

Sleep habits and physical activity in health science students – a cross-sectional study

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ABSTRACT

Background: Adequate sleep and physical activity are important for health, yet college students often face challenges in both. This study aims to determine the sleep habit and physical activity patterns among undergraduate health science students at Jumla, and to examine the relationship between these variables.

Data & Methods: A descriptive cross-sectional study was conducted involving 127 health science students (47 males) of Karnali Academy of Health Sciences, Jumla. Data were collected using a self-administered semi-structured questionnaire to assess sleep habits and physical activity. Descriptive statistics, chi-square test and Pearson correlation were used for data analysis.

Results: The study found that 15.75% of students had sleep durations of <7 hours, and 20.47% experienced sleep latency of ≥30 minutes. The mean sleep score was 3.15 ± 2.39 , and mean MET value was 895.02 ± 791.36 MET-min/week. Significant gender differences were observed in sleep quality (median sleep score in females 4 (IQR 2-5) vs males 2 (IQR 0-3), $p < 0.001$) and physical activity (median MET value in females 504.75 (IQR 260 – 893) vs males 1236 (IQR 706.5 – 1742), $p < 0.001$). There were significant associations between total MET values and sleep duration ($r = 0.193$, $p = 0.03$) and between sleep latency and sleep score ($r = 0.327$, $p < 0.001$). However, no significant associations were found between sleep quality and physical activity.

Conclusions: The physical activity and sleep quality was average in the health science students of Karnanali Academy, but was significantly lower in females than males. Interventions to improve both sleep quality and physical activity among health science students, especially to females might be beneficial.

Keywords: Exercise; Physical activity; Sleep; Student; Undergraduate

INTRODUCTION

Physical activity and sleep are important aspects of healthy lifestyle. National Sleep Foundation recommends a consistent 7-9 hours of sleep per night.¹ Insufficient sleep is linked to multiple physical and mental diseases.² Around 22% US citizens experience insomnia every night.³ Young college students are vulnerable to sleep disturbances due to academic responsibilities, hectic schedules and exams.^{4,5,6}

Physical activity plays a vital role in improving physiological and psychological functions of the human body.⁷ Apart from physical benefits, it also boosts brain serotonin levels, enhances immunity, improves psychological state and sleep.^{8,9} WHO recommends 150-300 minutes of moderate-intensity, or 75-minutes of vigorous-intensity activity per week for health benefits.¹⁰ However, nearly one-third of the global adult population, particularly college students falls short of this recommendation.^{11,12}

As future health workers, health-science students have high responsibility to maintain healthy lifestyle themselves. There is also paucity in the research about the healthy lifestyle in young adults and health-science students, especially in remote places like Jumla. Hence this study aims to determine the sleep habit and physical activity in the health science students of Karnali Academy of Health Sciences, Jumla.

DATA AND METHODS

This was a descriptive cross-sectional study conducted among health science students at Karnali Academy of Health Sciences (KAHS) in Jumla, Nepal, from October to November 2022. Ethical approval for the study was obtained from the Institutional Review Committee of KAHS

(Ref. No. 079/080/23, 21 Sept 2022). Each student was explained about the process and purpose of the study verbally as well as in writing and written informed consent was obtained from all students, ensuring their privacy and confidentiality.

All consenting undergraduate-level health-science students of different programs in the institute were included in the study using enumerative sampling method. Those unwilling to participate were excluded from study. Students were approached in person and were asked to fill the self-administered semi-structured questionnaire on paper. Incompletely filled data were followed-up for completion, and the incomplete data even after following up were rejected.

The questionnaire was developed by robust literature review and expert opinion. It consisted of 3 parts: (a) general demography – participants' age, gender, stream, year of study, and address; (b) sleep habits; (c) Physical activity. The sleep habits of the participants over the past two weeks were assessed using a modified version of the Pittsburgh Sleep Quality Index (PSQI).¹³ The questionnaire consisted of usual sleep time and duration; and sleep problems with seven items, each rated on a 3-point Likert scale: never (score 0), occasionally (score 1), and frequently (score 2). The total score ranged from 0 to 14. The questionnaire was pretested on 20 students from a similar setting who were not included in the final survey. The tool demonstrated good internal consistency, with a Cronbach's alpha of 0.88.

Physical activity level was measured using the short version of the International Physical Activity Questionnaire (IPAQ),¹⁴ which provided data over past two weeks on the amount of activity and metabolic equivalent of task (MET)

values per week across three levels of activity – vigorous, moderate and walking. Vigorous exercise includes strenuous activities such as heavy weightlifting, digging, aerobics, karate, heavy outdoor sports etc. Moderate exercises are jogging, light weightlifting, regular bicycling, light sports like table tennis, casual dance etc. Walking includes regular walking for at least 10 minutes at a time. The following formulae were used to calculate the weekly MET values:

- MET for vigorous activity: minutes of vigorous activity per day × number of days per week × 8
- MET for moderate activity: minutes of moderate activity per day × number of days per week × 4
- MET for walking: minutes of walking per day × number of days per week × 3.3

Total MET value for each student were counted by adding up the MET by different activities in a week. Physical activity level was classified as inactive, minimally active and health-enhancing physical activity (HEPA) according to IPAQ protocol.¹⁴

Data were analyzed using GNU PSPP software version 1.4.1. Descriptive statistical analysis such as frequency, percentage, mean and standard deviation were computed for quantitative variables. Chi-square test was used to determine the association of sleep quality and IPAQ category. Pearson correlation was applied to correlate between different quantitative parameters. A p-value less than 0.05 was considered statistically significant.

RESULTS

The undergraduate students of different programs participated in this study, the number is as follows: MBBS program (50 out of total 50 students), nursing (28/36), midwifery (24/30), pharmacy (17/30), and public health (8/8). Thus out of 154, total 127 students participated in the study (response rate 82.5%), of which 47 (37%) were males. Their mean age (±SD) was 22.25 (±2.99) years, range 18 to 30 years. Students belonged to wide variety of location, from Dhanukutta in east to Darchula in west; but Jumla was the most common address (10 students).

Sleep

The median sleep time for the students was 10 pm and wake up time was 6:00 am; seven and half hours was their median total sleep duration. Twenty students (15.75%) got sleep for less than 7 hours. None had sleep duration more than 9 hours. Twenty-six (20.47%) students had the sleep latency 30 minute or more (maximum latency was 2 hours). Thirty students (23.62%) experienced waking up more than once overnight (Table 1). None of these parameters were significantly different among boys and girls ($p>0.05$).

The sleep disturbances were assessed by 7-item questionnaire, each had response in 3-point Likert scale (never, occasionally, frequently; Table 1). Among the sleep disorders, majority of participants had never or occasional sleep problems. The early morning waking was the most common sleep disturbance (32 students, 25.2% experiencing frequently) followed by difficulty in returning to sleep after waking up at night (12, 9.45% experiencing frequently). The mean sleep score was 3.15 ± 2.39 (range 0 to 9) and median was 3 (IQR 1 to 4). Comparison of sleep scores in gender shows that sleep score was significantly higher in females [median 4 (IQR(2-5))] than males [median 2 (IQR (0-3); Mann-Whitney U = 1068.5, $p<0.001$, Wilcoxon Rank-sum test], indicating poorer sleep quality in females than males.

Physical Activity

Physical activity level was assessed by IPAQ questionnaire where the students reported the amount and weekly frequency of different level of physical activity. MET values were calculated for different activities as per the protocol. Total MET value for each student were counted by adding up the MET by different activities, per week. Based on the self-reported form, most of the students did not engage in heavy exercise. The mean of total MET value over a week period was 895.02 ± 791.36 MET-min/week; more than half of which was contributed by walking (58.5% of total MET). Total MET value was also significantly higher in males (median 1236, IQR 706.5 – 1742) than females (median 504.75, IQR 260 – 893) (Mann-Whitney U=1022, $p<0.001$; Wilcoxon Rank-sum test). Physical activity level was classified ac-

Table 1. Sleep parameters in students (over past two weeks, n=127)

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Sleep parameters	Mean ± SD	Median (IQR)	
Time of sleep (pm)	10:30 ± 50 min	10:00 (10:00 – 11:00)	
Time of waking up (am)	6:00 ± 56 min	6:00 (5:45 – 7:00)	
Sleep duration (hours)	7.54 ± 1.01	7:30 (7:00 – 8:00)	
Sleep latency (minutes)	15.54 ± 14.52	10 (5 – 20)	
Wakeup frequency	0.97 ± 1.11	1 (0 – 2)	
Sleep disturbances	Frequency (percent)		
	Never/rarely (score 0)	Occasionally (score 1)	Frequently (score 2)
Trouble falling asleep	83 (65.35%)	34 (26.77%)	10 (7.87%)
Thoughts racing too much in bed	55 (43.31%)	64 (50.39%)	8 (6.30%)
Frequent waking during sleep	108 (85.04%)	12 (9.45%)	7 (5.51%)
Difficulty returning to Sleep after waking up in the night	88 (69.29%)	25 (19.69%)	12 (9.45%)
Early morning waking	51 (40.16%)	44 (34.65%)	32 (25.20%)
Snoring	110 (86.61%)	15 (11.81%)	2 (1.57%)
Excessive daytime sleepiness	75 (59.06%)	46 (36.22%)	6 (4.72%)

Table 2. Physical Activity compared in male and female participants

Parameters		Female Number (Percent)	Male Number (Percent)	Total	Chi Square	P value
IPAQ Category	Inactive	44 (83.0)	9 (17.0)	53	17.537†	<0.001*
	Minimally active	35 (50.7)	34 (49.3)	69		
	HEPA active	1 (20.0)	4 (80.0)	5		

* Significant difference at 99% confidence; † Fisher Exact test

IPAQ = International Physical Activity Questionnaire; HEPA = Health Enhancing Physical Activity

Table 3. Correlation between sleep quality and physical activity (Pearson Correlation), n=127

Parameters	Pearson rho, (p value)			
	Sleep duration	Sleep Latency	Sleep score	MET total
Sleep Latency	-0.026, (p=0.771)			
Sleep score	0.028, (p=0.754)	0.327, (p<0.001**)		
MET total	0.193, (p=0.03*)	-0.092, (p=0.302)	-0.145, (p=0.105)	
Physical activity category	0.119, (p=0.184)	-0.124, (p=0.165)	-0.146, (p=0.100)	0.811, (p<0.001**)

* significant at 95% confidence; ** significant at 99% confidence.

cording to IPAQ protocol as inactive, minimally active and HEPA active. Most of the participants were minimally active (55.2%). Male students were significantly more active than females (table 2).

Correlation analysis

Correlation between different sleep parameters and physical activity is given in table 3. It shows that sleep score is directly correlated with sleep latency ($r=0.327$, $p<0.001$) but not with sleep duration ($p=0.754$); and sleep duration was positively correlated with total MET value per week ($r=0.193$, $p=0.03$). None of sleep parameters were correlated with physical activity level category.

DISCUSSION

This study describes the sleep habits and physical activity in undergraduate health science students of Karnali Academy of Health Sciences, Jumla, a remote place of Nepal. It shows the students had average level of both the sleep quality and physical activity, but were poorer in females.

Sleep

The average sleep duration of the participants was identified to be seven and half hours per night. Out of total, 15.75% of them reported inadequate sleep duration (i.e.<7hr), which is similar (21%) with the study done in a large sample of university students across 24 countries.¹⁵ Whereas, another study done in six US universities showed 36% of students obtaining less than seven hours of sleep per night.⁶

In the present study, one-fifth (20.47%) of students reported sleep latency of 30 min or more, a figure closely aligned with the 18.8% observed in a study of university students in Germany and Luxembourg.¹⁶

Regarding sleep quality, our study exhibited a lower proportion of sleep disturbances, which is contrast to other studies in Nepal¹⁷ and in India¹⁸ which showed 35.4% and 60% of poor sleep quality, respectively. In addition, the study identified that poor sleep quality was present mainly in females. This finding is supported by a previous study indicating a higher prevalence of poor sleep quality among females compared to males.¹⁹ The variation in sleep quality

may not only be attributed to biological factors but also to gender differences in how men and women report symptoms. Thus, it requires further exploration, such as investigating possible gender-specific stressors or lifestyle factors influencing sleep in future.

This study also found that there were no significant differences in other sleep parameters between males and females such as: sleep time, wake up time, sleep duration, sleep latency and wakeup frequency. However, multiple literatures have documented sex differences in sleep patterns.^{6,20,21} Various studies have described the importance of sleep quality and quantity in various domains of life, including academic performance in students.^{22,23} Oliver et al (2018) demonstrated that sleep quality and duration was the best predictor for quality of life and perceived physical wellness in US college students.²⁴

Physical activity

Our study revealed concerning trends in physical activity levels among undergraduate health science students. Participants engaging in health-enhancing exercises were very minimal (4%), and over half were classified as minimally active, aligning with recent findings indicating insufficient physical activity among university students.²⁵ This echoes global concerns, with WHO reporting that over 80% of adolescents and 27% of adults worldwide fail to meet recommended physical activity levels.²⁶ This highlights the need for interventions promoting higher physical activity levels among health science students.

In contrast, a nationwide survey in 4143 Nepali adults of 15 to 69 years age using Global Physical Activity Questionnaire has revealed that more than 96% of Nepalis have recommended levels of physical activity.²⁷ This high prevalence is not shared by other studies. For example Thapa et al (2019) used the GPAQ in 945 high school students to find that about 20% students had inadequate physical activity.²⁸ This discrepancy in prevalence of activity may be due to differences in sample population, sample size, geographical variances, environmental factors and the tools used. Thus, it requires further investigation considering these factors.

Sex differences in physical activity were evident in our

sample, with males had higher activity levels compared to females, consistent with previous research.²⁹⁻³¹ However, conflicting findings exist, as studies like Bertrand et al. observed higher physical activity among females during the COVID-19 pandemic.³² Luo and Zhong observed the differential trend of changing behaviours in US students about physical activity and sedentary lifestyle while emerging from adolescent to adulthood.³³ Thus, there seems to be influence of multiple contextual factors, cultural norms, societal pressure and individual preferences that impacted the apparent discrepancies between males and females in physical activity.

Correlation between physical activity and sleep duration showed a weak positive correlation, meaning higher physical activity may be linked to longer sleep duration ($r=0.19$). There is also moderate positive correlation between sleep latency and overall sleep score ($r=0.33$); indicating that longer sleep latency is associated with poorer overall sleep quality. Other factors have no significant correlation, indicating that physical activity levels may not directly impact how quickly students fall asleep.

Although the association between sleep and exercise have been discussed in multiple studies,^{4,34-37} the assumption that sleep quality or quantity can be enhanced solely through physical activity has been challenged.^{7,38-40} This difference is likely due to multiple confounders between these variables. Future study might investigate the sedentary time along with physical activity and their combined effect in sleep quality.

Limitations

This study used a self-report measure for data collection which are subject to recall biases and social desirability effects. Secondly, a single-centric data limits the generalizability of the study findings, and a cross-sectional study design means the causal relation between variables cannot be described. Additionally, this study used a modified PSQI instead of the full version, which might affect comparability with other studies.

Future longitudinal study design on multiple centres with wider sample can capture long term effects and changes in students' behaviours, experiences, academic performance and health status over an extended period of time.

CONCLUSIONS

This study demonstrates that females have higher sleep problems and lower physical activity among the undergraduate health-science students of Karnali Academy, Jumla. This highlights the need for targeted interventions to improve both sleep quality and physical activity among them. Addressing these lifestyle factors could contribute to improved well-being and academic performance among the students.

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