ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1830

A Cross-Sectional Study to Assess the Factors Related to Quality of Sleep and Physical Activity Amongst Medical College Students of Different Years of Study in Chennai, Tamilnadu

Dr. Ajitesh Tripathi[1]; Dr. Agash V.[2]; Dr. Arunmurugan[3]; Dr. Yamuna Devi[4]

[1]Principal Investigator; [2]Co-Investigator CRMI, Government Medical College, Omandurar Government Estate, Chennai
[3]MD., Professor and Head of Department of Community Medicine, Government Medical College, Omandurar Government Estate, Chennai
[4]MD., Associate Professor, Department of Community Medicine, Government Medical College, Omandurar Government Estate, Chennai

Publication Date: 2026/06/03

Abstract:

- ***Background:***

Sleep is a fundamental physiological process essential for cognitive performance, emotional regulation, and overall health. Among college students, sleep disturbances are increasingly prevalent and have been associated with poor academic outcomes and reduced quality of life. Lifestyle factors, including physical inactivity, excessive screen time, and sedentary behaviour, are hypothesised to adversely affect sleep quality.

- ***Aim:***

To estimate the prevalence of poor sleep quality among college students and evaluate the influence of lifestyle factors — particularly physical activity and screen time — on sleep quality using the Pittsburgh Sleep Quality Index (PSQI) and the Global Physical Activity Questionnaire (GPAQ).

- ***Methods:***

A cross-sectional observational study was conducted among 320 college students. Sleep quality was assessed using the PSQI (cut-off score >5 = poor sleeper). Physical activity was classified into High (≥3000 MET-min/week), Moderate (600–2999 MET-min/week), and Low (<600 MET-min/week) categories using the GPAQ. Spearman correlations, Kruskal-Wallis tests, and Mann-Whitney U post-hoc analyses were performed (significance $p<0.05$).

- ***Results:***

Of 320 participants (mean age 21.4 ± 2.3 years), 53.4% (n=171) were classified as poor sleepers (PSQI >5). The mean global PSQI score was 6.13 ± 3.24. Physical activity level was significantly associated with sleep quality (Kruskal-Wallis $H=59.61$, $p<0.001$). Sleep duration was the strongest negative correlate of PSQI ($r=-0.689$, $p<0.001$). Screen time ($r=+0.499$), sedentary time ($r=+0.509$), and sleep latency ($r=+0.478$) were all significantly and positively correlated with PSQI score. Accommodation type was not significantly associated with sleep quality ($p=0.332$).

- ***Conclusion:***

Over half of college students experienced poor sleep quality. Physical inactivity, prolonged sedentary behaviour, and excessive screen time were significant modifiable lifestyle determinants of impaired sleep. Interventions promoting regular physical activity and limiting sedentary screen exposure may meaningfully improve sleep quality in this population.

Keywords: *Sleep Quality, PSQI, GPAQ, Physical Activity, College Students, Sedentary Behaviour, Screen Time, Cross-Sectional Study.*

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1830

How to Cite: Dr. Ajitesh Tripathi; Dr. Agash V.; Dr. Arunmurugan; Dr. Yamuna Devi (2026) A Cross-Sectional Study to Assess the Factors Related to Quality of Sleep and Physical Activity Amongst Medical College Students of Different Years of Study in Chennai, Tamilnadu. *International Journal of Innovative Science and Research Technology*, 11(5), 2921-2931. https://doi.org/10.38124/ijisrt/26may1830

I. INTRODUCTION

Sleep is a biological necessity, integral to the maintenance of physical health, psychological well-being, and neurocognitive function. Chronic sleep deprivation and poor sleep quality have been associated with adverse health outcomes including immune dysfunction, metabolic disorders, cardiovascular disease, and impaired academic performance. College students represent a particularly vulnerable population, often experiencing irregular sleep schedules, social and academic pressures, and substantial lifestyle changes during their formative years.

The Pittsburgh Sleep Quality Index (PSQI) is a validated, widely-used self-report instrument that measures sleep quality over the preceding month across seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. A PSQI global score greater than 5 is conventionally used to distinguish poor sleepers from good sleepers, with higher scores indicating worse sleep quality.

Lifestyle factors — including physical inactivity, prolonged screen time, irregular dietary habits, and excessive sedentary behaviour — have been increasingly recognised as modifiable contributors to sleep dysfunction. The World Health Organization's Global Physical Activity Questionnaire (GPAQ) provides a standardised tool for quantifying physical activity across occupational, travel, and recreational domains, and computing MET-minutes per week, a measure of physical activity energy expenditure.

➢ *Justification of Study*

College students are a vulnerable group for poor sleep due to lifestyle changes, academic stress, irregular schedules, and increased autonomy over daily routines. Despite the well-established link between lifestyle and sleep, data specific to college students in the Indian context remain limited. Understanding the modifiable determinants of sleep quality in this population may guide targeted public health interventions.Poor sleep quality is associated with academic underperformance, impaired cognitive function, mood disturbance, and reduced quality of life. Early identification of at-risk students could support timely interventions to improve both mental health and academic success.

➢ *Rationale for Current Study*

This cross-sectional study was conducted to: (1) determine the prevalence of poor sleep quality among college students using the PSQI; (2) characterise physical activity patterns using the GPAQ; and (3) evaluate associations between lifestyle factors (physical activity, screen time, sedentary behaviour, and accommodation type) and sleep quality.

II. METHODS

➢ *Study Design and Setting*

This was a cross-sectional observational study conducted among college students. Data were collected via a validated self-administered questionnaire comprising demographic information, the Pittsburgh Sleep Quality Index (PSQI), the Global Physical Activity Questionnaire (GPAQ), and questions about daily screen time, accommodation, and extracurricular activities.

➢ *Study Population and Sampling*

- Inclusion Criteria: Currently enrolled college students (undergraduate or internship year), aged 18–25 years, willing to provide informed consent.
- Exclusion Criteria: Students with clinically diagnosed sleep disorders on treatment, or those who did not fully complete the questionnaire.
- Sample Size: A total of 320 college students were recruited through convenience sampling.
- Participant Characteristics: Mean age 21.4 ± 2.3 years (range: 18–25 years); mean BMI 23.0 ± 4.9 kg/m².

➢ *Instruments*

- *Pittsburgh Sleep Quality Index (PSQI):*

The PSQI is a 19-item self-report questionnaire assessing sleep quality and disturbances over the past month. Seven component scores (each scored 0–3) are summed to yield a global PSQI score ranging from 0 to 21. A score >5 indicates clinically significant poor sleep quality (sensitivity 89.6%, specificity 86.5%).

- *Global Physical Activity Questionnaire (GPAQ):*

The GPAQ is a WHO-developed instrument measuring physical activity across three domains: work (occupational), travel (active commuting), and recreational (leisure-time) activities. Participants were classified as High (≥3000 MET-min/week), Moderate (600–2999 MET-min/week), or Low (<600 MET-min/week) physical activity.

Additional data collected included daily screen time (hours), accommodation type (hostel, day scholar with family, paying guest), year of study, and self-reported height and weight (BMI calculated as kg/m²).

➢ *Statistical Analysis*

Statistical analyses were performed using IBM SPSS Statistics, Version 26. Descriptive statistics (means, standard deviations, frequencies, and percentages) were computed for all variables. Associations between physical activity level and PSQI score were assessed using the Kruskal-Wallis H test, followed by pairwise Mann-Whitney U post-hoc comparisons. Spearman's rank correlation coefficient (ρ) was used to quantify associations between continuous lifestyle

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1830

variables and PSQI global score. Chi-square tests were used for categorical associations. All tests were two-tailed; significance was set at $p<0.05$.

➢ *Ethical Considerations*

IEC clearance was obtained for the study. All participants provided informed written consent prior to participation. Data were maintained confidentially and identified only by unique participant ID numbers. Participation was voluntary, and refusal did not affect academic standing.

III. RESULTS

➢ *Participant Characteristics*

A total of 320 young adults completed the questionnaire. The sample had a mean age of 21.4 ± 2.3 years. The majority were medical students. Approximately 45.6% (n=146) resided in hostels, 34.4% (n=110) were day scholars, and 20.0% (n=64) lived in paying guest (PG) accommodation. BMI ranged with a mean of 23.0 ± 4.9 kg/m². Table 1 presents descriptive statistics for all sociodemographic variables.

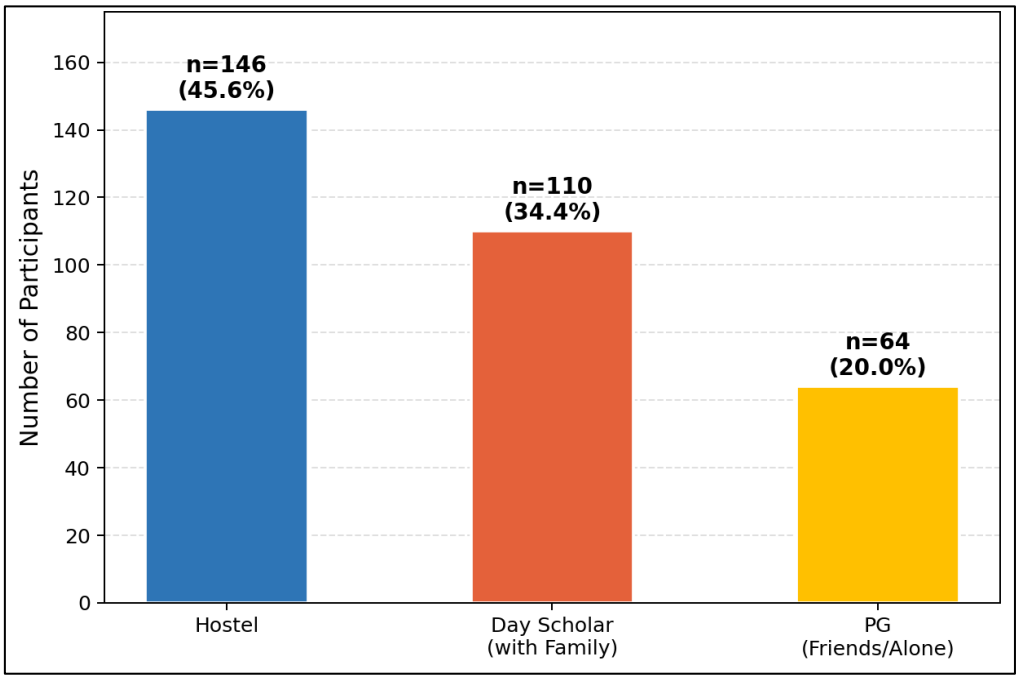

Fig 1 Distribution by Accommodation Type (N=320)

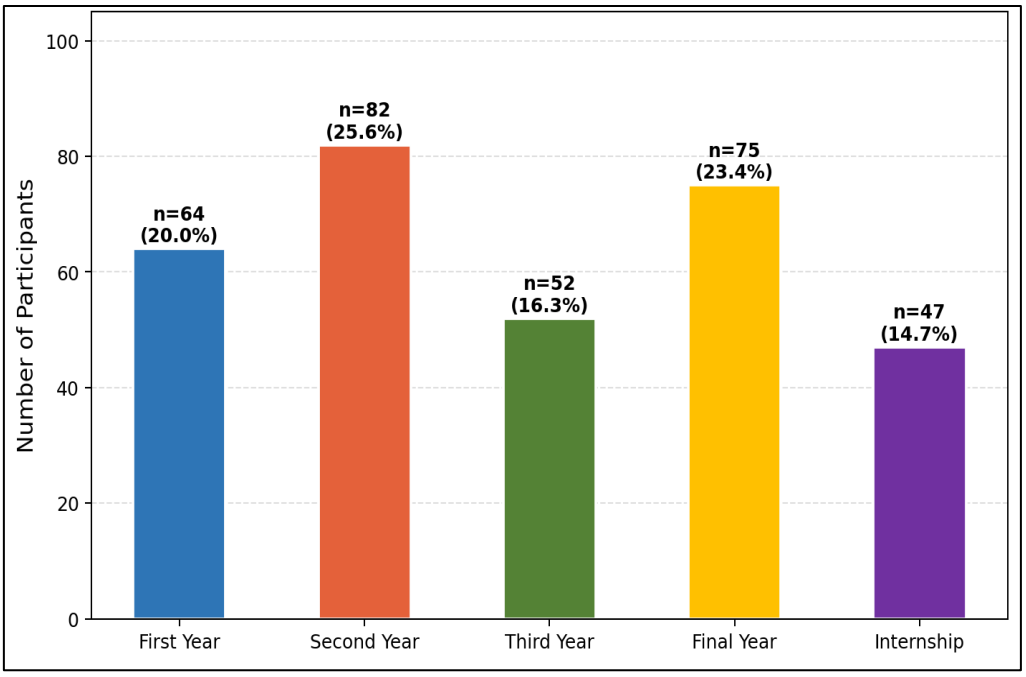

Fig 2 Distribution by Year of Study (N=320)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1830

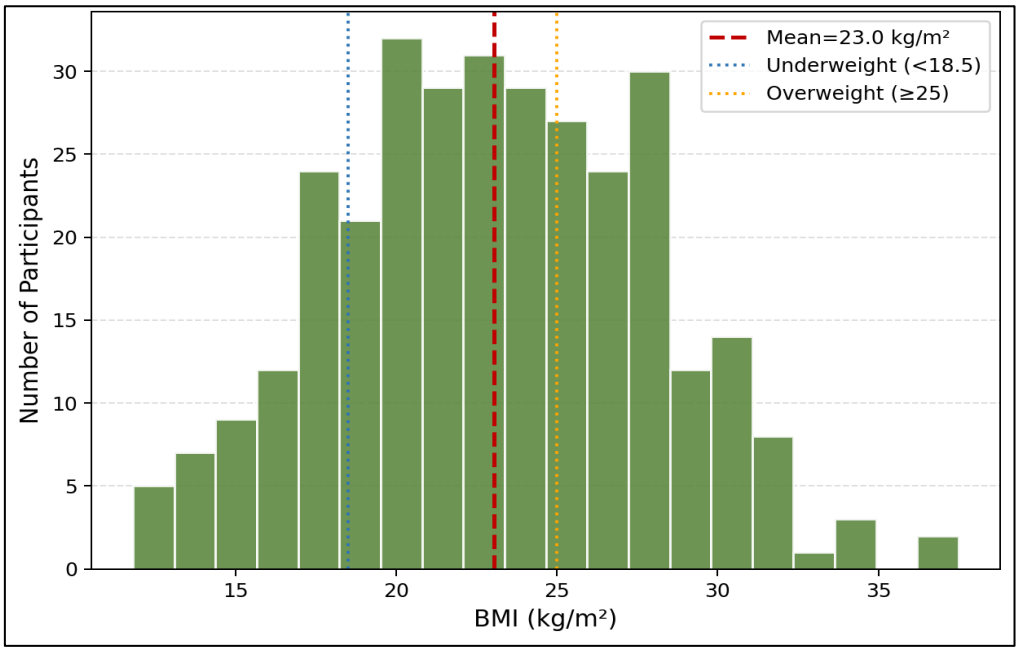

Fig 3 BMI Distribution of Study Participants (N=320)

Table 1 Sociodemographic Characteristics of Study Participants (N=320)

Variable	Category	n / Mean ± SD	Percentage (%)
Age (years)	—	21.4 ± 2.3	Range: 18–25
Height (m)	—	1.66 ± 0.09	—
Weight (kg)	—	62.6 ± 11.2	—
BMI (kg/m²)	—	23.0 ± 4.9	—
Accommodation	Hostel	146	45.6%
	Day Scholar (family)	110	34.4%
	PG (friends/alone)	64	20.0%
Year of Study	First Year	64	20.0%
	Second Year	82	25.6%
	Third Year	52	16.3%
	Final Year	75	23.4%
	Internship	47	14.7%
Screen Time (hrs/day)	Mean	5.6 ± 1.6	—
Sleep Duration	4–6 hrs	61	19.1%
	6–8 hrs	234	73.1%
	≥8 hrs	25	7.8%

BMI: Body Mass Index; PG: Paying Guest accommodation

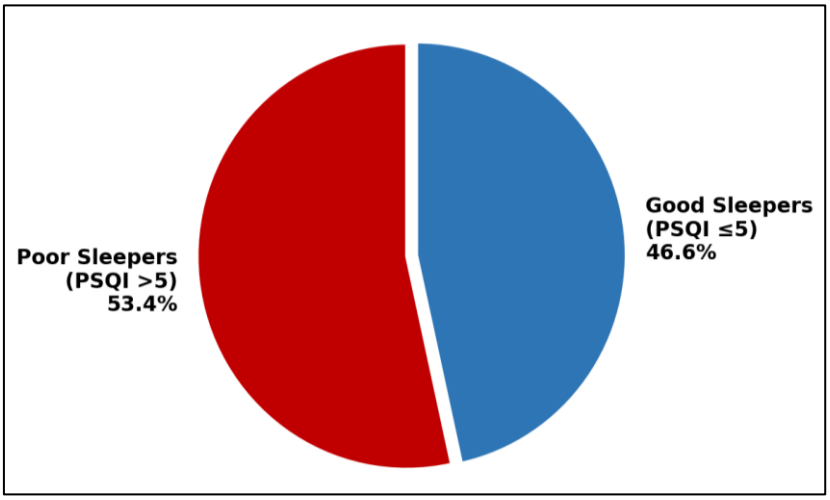

Fig 4 Prevalence of Poor vs Good Sleep Quality (N=320)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1830

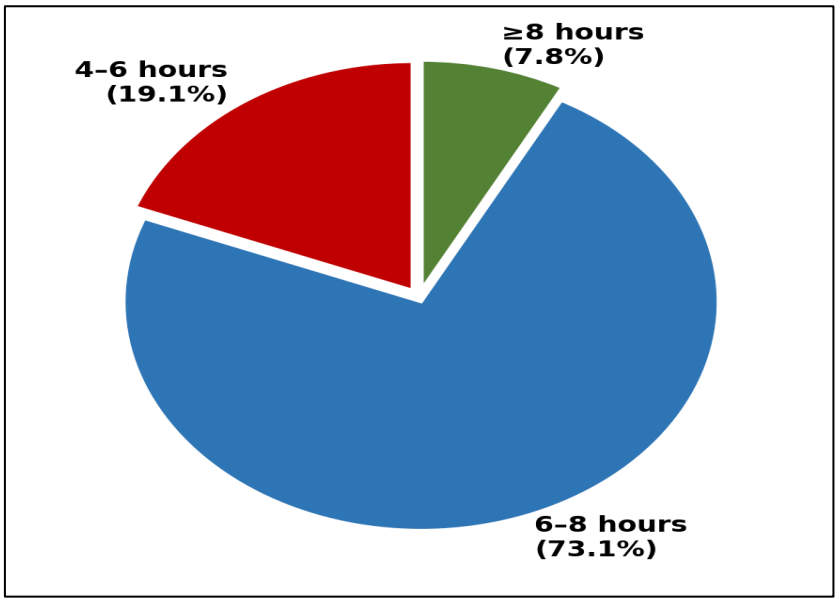

Fig 5 Sleep Duration Categories (N=320)

➢ *Prevalence of Poor Sleep Quality and PSQI Findings*

Using the established PSQI cut-off of >5, 171 participants (53.4%) were classified as poor sleepers and 149 (46.6%) as good sleepers. The mean PSQI global score was 6.13 ± 3.24 (median: 6.0). The subjective sleep quality component had the highest mean score (2.02 ± 1.19), indicating widespread subjective perception of poor sleep. Table 2 presents all PSQI component scores.

Table 2 PSQI Component Scores — Descriptive Statistics (N=320)

PSQI Component	Mean	SD	Median	Range
Subjective Sleep Quality	2.02	1.19	3.0	0–3
Sleep Latency	0.97	0.61	1.0	0–3
Sleep Duration	0.87	0.81	1.0	0–3
Habitual Sleep Efficiency	0.97	1.13	1.0	0–3
Sleep Disturbances	0.53	0.50	1.0	0–3
Use of Sleeping Medication	0.26	0.64	0.0	0–3
Daytime Dysfunction	0.51	0.69	0.0	0–3
PSQI Global Score (Total)	6.13	3.24	6.0	0–21

All components scored 0–3; PSQI global score range: 0–21; score >5 = poor sleep quality

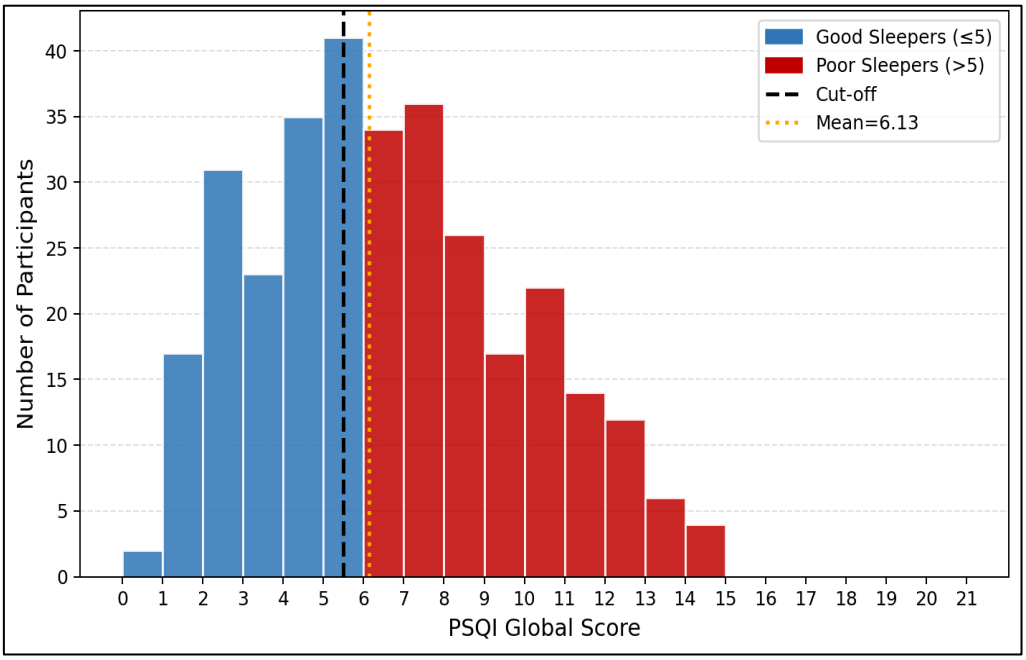

Fig 6 Distribution of PSQI Global Scores (N=320)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1830

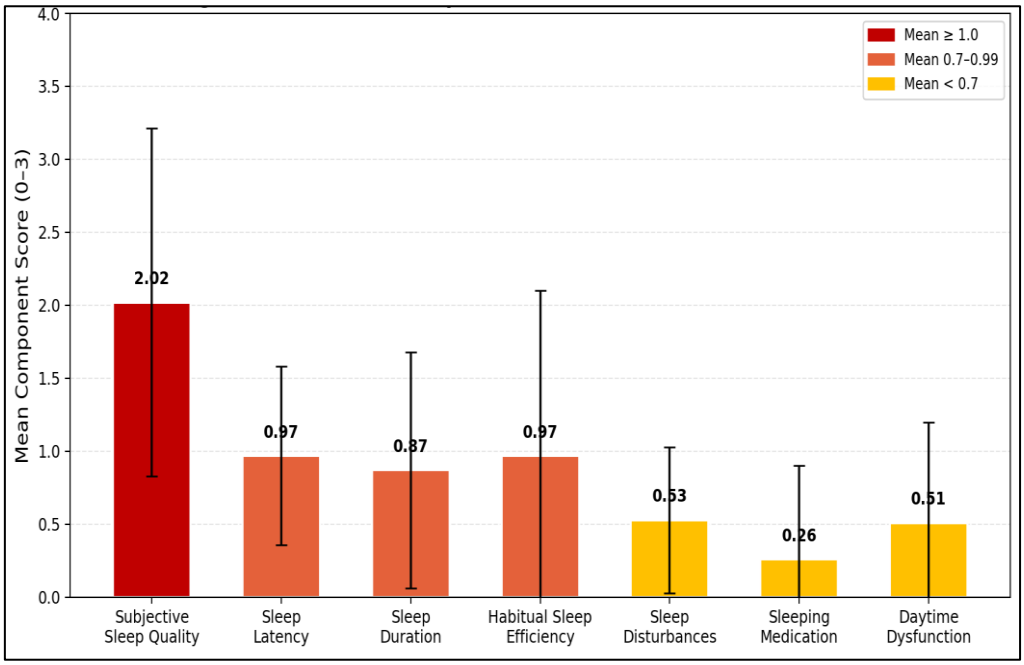

Fig 7 Mean PSQI Component Scores (N=320, Error Bars = ±1 SD)

➢ *Physical Activity: GPAQ Results*

Using GPAQ scoring, 96 participants (30.0%) were classified as High physical activity (≥3000 MET-min/week), 145 (45.3%) as Moderate, and 79 (24.7%) as Low (<600 MET-min/week). The mean total physical activity was 2222 ± 1974 MET-min/week. Mean sedentary time was 6.5 ± 2.0 hours per day, and mean daily screen time was 5.6 ± 1.6 hours. These findings are summarised in Table 3.

Table 3 Physical Activity and Lifestyle Descriptives (N=320)

Variable	n / Mean	SD	%
PA Level — High (≥3000 MET-min/wk)	96	—	30.0%
PA Level — Moderate (600–2999 MET-min/wk)	145	—	45.3%
PA Level — Low (<600 MET-min/wk)	79	—	24.7%
Total MET-min/week	2222	1974	—
Sedentary Time (hrs/day)	6.5	2.0	—
Poor Sleepers (PSQI >5)	171	—	53.4%
Good Sleepers (PSQI ≤5)	149	—	46.6%

GPAQ: Global Physical Activity Questionnaire; MET: Metabolic Equivalent of Task; PA: Physical Activity

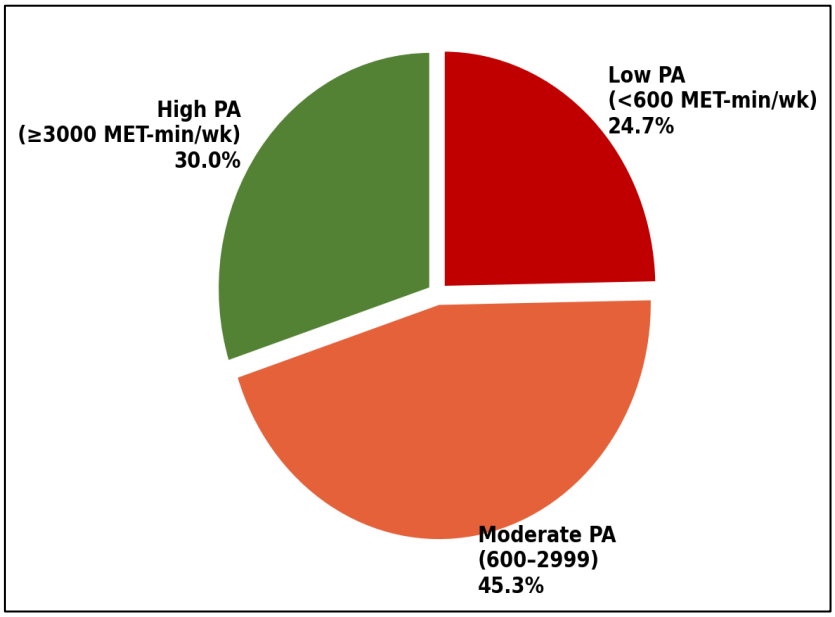

Fig 8 Physical Activity Level Distribution (GPAQ, N=320)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1830

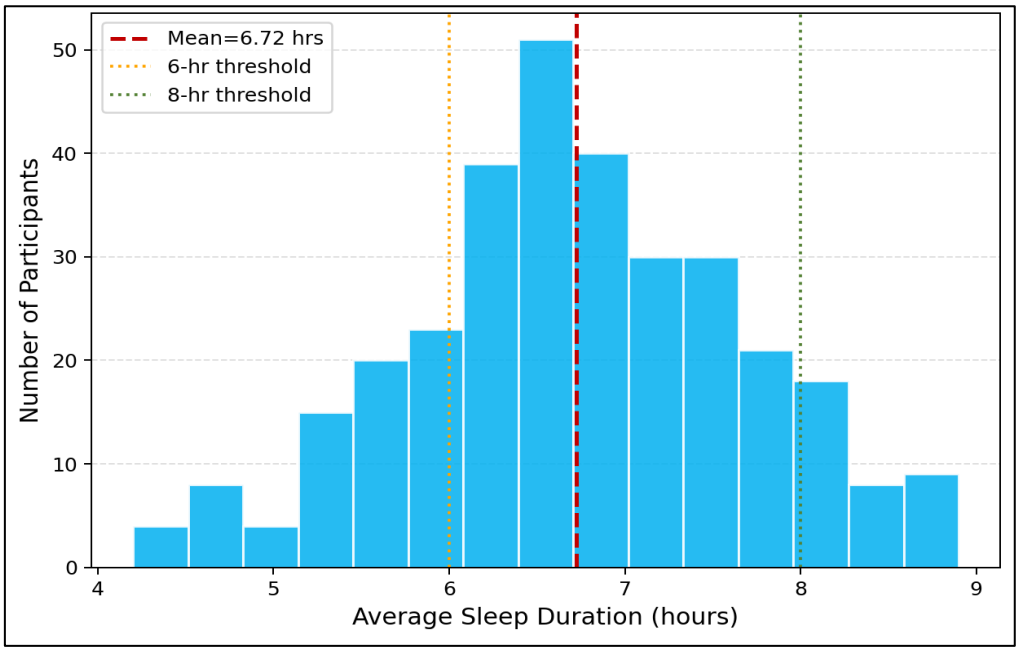

Fig 9 Distribution of Average Sleep Duration (N=320)

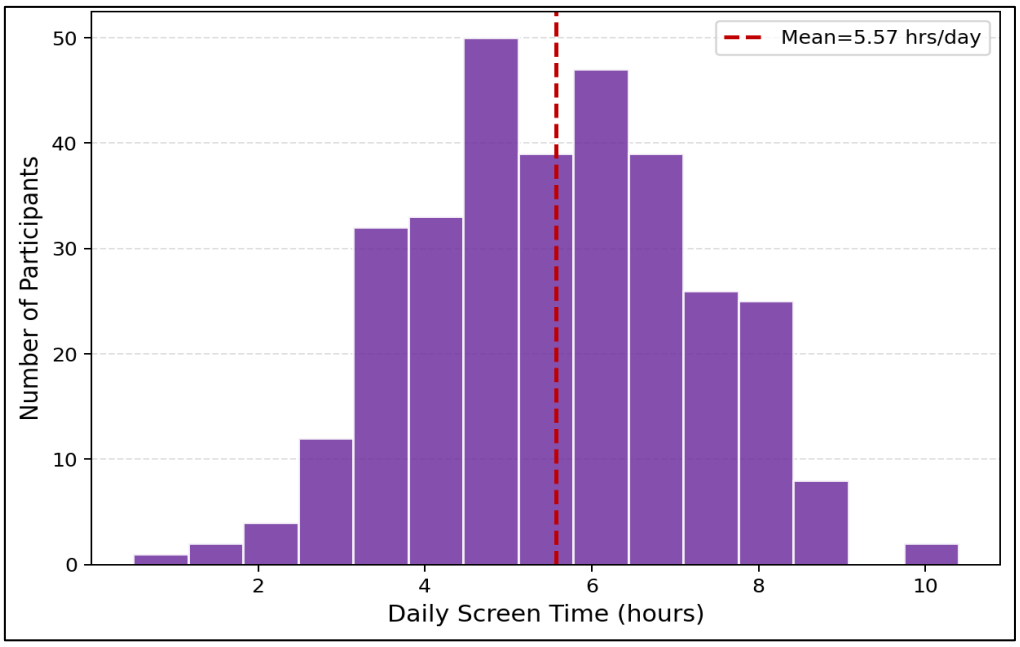

Fig 10 Distribution of Daily Screen Time (N=320)

➢ *Association Between Physical Activity and Sleep Quality*

A statistically significant difference in PSQI global scores was observed across physical activity levels (Kruskal-Wallis H=59.61, p<0.001). Participants in the Low PA group had the highest mean PSQI score (8.03 ± 2.62), followed by Moderate (6.26 ± 3.34) and High (4.38 ± 2.58). Post-hoc pairwise comparisons (Mann-Whitney U) confirmed significant differences between all pairs (all p<0.001). The proportion of poor sleepers was 79.7% in the Low PA group, compared to 54.5% in Moderate and 30.2% in the High PA group. Results are presented in Table 4.

Table 4 PSQI Score by Physical Activity Level (Kruskal-Wallis Test)

PA Level	n	Mean PSQI ± SD	Poor Sleepers (%)	Post-hoc p
High	96	4.38 ± 2.58	30.2%	Reference
Moderate	145	6.26 ± 3.34	54.5%	vs High: <0.001
Low	79	8.03 ± 2.62	79.7%	vs High: <0.001
Kruskal-Wallis: H = 59.61, p < 0.001			All pairs p<0.001	

PA: Physical Activity; PSQI: Pittsburgh Sleep Quality Index; ***p<0.001; Post-hoc: Mann-Whitney U

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1830

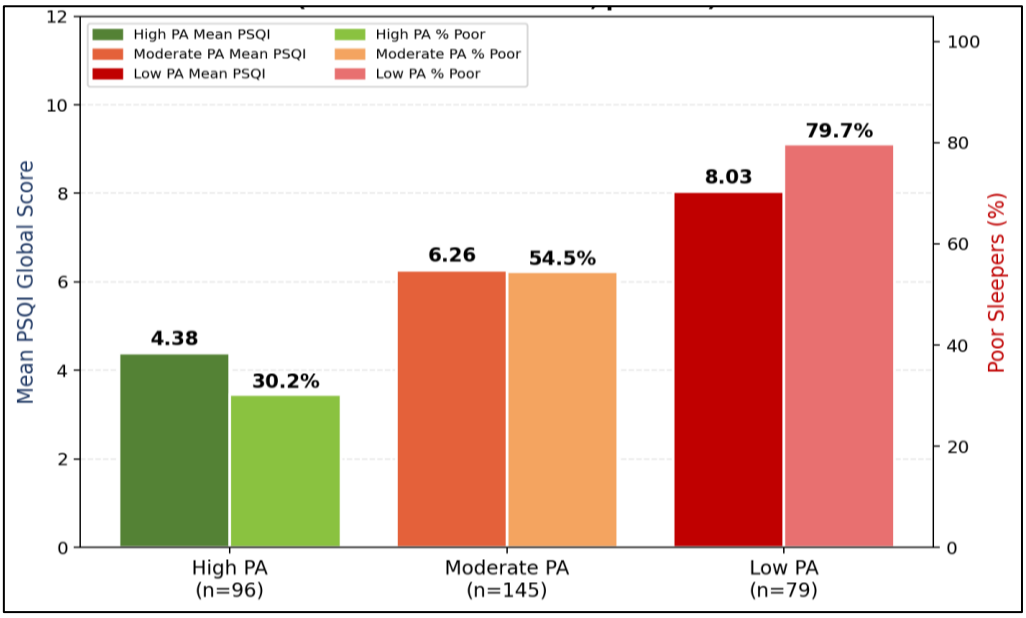

Fig 11 PSQI Score and Poor Sleeper % by Physical Activity Level (Kruskal-Wallis H=59.61, P<0.001)

➢ *Correlation of Lifestyle Variables with PSQI Score*

Spearman correlation analysis revealed several significant associations with the PSQI global score. Sleep duration had the strongest inverse correlation (ρ=−0.689, p<0.001), indicating that shorter sleep was strongly associated with higher (worse) PSQI scores. Sedentary time (ρ=+0.509, p<0.001), screen time (ρ=+0.499, p<0.001), and sleep latency (ρ=+0.478, p<0.001) were all significantly and positively correlated with PSQI global score. Total MET-min/week showed a significant negative correlation (ρ=−0.437, p<0.001), confirming that higher physical activity was associated with better sleep quality. BMI and age showed no significant association. These findings are presented in Table 5.

Table 5 Spearman Correlations Between Lifestyle Variables and PSQI Global Score

Variable	Spearman ρ	p-value	Sig.	Direction
Sleep Duration (hrs)	-0.689	<0.001	***	Longer → Better quality
Sedentary Time (hrs/day)	+0.509	<0.001	***	More sedentary → Worse quality
Screen Time (hrs/day)	+0.499	<0.001	***	More screen → Worse quality
Sleep Latency (mins)	+0.478	<0.001	***	Longer latency → Worse quality
Total MET-min/week	-0.437	<0.001	***	More active → Better quality
BMI	-0.003	0.964	ns	No association
Age	+0.002	0.965	ns	No association

***p<0.001; ns: not significant; ρ: Spearman rank correlation coefficient

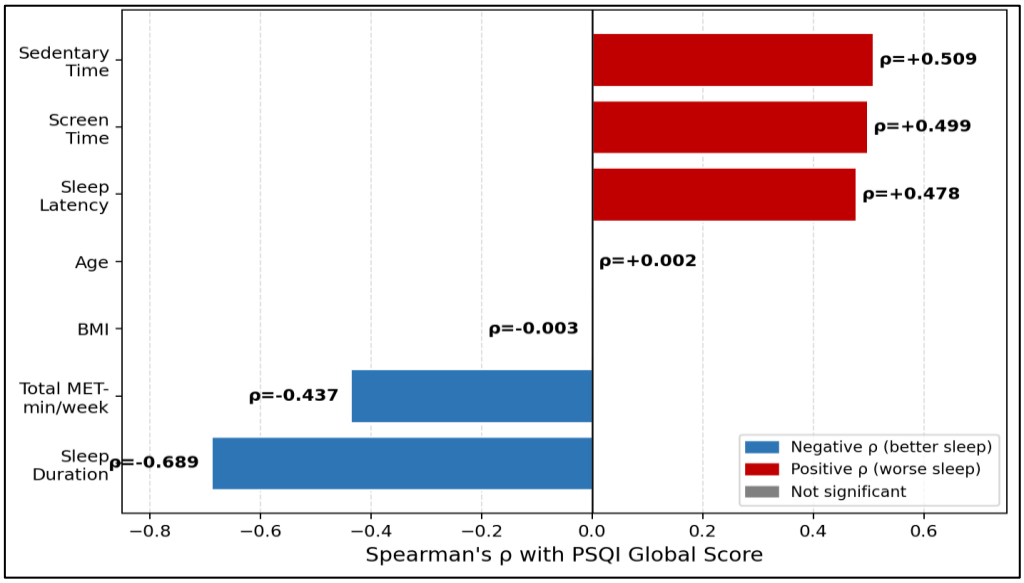

Fig 12 Spearman Correlations with PSQI Global Score (***P<0.001, ns=not Significant)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may1830

➢ *PSQI Score by Accommodation Type*

No statistically significant difference in PSQI global scores was observed across accommodation types (Kruskal-Wallis H=2.20, p=0.332). Although hostel residents had marginally higher mean PSQI scores (6.38 ± 3.27) compared to PG residents (5.66 ± 3.02) and day scholars (6.08 ± 3.32), these differences did not reach statistical significance. Results are presented in Table 6.

Table 6 PSQI Score by Accommodation Type

Accommodation	n	Mean PSQI	SD	p-value
Hostel	146	6.38	3.27	0.332 (ns)
Day Scholar (with family)	110	6.08	3.32	
PG (friends/alone)	64	5.66	3.02	

ns: not significant; Kruskal-Wallis H=2.20, p=0.332

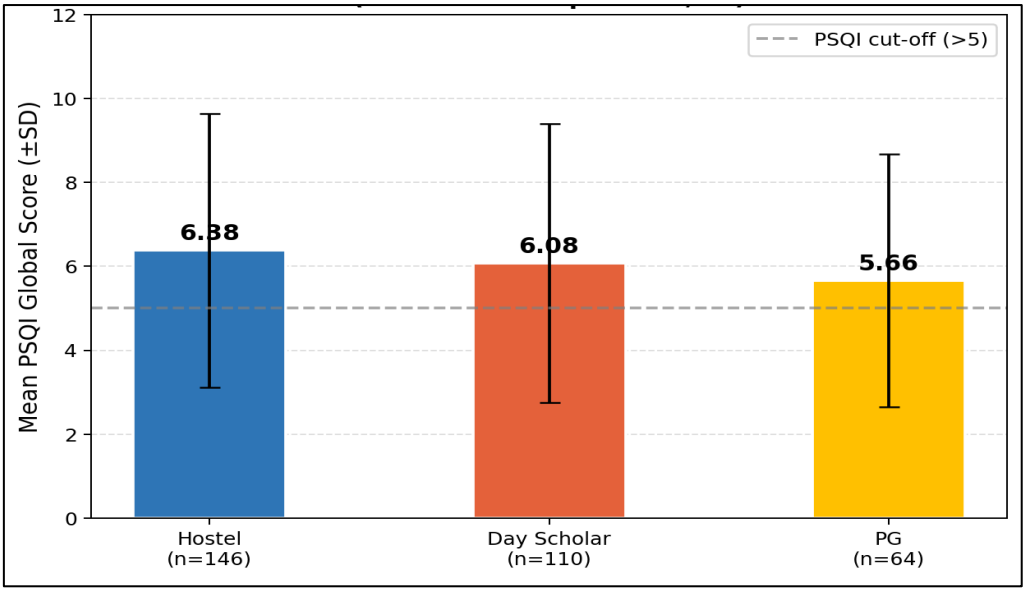

Fig 13 Mean PSQI Score by Accommodation Type (Kruskal-Wallis P=0.332, ns)

IV. DISCUSSION

➢ *Prevalence and Clinical Significance*

This study found a poor sleep quality prevalence of 53.4% among college students, with a mean global PSQI score of 6.13. These figures are consistent with published literature; studies among medical and college students globally have reported poor sleep prevalence ranging from 45% to 75%, reflecting the widespread nature of sleep dysfunction in this demographic. The high subthreshold burden suggests that significant proportions of students experience sleep-related impairment warranting clinical attention.

The predominance of subjective sleep quality as the highest-scoring PSQI component (mean 2.02 ± 1.19) highlights the degree to which college students perceive their own sleep as poor, independent of objective measures. Such patterns are consistent with the irregular sleep-wake schedules typical of college student life.

➢ *Physical Activity as a Determinant of Sleep Quality*

The most salient finding of this study was the strong, dose-response relationship between physical activity level and sleep quality. Participants classified as Low physical activity had mean PSQI scores nearly double those of the High PA group (8.03 vs 4.38), and the proportion of poor sleepers was nearly 2.7 times higher (79.7% vs 30.2%). This mirrors findings from a meta-analysis by Kredlow et al. (2015), who reported that regular physical activity significantly improved overall sleep quality, sleep onset latency, and total sleep time. The mechanisms underlying this relationship likely include exercise-induced thermoregulatory effects, adenosine accumulation, and the anxiolytic properties of physical activity, all of which promote sleep propensity.

➢ *Screen Time and Sedentary Behaviour*

Screen time demonstrated a moderate positive correlation with PSQI score (ρ=+0.499), indicating that higher screen use was associated with poorer sleep. This finding aligns with established evidence that blue light emitted by screens suppresses melatonin secretion, delays circadian phase, and reduces REM sleep. The mean screen time in this sample (5.6 hours/day) substantially exceeds current recommendations, underscoring the need for digital wellness interventions.

Sedentary time was also significantly correlated with poor sleep (ρ=+0.509). This independent association highlights the importance of breaking prolonged sitting as a separate health behaviour from physical activity. Even among physically active individuals, extended periods of sedentary behaviour have been linked to circadian disruption and sleep fragmentation.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may815

➢ *Role of Accommodation Type*

Accommodation type was not significantly associated with sleep quality in this study (p=0.332). While hostel living — with shared rooms and irregular schedules — might theoretically impair sleep relative to family accommodation, our data did not support this. This may reflect that modifiable lifestyle behaviours (physical activity, screen time) are more potent determinants of sleep quality than the physical living environment. Future prospective studies could elucidate whether hostel residence contributes to sleep disruption through specific mediating pathways.

➢ *Clinical and Practical Implications*

- Early identification: Simple screening questions include "How many hours do you sleep on average?" and "How many hours per day do you spend on screens?". Positive responses should prompt fuller PSQI assessment.
- Integrated health promotion: Given the strong association with physical inactivity and screen time, NES assessment should be incorporated into routine college health screening alongside lifestyle counselling.
- Sleep and physical activity hygiene: Interventions promoting consistent sleep schedules, moderate-to-vigorous physical activity, and blue light reduction before bedtime could be implemented as college-level wellness programmes.
- Nutritional and sedentary behaviour counselling: College students benefit from structured guidance on limiting sedentary periods and managing screen exposure, particularly in the evening hours.

V. STRENGTHS AND LIMITATIONS

➢ *Strengths*

- Moderate sample size (320) with diverse demographic representation
- Standardised, validated assessment instruments (PSQI, GPAQ)
- Systematic measurement of multiple lifestyle factors (physical activity, screen time, sedentary behaviour, accommodation type, BMI)
- Adequate response rate and minimal missing data

➢ *Limitations*

- Cross-sectional design precludes causal inference regarding associations between lifestyle factors and sleep quality
- All data were self-reported, introducing potential recall and social desirability biases, particularly for physical activity and screen time
- Important confounders such as academic workload, caffeine consumption, mental health status, and chronotype were not assessed
- College student sample limits generalisability to non-student populations or different geographic regions
- No objective assessment of sleep (e.g., actigraphy, polysomnography) to confirm self-reported sleep patterns

➢ *Future Research Directions*

- Prospective Cohort Studies: Follow college cohorts longitudinally to establish temporal precedence and identify lifestyle factors predicting sleep quality deterioration and improvement.
- Mechanistic Studies: Investigate circadian biomarkers (melatonin, cortisol), polysomnography for objective sleep architecture assessment, and neuroimaging to examine circadian and mood-related brain regions.
- Intervention Trials: Develop and test targeted interventions including structured physical activity programmes, screen time reduction protocols, and sleep hygiene education.
- Comparative Effectiveness: Compare efficacy of different intervention approaches (exercise vs. cognitive-behavioural therapy for insomnia vs. digital wellness programmes) for improving sleep quality in college students.

VI. CONCLUSIONS

Poor sleep quality is prevalent among college students in Chennai (53.4% full cases), with rates substantially higher than might be anticipated in a young healthy population. The condition is significantly associated with modifiable lifestyle factors — particularly physical inactivity, prolonged sedentary behaviour, and excessive daily screen time. Physical activity level, as assessed by the GPAQ, showed a clear dose-response relationship with sleep quality. Sleep duration was the single strongest correlate of PSQI scores.

These findings highlight the need for targeted health promotion strategies within college settings that encourage regular moderate-to-vigorous physical activity, reduce screen time — particularly before bedtime — and promote healthy sedentary behaviour management. Integrating sleep hygiene education into student wellness programmes may have significant public health benefits for this population.

REFERENCES

[1]. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Research. 1989;28(2):193–213.
[2]. World Health Organization. Global Physical Activity Questionnaire (GPAQ) Analysis Guide. Geneva: WHO; 2012.
[3]. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep patterns and predictors of disturbed sleep in a large population of college students. Journal of Adolescent Health. 2010;46(2):124–132.
[4]. Kredlow MA, Capozzoli MC, Hearon BA, Calkins AW, Otto MW. The effects of physical activity on sleep: a meta-analytic review. Journal of Behavioral Medicine. 2015;38(3):427–449.
[5]. Chang AM, Aeschbach D, Duffy JF, Czeisler CA. Evening use of light-emitting eReaders negatively affects sleep, circadian timing, and next-morning

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/26may815

alertness. Proceedings of the National Academy of Sciences. 2015;112(4):1232–1237.
[6]. Biswas A, Oh PI, Faulkner GE, et al. Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: a systematic review and meta-analysis. Annals of Internal Medicine. 2015;162(2):123–132.
[7]. Watson NF, Badr MS, Belenky G, et al. Recommended amount of sleep for a healthy adult: a joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. Sleep. 2015;38(6):843–844.
[8]. Hirshkowitz M, Whiton K, Albert SM, et al. National Sleep Foundation's sleep time duration recommendations: methodology and results summary. Sleep Health. 2015;1(1):40–43.