Sleep quality and its association with perceived stress and junk food consumption among undergraduate medical students in Pokhara

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ABSTRACT

Introduction: Poor sleep quality has proven to impact students' academic performance, interpersonal skills, and learning capacity and health. The objective of this study was to assess the quality of sleep and its association with perceived stress and junk food consumption among MBBS students studying at a Medical College, Pokhara. **Methods:** A cross-sectional study was conducted among 240 MBBS students studying at Gandaki Medical College using a self-administered questionnaire from November to December, 2023. The Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality which includes seven sleep items, with higher scores indicating lower quality and a cumulative score of less than five indicating good sleep quality. The study used both descriptive and inferential statistics. Multivariate logistic regression was computed to examine the association of perceived stress and junk food consumption with sleep quality at the 5% level of significance. **Results:** Out of total 240 respondents, 68.3% had poor sleep quality, 64.2% slept for six or less than six hours in the past one month. After adjusting with socio-demographic characteristics, students who reported that they consumed junk food more than three times in last week were 3.68 (AOR 3.68, CI 95%, 1.34-10.09) times more likely to have poor sleep quality as compared to those who consumed two or less times a week. Students who perceived moderate level stress had 2.49 (AOR 2.491, CI 95%, 1.19-5.23) times and who perceived high level of stress had 20.13 (AOR 20.13, CI 95%, 4.66-86.98) times likelihood of having poor sleep quality as compared to who perceived mild level of stress. **Conclusions:** The study revealed poor sleep quality; and sleep quality was significantly influenced by junk food intake and stress levels among undergraduate medical students.

Keywords: Junk food, medical College, perceived stress, sleep quality, students.

INTRODUCTION

In order to maintain general health and well-being, sleep is a basic human need that is influenced by a variety of environmental, mental, and physical factors.[1] Sleep is essential for the brain's optimal operation, which enhances learning and facilitates the assimilation of new ideas.[2] A person's contentment with their sleep experience is reflected in their quality of sleep, which incorporates elements of sleep initiation, maintenance, amount, and reliability upon awakening.[3] According to epidemiological data, sleep quality and duration are linked to early death and a number of adverse health effects, including migraines, obesity, immune system suppression, cardiovascular illnesses, and other conditions.[4,5] University students, particularly those transiting from adolescence to adulthood, are a high-risk population for sleep issues. This vulnerability may stem from lifestyle changes, such as increased independence, new relationships, academic responsibilities, and greater access to alcohol and other substances. Additionally, the significant demands on their time for academic pursuits contribute to poor sleep quality.[6,7]

In addition, they have to deal with the issue of poor sleep quality since there is a significant demand on their time for academics.[8] The rigorous educational and professional demands placed on medical students make them vulnerable to stress.[9] Many students' poor sleeping habits have an impact on their academic performance, something that they are often unaware of it.[10] According to the previous study, 44.2% of medical students experienced poor sleep quality.[11] A study of non-medical students also revealed a comparable outcome, i.e. 35.4%.[12] Lack of sleep increases the risk of substance abuse in adolescents and can cause depression and suicidal tendencies.[13] There is limited data indicating that medical students in Nepal suffer from poor sleep quality, despite having extended hospital postings, insufficient vacation time, demanding academic schedules, and hard lives. A previous study shows that sleep quality is greatly influenced by lifestyle factors, followed by mental health factors, social factors and physical factors.[14] A study conducted among university student also stated that eating habits was significantly associated with sleep quality.[15] Sleep quality was significantly associated with stress in a study conducted among medical students.[16] Previous study has reported a higher proportion, i.e. 55% undergraduate medical students were stressed in Nepal.[17] Therefore, this is essential to generate evidence about the association among medical students in Nepal. Thus, this study aimed to assess the quality of sleep and its association with perceived stress and junk food consumption among MBBS students studying at a Medical College, Pokhara.

METHODS

A cross-sectional study was conducted among undergraduate students pursuing MBBS in Gandaki Medical College who were studying in first to fifth years. This study was conducted as a part of the study "Lifestyle related behavior and stress among undergraduate students of Medical College", which was conducted from November to December 2023. The sample size for the study was performed by using the finite population formula. The prevalence of sleep quality among medical students (p) was taken to be 50% to make sample size maximum. The absolute allowable error was set at 5%; and finite population was 500 students based on 100 student enrolment each at the Medical College.[18] The final sample size was 240. From each batch, 48 students were selected using sample random sampling i.e. the lottery method. Only selected students were identified and placed in the confidential place to be informed about the survey. A self-administered questionnaire was given to the respondent. Orientation about the questionnaire was done for 10 minutes. Then, data was collected through self-administered questionnaire method. Total time taken by students to fill the questionnaire was 20 minutes.

Independent variable of the study population were age, sex of the respondent, type of family, current living status, study year, status of junk food consumption, and perceived stress level. The dependent variable was sleep quality. Pittsburgh Sleep Quality Index (PSQI) is a 19-item self-report tool that assesses seven areas of sleep during the previous month: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The term "sleep onset latency" describes the amount of time needed to fall asleep. The measurement of daytime dysfunction involves evaluating issues related to excessive sleepiness that prevent one from driving, eating, or participating in social activities. PSQI consists of 19 items and produces a score of 0 (no difficulty) to 3 (severe difficulty) on these seven domains. The overall PSQI score was determined by adding the scores for each domain. The PSQI total score varied from 0 to 21, with higher values denoting lower sleep quality. Each item was graded on a three-point scale. A cumulative PSQI score of less than five, according to the PSQI, denotes good sleep quality.[19]

Statistical package on social science (SPSS) version 21.0 was applied for data entry, cleaning, and analysis. All inferential analyses were conducted at a 5% level of significance. A multivariate logistic regression test was applied to find out the role of different independent variables on sleep quality. Adjusted odds ratios (AORs) with corresponding 95% confidence intervals (CI) were computed and presented. Ethical approval (Ref. No. 07/080/081) was obtained from the Gandaki Medical College Ethical Review Committee. The respondents provided written informed consent. Respondents received comprehensive explanations of the study's goals, and responses autonomy and confidentiality were guaranteed.

RESULTS

Table 1 shows the characteristics of the study population. Of the total participants, 139(57.9%) were male, 149(62.1%) were aged above 20 years, and 162(67.5%) had nuclear family. Around 201(83.8%) participants lived without a family member either at a hostel or on rent. Similarly, 144(60%) respondents were from the clinical year; studying from the third to the fifth year. Most of the respondents, 218(90.8%) of the respondents reported that they consumed junk food more than three times in the last week. Regarding the perceived stress, 35(14.6%) of respondents reported they had a high level of stress.

Table 1: Socio-demographic characteristics of study respondents (N=240)

Characteristics		Frequency	Percentage (%)
Sex of the respondents	Male	139	57.9
	Female	101	42.1
Age of the respondents (in years)	Mean age	21.46	
	18-20	91	37.9
	>20	149	62.1
Type of family	Nuclear	162	67.5
	Joint/Extended	78	32.5
Current living status	With family	39	16.3
	Without family	201	83.8
Study year	Preclinical (1st and 2nd year)	96	40.0
	Clinical (3rd to 5th year)	144	60.0
Junk food consumption (energy dense/noodle/packed)	2 or less	22	9.2
	3 or more	218	90.8
Perceived stress	Mild	50	20.8
	Moderate	155	64.6
	High	35	14.6

Among the study respondents, 164(68.3%) had poor sleep quality. Regarding sleep latency, about 59(24.6%) participants had sleep latency of more than 30 minutes. Only 55(22.9%) had reported having good subjective sleep quality. About 154(64.2%) slept for six or less than six hours in the past one month. The majority 226(94.2%) reported that they did not use sleep medication in the past one month. (Table 2)

Table 2: Sleep quality and sleep patterns of study respondents (N=240)

Characteristics		Frequency	Percentage
Overall sleep quality	Mean PSQI (±SD)	6.57±1.98	
Sleep quality	Poor	164	68.3
	Good	76	31.7
Subjective sleep quality	Very good	55	22.9
	Fairly good	146	60.8
	Fairly bad/ Very bad	39	16.3
Sleep latency	≤ 15 minute	7	2.9
	1-30 Minute	174	72.5
	31-60 minute/>60 minute	59	24.6
Sleep duration (in hour)	Insufficient (6 or less)	154	64.2
	Sufficient (7-8)	86	35.8
Sleep efficiency	>85%	212	88.3
	75-84%	28	9.6
	65-74%	4	1.7
	<65%	1	0.4
Sleep disturbance	Not during the past month	10	4.2
	Less than once a week	158	65.8
	Once or twice a week/ Thrice or more than a week	72	30.0
Use of sleep medication	Not during the past month	226	94.2
	Less than once a week	11	4.6
	Once or twice a week/ Thrice or more than a week	3	1.2
Day time dysfunction	Not during the past month	14	5.8
	Less than once a week	51	21.3
	Once or twice a week	96	40.0
	Thrice or more than a week	79	32.9

Multivariate logistic was applied to find out the effect of sociodemographic and exploratory factors on sleep quality. Most of the socio-demographic characteristics except age were not statistically significant with sleep quality. Respondents who reported that they consumed junk food more than three times in last week were 3.68 (AOR 3.683, CI 95% [1.34-10.09]) times more likely have poor sleep quality as compared to respondents who consumed two or less than two times. Respondents who perceived moderate level stress had 2.49 (AOR 2.491, CI 95% [1.19-5.23]) times, and respondents who perceived high levels of stress had 20.13 (AOR 20.139, CI 95% [4.66-86.98]) times more likely to have poor sleep quality as compared to those who perceived mild levels of stress. (Table 3)

Table 3: Logistic regression analysis of sleep quality with perceived stress and junk food consumption adjusting with socio-demographic and other characteristics

Characteristics		Sleep quality Good (%)	Sleep quality Poor (%)	Crude OR	P-value	Adjusted OR	p-value
Sex of the respondent	Male	40 (28.8)	99 (71.2)	1		1	
	Female	36 (35.6)	65 (64.4)	0.730 (0.42-1.26)	0.260	0.79 (0.44-1.45)	0.458
Age of the respondent	18-20	39 (42.9)	52 (57.1)	1		1	
	>20	37 (24.8)	112 (75.2)	2.270 (1.30-3.96)	0.004	3.25 (1.38-7.67)	0.007*
Current living status	With family	16 (41.0)	23 (59.0)	1		1	
	Without family	60 (29.9)	141 (70.1)	1.64 (0.81-3.31)	0.172	1.59 (0.73-3.48)	0.247
Study year	Preclinical	37 (38.5)	59 (61.5)	1		1	
	Clinical	39 (27.1)	105 (72.9)	1.69 (0.97-2.93)	0.063	1.189 (0.52-2.73)	0.683
Junk food consumption on each week	2 or less	13 (59.1)	9 (40.9)	1		1	
	3 or more	63 (28.9)	155 (71.1)	3.55 (1.45-8.73)	0.006	3.683 (1.34-10.09)	0.011*
Perceived stress	Mild	23 (46.0)	27 (54.0)	1		1	
	Moderate	50 (32.3)	105 (67.7)	1.79 (0.93-3.43)	0.080	2.491 (1.19-5.23)	0.016*
	High	3 (8.60)	32 (91.4)	9.09 (2.46-33.59)	0.001	20.139 (4.66-86.98)	<0.001*

Note: 1= Reference; * denotes statistical significance

DISCUSSION

The study found the prevalence of poor quality among undergraduate medical students (68.3%), which was higher than the study reported among undergraduate non-medical students of Chitwan and Kathmandu 35.4%.[12] The longer period of medical education (5.5 years) compared to other undergraduate courses in Nepal may be the reason for the increased frequency of poor sleep quality among medical students. Compared to students in other fields, medical students experience higher levels of academic stress and

have less free time.[20] Comparing the study conducted in India, it revealed a high prevalence i.e. 32.5%.[21] The result of the present study showed low prevalence as compared to a study conducted in Saudi Arabia (74.2%).[22] Variations in sample methodology, medical school year, and social environment exposure may be the causes of the variation throughout the nations.

According to the study, odds of poor quality sleep was 0.79 among female students as compared to male students. Among students at the university, there has been disagreement over the link between gender and sleep issues. According to data from Saudi Arabia[22] male students experienced a greater rate of sleep issues than female students, whereas results from India[23] indicated that female students were more likely than male students to have sleep issues. The results of subgroup studies indicated some variations between nations, indicating that cultural values, regional circumstances, and surroundings influence sleep habits and perspectives.[24] Those above the age of 20 in this research had three times higher odds of having poor sleep quality than those under the age of 20. A similar finding was reported by the study conducted among university students in Brazil.[25]

Living with family was not statistically associated with sleep quality in the study. In contrast to the study, a study conducted among Brazilian university students found significant association. According to the study, students who live alone or with family members other than their parents are more likely to have trouble sleeping than students who live with friends, their parents, or a partner.[25] It is not unexpected that many single young people endure severe health issues and sleep deprivation upon entering college due to their new found independence. In comparison to preclinical students, clinical students were found to be 1.18 times more likely to have poor sleep quality. As they go from the pre-clinical to the clinical year, they face additional pressure from their increasing workload and academic schedule.[26] Numerous lectures, the challenge of managing the pressure to study, the hospital clinical rotations, and the lack of academic breaks might all be contributing factors.[27]

Respondents who reported consuming junk food more than three times over the previous week were shown to have three times higher odds of experiencing poor sleep quality than those who reported consuming two or less servings during the same period. The result was consistent with different studies that have shown that consumption of ultra-processed food has been associated with worse quality and short sleep in adolescents and young adults.[21] Respondents who consumed junk food slept in worse quality. However,

the results imply that there could be significant ways in which diet influences the quality of sleep.[28, 29] In comparison to those who reported mild levels of stress, those who experienced moderate levels of stress had a 2.49-fold more chance of experiencing poor sleep quality, and those who perceived high levels of stress had a 20.13-fold higher likelihood, a finding that was consistent with the previous study.[30] Perceived stress and junk food consumption have a role in sleep quality, irrespective of socio-demographic characteristics. For the improvement of sleep quality, stress factors and junk food habits should be improved.

Establishing causality is not possible because the study is cross-sectional. Since medical students participated in the study, it might not be generalizable to other fields. Wide range of CI has been observed in association with perceived stress, therefore the result should be interpreted cautiously.

CONCLUSIONS

This study found that among undergraduate medical students, poor sleep quality was highly prevalent. The respondents' age, their junk food intake, and their reported stress levels were all shown to be statistically significant. These results may provide guidance to instructors at medical schools about the implementation of early sleep hygiene programs.

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