, BDI, Medical students, college students, adolescent health, freshman, freshers

1. Introduction

High incidence of depression has been reported in undergraduate medical students. Sleep disturbance has been associated with depressive symptoms and higher body mass index (BMI). Depression and sleep quality have not been adequately studied in Indian medical students. We evaluated the sleep quality and depression scores in medical students as these can have significant implications on their learning and academic performance. This study evaluated the relationship between sleep disturbance measured by Pittsburgh Sleep Quality Index (PSQI) and Epworth sleepiness scale (ESS) with BMI and depression measured by Beck Depression Inventory (BDI) in 1st year medical students in an Indian Medical College.

1.1 Methods

First year medical students of Era's Lucknow Medical College, Lucknow who volunteered for study and gave written informed consent (n=73) were administered PSQI, ESS & BDI questionnaires. Height and weight were measured by standard methods. We performed the study after seven months of their admission to the medical school since if the questionnaire was administered soon after admission or near to the summative examination, other confounding variables would have influenced the sleepiness and depression scores and BMI and the associations established would be questionable. Prior permission of Institutional Ethics Committee was taken. Scores of PSQI, BDI and BMI were calculated and their interrelationship was measured statistically. PSQI which is appropriate for 18-year-old or older individuals is a self-rated questionnaire that assesses sleep quality over a time interval of 1 month. It consists of 19 self-rated questions and 5 other questions which are rated by bed

partner or roommate. We neglected the last 5 questions because the 5 question set is used for clinical information only and is not tabulated in scoring of the PSQI. The 19 self-rated questions evaluate a wide variety of factors related to sleep quality. In PSQI, these are grouped into 7 component scores, all of which are weighted equally on a 0-3 scale. These components are: sleep quality, sleep latency (time from "light off" to falling asleep), habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The 7 component scores are then added to yield a global PSQI score in the range of 0 to 21; the higher the score, the worse the sleep quality. A global score equal or greater than 5 would indicate poor sleep quality in the past month (1, 2). The entire questionnaire requires 5 to 10 minutes to complete and 5 minutes to score. The BDI (3) is composed of 21 questions, the answers being closed and non-refutable. Each question consists of four self-assessment items. A score of 1-10 was considered as normal whereas 11 or greater was considered as depressed.

1.1.1 Results

Descriptive analysis of respondents is given in Table 1. No significant difference between males and females was seen in BDI, PSQI and ESS (P= 0.473, 0.884 and 0.109 respectively). BDI was not correlated significantly with age, weight, height or BMI of the students (P > 0.05). However, significant correlation was found between BDI and PSQI scores (r = 0.458, P < 0.001, Figure 1) and Between BDI and ESS cores (r = 0.245, P = 0.037). Out of 73 students, 64.38 % were found to have poor sleep quality according to PSQI scores. ESS scores of 32.88 % students were in borderline or abnormal range. BDI scores showed that 60.27 % students were depressed.

The different characteristics of students with adequate or poor PQSI are depicted in Table 2. Significantly higher BDI score (p=0.047) where seen in student with poor PQSI. Characteristics of students who were normal or depressed according to BDI scores are shown in Table 3. Significantly higher PSQI (p=0.013) & ESS (p=.048) scores were seen in depressed individuals.

1.1.2 Discussion

In our study, no significant correlation was found between age, weight, height, BMI &sex of students with BDI, PSQI &ESS scores.

Previous studies are also reported that there was no significant gender differences among medical students in sleeping problem &depression(4,5).However some studies reported higher frequency of depressive symptoms in female Estonian medical students (6) &17-year old italian secondry school student(7).

Poor sleep quality &depression were found in majority of first year medical student.Jeong et.al 2010 reported depression in37.1% Korean medical students (8).Similar figure(30.6%) was reported in Estonian medical student. A study in Chinese medical student reported that 19.7% suffer poor sleep quality (5) similar figure(16.5%) for poor sleepers has been reported in17year old Italian secondry school students. The higher incidence of poor sleep quality and depression seen in our study is probably because we study the behaviour of first year medical student only who have difficulty in adjusting in new environment and making strong social ties in the new place. Social ties was the factor most positively related to better health & life satisfaction in first year medical students (9). Factors influencing on the quality of sleep in medical college students would include: worry on examination, stress, poor relationship with classmates and adverse environments of the dormitory (5) which may be common in first year of medical school. First year medical student have shown significant changes in health, habit has they adjust to medical school (10). Another reason may be due to cultural difference as our study has been done on Indian medical student. To the best our knowledge no such study has been in medical student previously. Our study shows positive correlation between PQSI, ESS &BDI scores showing that depressive symptoms and sleep quality are inter-related. Previous studies have also shown similar correlation in medical students. Subjective sleep quality was strongly negative correlated with depression score (11). Young age, poor sleep quality and high degree of depression, anxiety and loneliness were significantly associated with poor self-rated health of adolescents (12). High degree of depression and anxiety were found to be the influencing factors of poor sleep among Chinese mainland adolescents (13). Stress symptoms, such as fatigue,sleeping problems, anxiety, irritability and depression, were common in undergraduate medical students in Finland (4). It was found that some sleep problems indicated underlying symptoms of anxiety and depression in Estonian medical students (6). a long-term prospective study showed that the relative risk of clinical depression was greater in those who reported insomnia in medical school compared with those who did not and greater in those with difficulty sleeping under stress in medical school compared with those who did not report difficulty. There were weaker associations for those who reported poor quality of sleep and sleep duration of 7 hours or less with development of clinical depression (14). In college students sleeping an average of 7 hours a night, average sleep quality was better related to health, affect balance, satisfaction with life, and feelings of tension, depression, anger, fatigue, and confusion than average sleep quantity (15). A significant association was found between chronic poor sleep and emotional factors, such as worries, anxiety and depression in 17-year-old Italian secondary school students (7). First-year Duke University medical students who were very satisfied with life had fewer symptoms of depression and anxiety and more sleep (9).

Delta waves are characteristic of deep stage of non-rapid eye movement sleep which usually occours in 1st few hours and is thought to have a primarily restorative function. Persons with sleep abnormalities and non-restorative sleep have been shown to have reduced delta waves leading to depression (16).

Taking into account that poor sleep quality has major negative long term impact on health, prevention programmes should focus especially on the association between depressive symptoms and subjective sleep quality. We need interventions that help students to cope with stress, to make a smooth transition from school to medical school, and also to adjust to different learning environments during the different phases of medical education. Interventions are all the more necessary since insomnia in young men is indicative of a greater risk for subsequent clinical depression and psychiatric distress that persists for at least 30 years (14). Efforts should be made to encourage social support in order to promote mental health in medical students. Engaging in activities with other people may increase regularity in bedtime and rise time schedules in undergraduates leading to better sleep and better mental health (17). An educational intervention involving written feedback and participation in an educational discussion group demonstrated promising effects in changing patterns of positive health habits, particularly socialization, and sleep and exercise behaviors (7).

Our study is limited by small size and survey of student of only one medical college.We can not elucidate whether poor sleep quality is leading to depression or vice-versa in first year medical students.

We conclude that poor sleep quality &depression are common in first year medical student and urgent intervention is needed to adressed these issues.

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Table 1. Descriptive analysis of respondents

	Mean	Std. Deviation
Age (years)	19.40	1.233
Ht (cm)	164.53	9.859
wt	62.95	14.764
BDI	14.27	10.114
PSQI	6.19	2.837
ESS	8.27	3.735
BMI	23.0788	4.19455
Sex (males/ females)	30/43	

Table 2. Characteristics of respondents classified on basis of PSQI scores
[values are expressed as mean (CI)]

	PSQI		
	Adequate (n=	Poor	P value
Age (yrs)	19.19 (18.71-19.68)	19.51 (19.14-19.88)	0.090
Height (cm)	164.27(160.21-168.32)	164.68(161.78-167.57)	0.868
Weight (Kg)	60.92(55.17-66.67)	64.06(59.64-68.49)	0.381
BMI (Kg/m^2)	22.39(20.83-23.95)	23.45(22.17-24.73)	0.285
BDI	11.35(7.85-14.84)	15.89(12.79-19.0)	0.047*
PSQI	3.46(3.13-3.79)	7.70(7.00-8.40)	0.000*
ESS	6.62(5.28-7.95)	9.19(8.11-10.27)	0.003*
Sex (male/female)	10/16	20/27	0.465

*P < 0.05

Table 3. Characteristics of respondents classified on basis of BDI scores
[values are expressed as mean (CI)]

	BDI		P value
	Normal	Depressed	
Age (yrs)	19.52(19.07-19.97)	19.92(18.93-19.70)	0.497
Height (cm)	164.57(161.19-167.94)	164.51(161.30-167.72)	0.978
Weight (Kg)	60.72(55.05-66.40)	64.41(59.95-68.86)	0.302
BMI (Kg/m^2)	22.19(20.69-23.70)	23.65(22.35-24.96)	0.141
BDI	5.66(4.64-6.67)	19.95(17.18-22.73)	0.000
PSQI	5.10(4.34-5.87)	6.91(5.97-7.85)	0.013
ESS	7.24(5.65-8.83)	8.95(7.96-9.95)	0.048
Sex (male/female)	11/81	19/25	0.421

Table 4 Correlations (r) between PSQI, BDI and various characteristics of respondents.

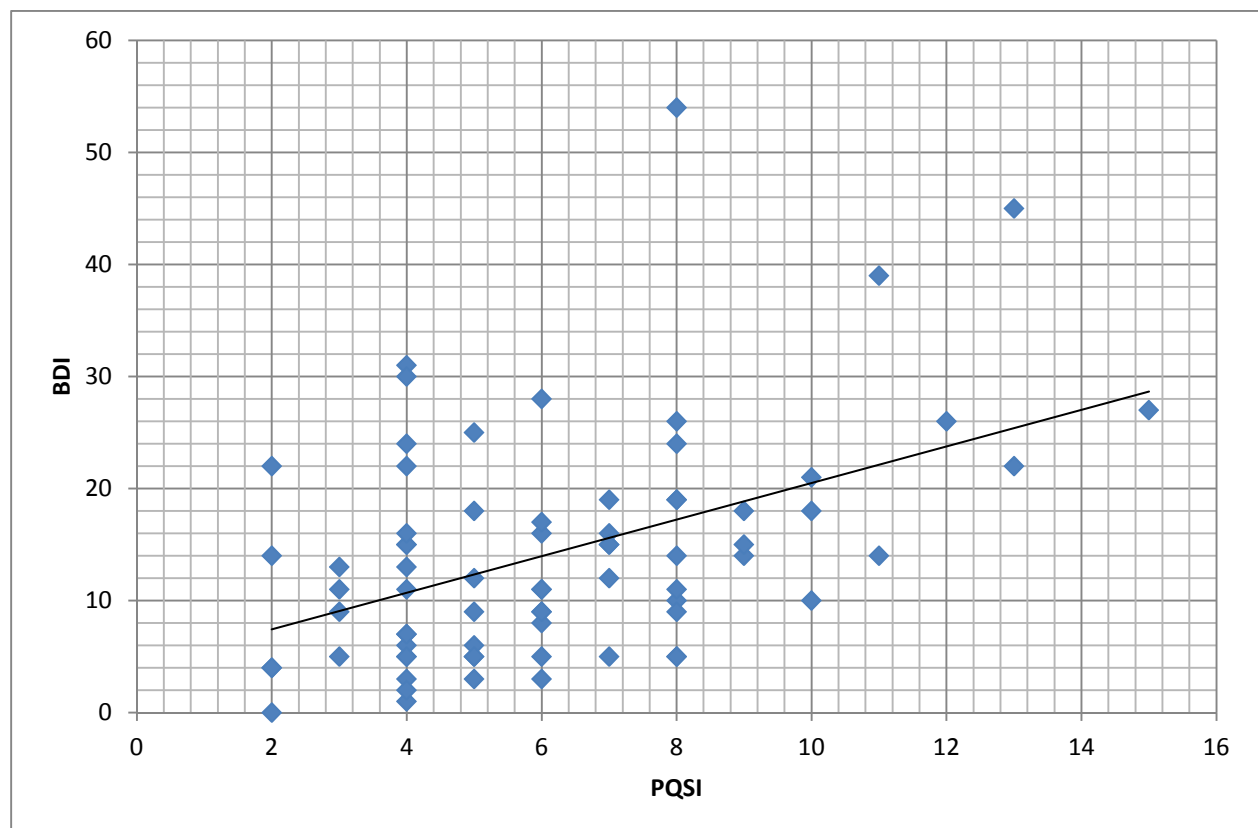|	BDI	PSQI
Age (yrs)	0.023	0.109
Height (cm)	0.055	-0.027
Weight (Kg)	0.142	0.057
BMI (Kg/m^2)	0.169	0.098
BDI	1.000	0.458**
PSQI	0.458**	1.000
ESS	0.245*	0.304**

$*P < 0.05, **P < 0.01$

Figure 1. Correlation between BDI and PSQI scores.