ORIGINAL ARTICLE

Influence of Various Lifestyle and Psychosocial Factors on Sleep Disturbances among the College Students: A Cross-Sectional Study from an Urban Area of India

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Abstract:

Background: Sleep occupies nearly 1/3rd of our life and is essential for overall growth and stability. Sleep deprivation results weakening of physical functions, mental health problems like depression and lowering of productivity, thus resulting in loss to an individual and society. *Aim and Objectives:* Sleep is essential for physical and mental stability. Its deprivation lowers work productivity and results in mental problem like depression. Various lifestyle and psychosocial factors may have impact on the sleep. In the western countries the subject is amply explored; however studies on student from developing countries like India are limited. Our objective was to study the extent of sleep disturbance and associated factors among the graduating college students. *Material and Methods:* It is a cross-sectional study conducted in Arts, Commerce and Science graduating college students from an urban area. The sampling technique was cluster random sampling with the sample size of 890. A pretested, self-administered questionnaire was used as a study tool. Statistical Analysis was done using percentages, chi-square test and bi-variate logistic regression. *Results:* The mean duration of sleep reported by the 900 study subjects was 7.3 hours (std. deviation 1 hour). Any sleep disturbance was reported by 826 (91.8%) subjects; with day time sleepiness (77.5%) and difficulty in falling asleep (65.4%) being the commonest complaint. Sleep disturbance score was associated with exercise, outdoor games and tea / coffee intake. It was also associated with nocturnal use of mobiles and feeling depressed. *Conclusion:* Sleep disturbances were present in majority of college students with day time sleepiness as its commonest manifestation. Various lifestyle and psychosocial factors had impact on the sleep. Proper lifestyle modification and good family environment are important to avoid sleep disturbances among the college students.

Keywords: Sleep Disorders; Lifestyle; Psychosocial factors; Students; India.

Introduction:

Sleep occupies nearly one third of our life and is essential for overall growth and stability. Sleep deprivation results in weakening of physical functions & causing mental health problems like depression and lowering of productivity, thus resulting in loss to an individual and society [1]. For example, it was reported that annual social costs of daytime sleepiness due to various sleep problems were estimated to be $15 billion in the United States [1]. Various studies have identified female gender, lower education level, and low socioeconomic status and life style factors like smoking alcohol etc., as risk factors for sleep disturbances [2]. While considering consequences of sleep disturbances; studies have observed increased risks of accidents, strained relationship and impaired concentration [1, 3]. Similarly higher mortality was observed among people with excess or deficiency of sleep [4]. The adolescent and youth seemed to be more vulnerable. Most of the studies regarding the subject are from western countries, and literature from India is very scare [5]. Hence, this research was planned to study the magnitude of sleep disturbance among college going students as well as to observe various risk factors and health problems associated with it.

Material and Methods:

It is a cross sectional study conducted among graduating students in randomly selected Arts, Commerce and Science College, from Sangli district, Maharashtra, India. Based on observed prevalence in previous such study; calculated sample size was 890 (p=30.2%, α=5%, Z=1.96%, two tailed, d=0.10) [1]. Sampling technique used was cluster random sampling and study period was July to December 2013. All the willing students were included in the study. Study tool was predesigned, pretested self administered questionnaire developed with the help of existing literature and field experts; finalized after pilot study. First section of the study questionnaire had socio-demographic factors like age, sex etc.

The second section was 9 point sleep disturbance scale with maximum allotted score of 31. Based on the score of <= 25%, 25-50% and>50%, study subject were divided as those having mild, moderate and severe disturbances respectively. The scale had good test-retest reliability and internal consistency. The third section was about determinants of sleep disturbances, which were divided in four groups; Group A: socio-demographic, Group B: diet and exercise, Group C: life style factors like use of television, mobile messaging applications (e.g. whatsapp, hike) etc. and Group D: psychosocial factors like communication with parents, enjoy college life etc. This section was finalized after pilot study. The sleep disturbance scale has good internal consistency, Cronbach's alpha 0.72 and split half validity coefficient 0.78. For this purpose pilot study was conducted on B.Sc. nursing students using questionnaire.

After clearance from institutional ethical committee, permission from head of institute was taken. After acquiring informed consent, voluntary participation, adequate privacy and conveying appropriate pre-information; questionnaire was given to the students. Those unwilling to participate or withdrawing before submission were excluded from the study. The completed questionnaire was collected in a drop box.

The analysis was done using Microsoft excel 2007 and SPSS-22. Percentage, Chi-square test and logistic regression were used in final analysis. The data from pilot study as well as incomplete questionnaire were not included.

Results:

Out of the total 900 study subjects, 426 (47.3%) were boys and 474 (52.7%) were girls. The mean age of study subjects was 19.3 years (std. deviation 1.5 years) with the range of 18 to 25 years. Sixty percent of the subjects belonged to joint family. Except two (0.2%) female subjects all the participants were unmarried. While considering addictions, history of smoking and tobacco chewing was reported by 3 (0.3%) and 8 (0.9%) subjects respectively. History of medication for chronic illness was reported by only two (0.2%) subjects; both being suffering with asthma.

The mean duration of sleep reported by subjects was 7.3 hours (std. deviation 1 hour), with a range of 3.3 to 10 hours. Low sleep hours i.e. <7 hrs were reported by 412 (45.8%) subjects, while 450 (50%) reported 7-9 hrs of sleep and 38 (4.2%) subjects reported sleep of ≥ 9 hrs.

Considering the score for sleep disturbances scale; range of score achieved was 0 to 21, with mode 4. Score of zero was achieved by 74 (8.2%) participants.

Eight hundred twenty six (91.8%) subjects reported some sleep disturbances; commonest was day time sleepiness (Table 1). However, only 201 (22.3%) subjects were aware about having any sleep related problem.

Table1: Distribution of Study Subjects According to Sleep Disturbances

Sleep Disturbances	Number of Participants	Percentages
Some sleep disturbance	826	91.80
Daytime sleepiness	698	77.50
Not able to wake up early morning	660	73.30
Difficulty in falling asleep	603	67
Nightmares	513	57
No sound sleep	318	35.30
Not feeling fresh in the morning	260	28.90
Subjective insufficient sleep	85	17
Use of sleeping pills	45	5

Higher percentage of students with sleep duration of 7-9 hours had no sleep disturbances while severe disturbances were common in those with sleep ≥ 9 hours. However the statistical association was not significant.

On considering socio-demographic determinants; stream of education was the only factor significantly associated with sleep disturbances (Table 2). Severe sleep disturbances were common in age group of 20-22 years, male participants and among residents of joint family; however none of the association was statistically significant.

Significantly more number of students who had communication with parents and discussion of problems with parents had low scores (mild disturbances). Similarly, sleep disturbances were significantly more common in students who were feeling depressed no interest in life, not enjoying college life (Table 2).

There was a significant inverse association found between exercise and outdoor games & sleep disturbances. Sleep disturbances were lower in students who exercised regularly or played outdoor games. Students having regular breakfast, milk and non consumption of tea / coffee had significantly lower sleep disturbances (Table 3).

In television and mobile use determinants; duration of television viewing was significantly associated with sleep disturbances. Sleep disturbances were significantly more common in students who had more frequency of mobile phone use for talking, long duration of talking on mobile at night before sleeping and use of mobile messaging apps and internet use (Table 4).

By using binary logistic regression analysis the important determinants related sleep disturbances were; tea / coffee consumption from group B, duration of mobile conversation and use of mobile messaging applications at night from group C and enjoying college life, and discussing problems with parents from group D (Table 5).

Table 2: Association of Socio-Demographic and Psychosocial Determinants with Sleep Disturbances Score

Determinants	Score Groups			Total	Significance
	0-25% Mild N (%)	25-50% Moderate N (%)	≥50% Severe N (%)		
Stream of education*					
Arts	230 (67.65)	93 (27.35)	17 (5.00)	340(100)	χ^2=27.504, P<0.001
Science	321(73.46)	107(24.49)	9(2.06)	437(100)	
Commerce	65(52.85)	56(45.53)	2(1.63)	123(100)	
Communication with Parents*					
Yes	557(70.42)	210(26.55)	24(3.03)	791(100)	χ^2=12.865 P=0.002
No	54(53.47)	44(43.56)	3(2.97)	101(100)	
Problem Discussion with Parents*					
Yes	547(71.88)	196(25.76)	18(2.37)	761(100)	χ^2=30.359, P<0.001
No	63(48.46)	58(44.62)	9(6.92)	130(100)	
Enjoying College Life*					
Yes	578(69.47)	233(28.00)	21(2.52)	832(100)	χ^2=13.608 P<0.001
No	32(54.24)	21(35.59)	6(10.17)	59(100)	
No Interest in life*					
Always	15(51.72)	11(37.93)	3(10.34)	29(100)	χ^2=53.863, P<0.001
Sometimes	222(57.22)	150(38.66)	16(4.12)	388(100)	
Never	373(78.86)	92(19.45)	8(1.69)	473(100)	
Depressed Feeling*					
Always	17 (41.5)	20 (48.8)	4 (9.8)	41 (100)	χ^2=55.397, P<0.001
Sometimes	388 (63.8)	198(32.6)	22(3.6)	608(100)	
Never	211(85.1)	36(14.5)	1(0.4)	248 (100)	
Total	**616(68.44)**	**256(28.44)**	**28(3.11)**	**900(100)**	

Table 3: Association of Exercise and Diet Determinants with Sleep Score

Determinants	Score Groups			Total N (%)	Significance
	0-25% N (%)	25-50% N (%)	≥50% N (%)		
Exercise*					
Regularly	262(73.60)	85(23.88)	9(2.53)	356(100)	χ^2=11.682 P=0.02
Sometimes	286(66.05)	136(31.41)	11(2.54)	433(100)	
Never	65(63.11)	31(30.10)	7(6.80)	103(100)	
Outdoor Games*					
Play Regularly	125(75.30)	31(18.67)	10(6.02)	166(100)	χ^2=28.585 P<0.001
Sometimes	421(69.70)	173(28.64)	10(1.66)	604(100)	
Never	65(53.72)	49(40.50)	7(5.79)	121(100)	
Breakfast*					
Daily	317(77.51)	85(20.78)	7(1.71)	409(100)	χ^2=35.302 P<0.001
Sometimes	248(60.19)	149(36.17)	15(3.64)	412(100)	
Never	46(62.16)	22(29.73)	6(8.11)	74(100)	
Milk Consumption*					
Daily	191(75.20)	52(20.47)	11(4.33)	254(100)	χ^2=15.346 P=0.004
Sometimes	215(64.18)	114(34.03)	6(1.79)	335(100)	
Never	206(67.10)	90(29.32)	11(3.58)	307(100)	
Tea*					
No tea	197(77.25)	51(20.00)	7(2.75)	255(100)	χ^2=30.174 P<0.001
1-2 cups	293(68.78)	128(30.05)	5(1.17)	426(100)	
3 and more cups	47(58.02)	26(32.10)	8(9.88)	81(100)	
Total	**616(68.44)**	**256(28.44)**	**28(3.11)**	**900(100)**	

**Cases missing*

Table 4: Association of Television and Mobile Use Determinants with Sleep Score

Determinants	Score Groups			Total N (%)	Significance
	0-25% N (%)	25-50% N (%)	≥50% N (%)		
TV watching*					
Upto 1hr	229(68.98)	95(28.61)	8(2.41)	332(100)	χ^2=12.520 P=0.014
1-2 hr	250(73.10)	85(24.85)	7(2.05)	342(100)	
>2hrs	136 (60.71)	76 (33.93)	12 (5.36)	224 (100)	
Talking on Mobile*					
Upto 1 hour	540(70.96)	206(27.07)	15 (1.97)	761(100)	χ^2=32.313 P<0.001
1-2 hour	39 (53.42)	27 (36.99)	7 (9.59)	73 (100)	
>2hours	21 (51.22)	15 (36.59)	5 (12.20)	41 (100)	
Mobile messaging applications*					
Yes	54 (60.00)	26 (28.89)	10 (11.11)	90 (100)	χ^2=22.490 P<0.001
No	554 (69.51)	226 (28.36)	17 (2.13)	797 (100)	
Internet Use*					
Upto 1hr	565 (69.58)	226 (27.83)	21 (2.59)	812 (100)	χ^2=12.228 P=0.016
1-2hr	44 (63.77)	20 (28.99)	5 (7.25)	69 (100)	
>2hr	6 (37.50)	9 (56.25)	1 (6.25)	16 (100)	
Total	**616(68.44)**	**256(28.44)**	**28(3.11)**	**900(100)**	

**Cases missing*

Table 5: Binary Logistic Regression Analysis if Sleep Disturbances with Various Determinants

Determinants	B	S.E.	Wald	df	P	OR	95% C.I. of OR	
							Lower	Upper
Group B: Diet and exercise model								
Exercise	-0.611	0.519	1.386	1	0.239	0.543	0.196	1.501
Outdoor Games	-0.552	0.492	1.261	1	0.262	0.576	0.22	1.509
Tea consumption	-0.981	0.444	4.878	1	0.027	0.375	0.157	0.896
Milk consumption	-0.166	0.412	0.163	1	0.686	0.847	0.378	1.898
Regularity of food timings	0.546	0.403	1.839	1	0.175	1.727	0.784	3.803
Constant	-2.348	0.9	6.8	1	0.009	0.096		
Group C: Lifestyle factors model								
Duration of Mobile conversation at night	0.476	0.163	8.496	1	0.004	1.61	1.169	2.218
Mobile use for internet at night	-0.788	0.52	2.293	1	0.13	0.455	0.164	1.261
Mobile messaging application at night	1.659	0.521	10.134	1	0.001	5.256	1.892	14.6
Constant	-3.939	0.334	139.37	1	0	0.019		
Group D: Psycho-social factors model								
Enjoying college life	1.09	0.508	4.601	1	0.032	2.976	1.099	8.06
No interest in life	0.424	0.439	0.934	1	0.334	1.529	0.646	3.616
Feeling sad	1.416	0.767	3.402	1	0.065	4.119	0.915	18.536
Communication with parents	0.882	0.639	1.907	1	0.167	2.416	0.691	8.451
Discussing problems with parents	1.192	0.495	5.794	1	0.016	3.294	1.248	8.697
Constant	-8.356	1.304	41.068	1	0	0		

B: coefficient of regression, SE: Standard Error of Mean, Wald: Wald statistics, df: degree of freedom, sig: significance.

Discussion:

In the current study, the mean duration of sleep reported by subjects was 7.3 hours, with more than 45% participants reporting inadequate sleep. Ban *et al* (2000) observed that the mean sleep duration of the Korean University students was 6.7 hours [1]. While Ohida *et al* (2004) observed that more than 65% Japanese students had < 7 hours of sleep [1]. Chen *et al*, less than recommended duration of sleep in 54% Taiwanese adolescents [6]. Hence, we have observed higher mean duration of sleep and fewer of participants with inadequate sleep as compared to other such studies.

More than 90% participants in the current study had some sleep disturbances; daytime sleepiness was the commonest disturbance reported by 77.5%, difficulty in falling asleep by 67%, subjective insufficient sleep by 17% and the use of sleeping pills by 5% while, Ohida *et al* (2004) reported excessive daytime sleepiness and subjective insufficient sleep in less than 40% Japanese adolescents. Similarly difficulty in initiation of sleep was reported by less than 16% adolescents [7]. Hence overall sleep disturbances observed by us were higher than observations of Ohida *et al*. But the age group of in the study of Ohida *et al* was adolescents, while age group in our study was higher (18-25 years). Hence the difference in social life as well as use media may be the reason for observed difference.

Morin *et al* (2006), conducted similar study in adults from Canada; they observed that 48% and11% study participants had reported daytime fatigue and prescription of sleep medication in a year respectively [8]. Hence in our study even though day time sleepiness was more, use of sleep medication was lower. The difference could be attributed to geo-cultural differences as well as difference in age of the study population.

Female preponderance in sleep disturbances was observed among Korean University students by Ban *et al*, Japanese school going students by Ohida *et al*, Japanese general population by Ohida *et al*, adults from United States and in Hong Kong Chinese population by Li *et al* [1, 4, 9, 10]. Su TP *et al* have however observed reverse trend among elderly population from Taiwan [11]. In the current study, higher percentages of male participants were affected by sleep disturbances but the difference was not statistically significant.

We have observed that, exercise, outdoor games, consumption of milk and avoiding tea/coffee helped in better sleep. Participants with lower sleep disturbances were having regular breakfast. Observations of Ohida *et al*, in Japanese adolescents regarding breakfast and tea/coffee were similar to this study [1]. Ban *et al* also observed the negative effect of coffee consumption in a similar study in Korea. Similar findings are noted in an Indian study by Giri *et al* conducted on medical students [12]. Similar effects of tea /coffee and exercise were noted by Heath *et al*, in adult twin from Australia [2]. Beneficial effects of exercise were appreciated by Urponen *et al*, Chen *et al*, Reid *et al* and Singh *et al* [6, 13-15]. Participants who had regular breakfast or exercise must be having overall healthy lifestyle that is why sleep disturbances are less common in them.

In the current study, we observed communication with parents and discussion of problems with parents was significantly associated with the mild sleep disturbance score while feeling depressed no interest in life and enjoying college life as psychosocial determinants associated with severe sleep disturbance score. Similar observations were made by Ohida *et al* [1]. Enjoying college life or feeling disinterested in life/depressed

indicates the current mental health status; the positive relationship of mental health to sleep has been recorded [16]. Deborah *et al* found highly significant association of insomnia with life stress in Canadians [3]. While talking with parents' and discussing problems with parents may help in relieving stress and anxiety which in turn reduces sleep disturbances.

On considering use of media we observed that, excessive use television was associated in poor sleep. Similarly, over use of mobile phones for talking, messaging and internet was an important determinant of sleep disturbances. Van den Bulck J (2004), on investigating effect of media on sleep among school going Belgian adolescents concluded that, television, computer and internet all had effect on sleep [17]. He concluded that the unstructured leisure activities i.e. use of internet, not being time bound or having clear end point lead to decreased actual time spend in the bed; while structured leisure activities like sports did not hamper sleep pattern.

Cain *et al* reviewed thirty six articles that investigated the relationship between sleep and electronic media in school-aged children and adolescents; and observed that use of media was consistently associated with delayed bedtime and reduced sleep hours. They hypothesized that use of media may displace sleep or it may result in increased mental or emotional or physiological arousal or the exposure to bright light from television, computer etc. delay the circadian rhythm [18]. Owens *et al* concluded that presence of a television set in the child's bedroom may be an important contributor to sleep problems [19]. With the boom of smart phones, the problem has become acute. These phones are used for talking, messaging, internet use, watching / listening, reading, and social media etc.; resulting in addiction. A meta-analysis by Davey *et al* has raised concern about this addiction among Indian adolescents [20]. This may further escalate problem of sleep disturbances. Panda S *et al* have concluded in their study on healthy adult relatives of patients attending hospital that, SRDs are widely prevalent in India & considering the health implications and poor awareness, there is a need to sensitize physicians and increase awareness among the public [21].

Conclusion:

Sleep disturbances are common in college students. Daytime sleepiness, difficulty in waking up early was some of the common problems; which indicated inadequate sleep. These problems were associated with disturbed mental status, excessive consumption of tea/coffee, television and nocturnal use of mobiles. While good communication with parents, exercise and proper diet were associated with good sleep. Hence adolescents should be periodically educated about importance of good sleep and factors associated with it. They should be encouraged to decrease the use media especially during night, uptake of proper diet and exercise. Similarly, parents should be educated and encouraged to identify symptoms mental health problems in their children and develop a healthy communication to avoid or decrease such problems.

Limitations:

Study being conducted in college, results cannot be generalized to the community. Due to self administered study tool, there are chances of reporting bias; probably under reporting of addictions, sleep disturbances and other such situations. Actual psychological analysis is not conducted and the available questions are based on self perception. Confounders like obesity, recent or past important life events etc. are not considered.

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