

Volume: 78
Issue No. 3
Year: 2026



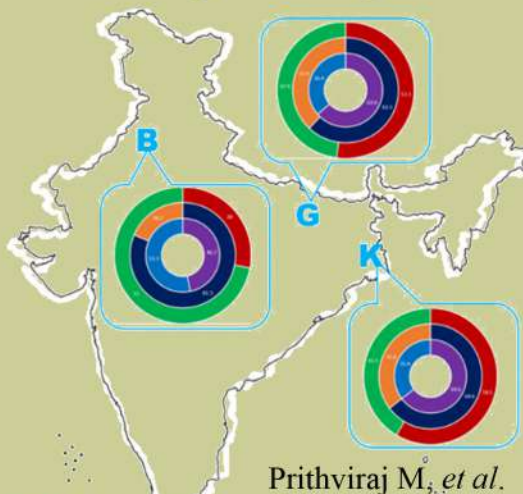
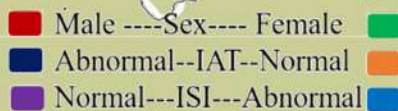
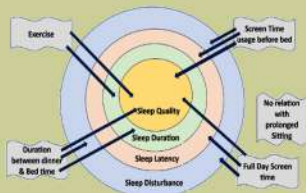
Indian Journal of Physiology and Allied Sciences

An official peer-reviewed journal of

The Physiological Society of India

IJPAS

Vol. 78; No. 3; Year 2026

Prithviraj M, *et al.*Bag S. *et al.*Amit S. *et al.*

Nayak P.

EDITORIAL BOARD

Chief Editor

Dr. Prasunpriya Nayak

Professor, Dept. of Physiology, AIIMS,
Jodhpur, India.

Editorial Board

Dr. Arani Das

Associate Professor, Dept. of Physiology,
AIIMS, Gorakhpur, India.

Dr. Amal K Bera

Professor, Dept. of Biotechnology, BJMSB, IIT
Madras, Chennai, India.

Dr. Armin Just

Academic Faculty, Teaching
Coordinator, Physiologisches
Institut, Dept. 1, Albert-Ludwigs-
Universität Freiburg, Germany.

Dr. Arnab Banerjee

Guest Faculty, PG Dept. of Physiology,
Serampore College, Serampore, India.

Dr. Ayodeji Folorunsho Ajay

Professor & Head, Dept. of Physiology, Ladoke
Akintola University of Technology, Ogbomoso,
Nigeria.

Dr. Debasish Maiti

Professor, Dept. of Physiology,
Tripura University, Agartala, India.

Dr. Gausal Azam Khan

Professor & Chartered Scientist, King
Faisal University, Saudi Arabia.

Dr. Madhumita Debnath

Associate Professor, Dept. of Physiology, Dr.
Kanailal Bhattacharyya College, Howrah, India.

Dr. Makinde Vincent Olubiyi

Lecturer, Dept. of Medical
Physiology, University of Rwanda,
Rwanda.

Dr. Nibedita Naha

Scientist-E, ICMR-National Institute
of Occupational Health (NIOH),
Ahmedabad, Gujarat, India.

Dr. Pallabi De

Director, Therapy Area Head, Global
Regulatory Medical Writing, Teva
Pharmaceuticals, USA.

Dr. Sabyasachi Das

Senior Lecturer, Dept. of Physiology,
Faculty of Medicine, Universiti
Malaya, Malaysia.

Dr. Sanjit Dey

Professor, Dept. of Physiology, University
of Calcutta, Kolkata, India.

Dr. Sarmistha Ghosh

Adjunct Professor, Dept. of Health Professions
Education, Parul University, Gujarat, India.

Dr. Sovan Bagchi

Director-Program & Professor of
Physiology, College of Medicine,
Gulf Medical University, UAE.

Dr. Soumyabrata Banerjee

Assistant Professor, Dept. of Human
Physiology, Vidyasagar University, India.

Dr. Trina Sengupta

Assistant Professor, Dept. of Physiology, ESI-
PGIMS Medical College and Hospital, Joka,
India.

Dr. Uditi Gupta

Associate Professor, Dept. of
Physiology, AIIMS, Jammu, India.

Dr. VBS Chaitanya Thinuguntala

Post Doc, Research and Academic at
Victoria University, Melbourne, Australia.

Dr. Yasser El-Wazir

Professor, Dept. of Physiology, Faculty of
Medicine, Suez Canal University, Ismailia, Egypt.

Dr. Pranav Bhanushali

Physical Therapist, Sutter Health,
California.

Authors' Guidelines: <https://ijpas.org/index.php/ijpas/about/submissions>

The content published in the *Indian Journal of Physiology and Allied Sciences (IJPAS)* is made available under the **Creative Commons Attribution 4.0 International License** (CC BY 4.0).

CONTENTS

EDITORIAL

- Academic campaign of the Physiological Society of India during Foundation Week 2026:
Outcomes and lessons learned** 1-5
Prasunpriya Nayak

PERSPECTIVE

- Physiology: The nucleus of medicine and biomedical sciences** 6-9
Susan M. Barman, Erica A. Wehrwein

REVIEW ARTICLE

- Neurocognitive profiling in Polyendocrine Metabolic Ovarian Syndrome (PMOS):
A mini-review of current evidence** 10-16
Soumen Manna, Saloni Kumari

RESEARCH ARTICLE

- Evaluating the role of lifestyle habits and sleep behavior on sleep quality: A cross-sectional study** 17-21
Steffy Amit, Puja Dulloo, Deepak Sharma
- Dose- and time-dependent polystyrene microplastic exposure alters brain metabolic
markers and behavior in male Wistar rats** 22-34
Sumana Mondal, Susmita Chakraborty, Jyotirmoy Saha, Sudipta Pal
- Unseen efforts, untold stress: Associations of workload and mental health among
ASHA workers in rural West Bengal** 35-41
Trina Paul Das, Upasana Chowdhury, Tamal Das, Somnath Gangopadhyay
- Insomnia among Indian medical graduates: Exploring the impact of internet addiction** 42-45
Manoj Prithviraj, Rama S Rath, Palani S Mohan, Sanjay K Patel, Meena Mirdha, Riya Wasnik, Arani Das
- Clinical profile and outcomes of Tarantula bite: A retrospective observational
study from Eastern India** 46-50
Subhendu Bag, Durga Pada Dolai, Nilotpall Banerjee, Dayal Bandhu Majumdar

Evaluating the role of lifestyle habits and sleep behavior on sleep quality: A cross-sectional study

Steffy Amit¹, Puja Dulloo^{1*}, Deepak Sharma²

ABSTRACT

Abstract The current lifestyle and technological advancements are contributing to chronic sleep deprivation, a significant public health issue. The study examines the effect of sleep behavior and disruptors, such as screen time, bedtime displacement, and physical activity, on sleep parameters, highlighting the growing public health concern of chronic sleep deprivation. **Materials and Methods:** The cross-sectional analytical study was conducted among medical students, faculty, and staff members (aged 18–49 years) after obtaining ethical approval. Basic demographic details and the Pittsburgh Sleep Quality Index (PSQI) were used to assess sleep parameters. A sleep behavior questionnaire was prepared and validated to gather information on sleep hygiene, physical activity, and screen time. **Results:** The study of 216 participants found that 52.78% had good sleep quality and 47.22% had poor sleep quality. Sleep quality and duration had statistically significant associations with exercise frequency and the duration between dinner and bedtime. Sleep quality and latency had statistically significant associations with two additional sleep behaviors: screen use before bed and screen time per day. Sleep disturbances had a statistically significant association with screen time per day and the duration between dinner and bedtime. **Conclusion:** The study reveals that lifestyle factors, such as physical activity and screen time, significantly influence sleep duration and quality, with increased screen usage leading to sleep disturbances, particularly before bedtime.

Keywords: Sleep quality, Screen time, Chrono-nutrition, Physical activity, PSQI

Indian Journal of Physiology and Allied Sciences (2026);

DOI: 10.55184/ijpas.v78i03.606

ISSN: 0367-8350 (Print)

INTRODUCTION

Sleep is vital to good health and well-being. Without it, the functioning of various body parts will be affected. Sleep is essential for tissue repair, metabolism, growth, infection control, learning, memory, and emotional regulation.¹

Globally, there is a burden of sleep disorders due to rapid urbanization and an increase in social demands, leading to a 24-hour society.² Chronic sleep deprivation significantly impacts body systems, leading to increased cardiovascular morbidity, diabetes, obesity, cognitive impairment, vehicular accidents, and workplace accidents.³ Adolescents with insufficient sleep and poor sleep quality are likely to be overweight and may suffer from depressive symptoms.³

The increased use of smartphones and electronic devices is exacerbating the epidemic of chronic sleep deprivation.⁴ Evening chronotypes disrupt the body's circadian rhythm, which regulates the internal body clock, hormone secretion, and metabolic processes.⁵ Sleep hygiene encompasses healthy habits, such as mealtime, and environmental factors also contribute to overall sleep quality.⁶ Research has shown that lifestyle factors such as vigorous exercise and sedentary behavior affect sleep duration and quality.⁷⁻⁹ However, there is limited evidence, particularly from the Indian subcontinent. The present study aims to investigate the effects of sleep behaviors and disturbed peripheral circadian rhythm signals, such as screen time, bedtime displacement, disrupted chrono-nutrition, physical activity, and sitting time, on sleep parameters, including sleep quality, duration, latency, and sleep disturbances.

This will guide researchers and policymakers in promoting sleep education within the school and higher education

¹Department of Physiology, Parul Institute of Medical Sciences and Research, Parul University, Vadodara, Gujarat, India.

²Department of Community Medicine, Pramukh Swami Medical College, Karamsad, Anand, Gujarat, India.

***Corresponding author:** Puja Dulloo, Department of Physiology, Parul Institute of Medical Sciences and Research, Parul University, Vadodara, Gujarat, India.

, Email: drpujapsmc@gmail.com

How to cite this article: Amit S, Dulloo P, Sharma D. Evaluating the role of lifestyle habits and sleep behavior on sleep quality: A cross-sectional study. *Indian J Physiol Allied Sci* 2026;78(3):17-21.

Conflict of interest: None

Submitted: 02/08/2026 **Accepted:** 19/08/2026 **Published:** 30/09/2026

systems by emphasizing the importance of a consistent sleep schedule and improving sleep hygiene to support better health.

MATERIALS AND METHODS

The cross-sectional analytical study was conducted on 216 participants at the Clinical Physiology Laboratory, after ethical approval from the Institutional Ethics Committee. [PUIECHR/PIMSR/00/081734/7211; Dated:02/07/2024]. A sample size of 260 was calculated using EPITOOLS software with a confidence interval of 95%, desired precision (± 0.05) and an estimated true proportion of 0.3. As per the convenience sampling for the study, 216 participants, teaching and non-teaching staff, and medical students (undergraduate and postgraduate) of a medical institute, aged 18 to 49 years,

were included in the study. Subjects diagnosed with insomnia and/or on sleeping medications and/or any medication that affects sleep parameters were excluded from the study.

The data were collected after explaining the study's objectives and obtaining participants' written consent, with confidentiality maintained.

The basic demographic details, such as age, gender, and job profile, were collected. A sleep assessment tool, the Pittsburgh Sleep Quality Index (PSQI), was used to collect the sleep parameters.¹⁰ After a comprehensive literature review,^{11,12} a questionnaire was prepared regarding sleep behavior, physical activity, and screen use. The face validity of the developed questionnaire was established by convening a panel of five experts (two within the institute and three outside the institute) using a Delphi approach. Most experts agreed on most questionnaire parameters during the first round of the Delphi.

The collected data were entered into a Microsoft Excel sheet and analyzed using SPSS version 31. Both parametric and non-parametric tests were used. ANOVA is used to test for significant differences in a variable measured on a continuous numerical scale. The association between two variables is assessed using the Chi-Square test. Fisher's exact test is a modified form of the chi-square test used when the expected cell frequency is <5. Sleep quality and exercise; screen time before bed; using the Chi-square test; sleep quality and sleep behavior using the t-test. Sleep duration, sleep latency, sleep disturbances, and other sleep behavior parameters using Fisher's test and ANOVA. $P < 0.05$ was considered statistically significant

RESULTS

Of the 216 participants, 91 were male, and 125 were female. There were 48 individuals in the 18-20 years age group, 101 in the 21-25 years age group, 43 in the 26-30 years age group, 9 in the 31-35 years age group, 9 in the 36-40 years age group, and 6 in the 41-50 years age group.

Out of 216 participants, 114 (52.78%) had good sleep quality ($PSQI \leq 4$ global score), and 102 (47.22%) had poor sleep quality ($PSQI \geq 5$ global score); while 144 (66.7%) participants had mild sleep disturbances, 98 (45.4%) had a sleep duration of more than 7 hours, and 104 (48.1%) had a sleep latency of less than 15 minutes.

Table 1 shows the association of sleep distractors and exercise with sleep quality. Sleep quality had a statistically significant association with exercise ($t = 12.26$, $p = 0.006$) and screen usage before bed ($t = 4.090$, $p = 0.03$), as determined by the chi-square test. Also, with screentime/day on weekends ($t = 2.97$, $p = 0.003$), duration between dinner and bed on both weekdays ($t = 1.89$, $p = 0.05$) and weekends ($t = 3.28$, $p = 0.001$), using the t-test. No statistical significance was found for screen time on weekdays ($t = -0.73$, $p = 0.46$) and sitting ($t = -0.03$, $p = 0.97$) in relation to sleep quality.

Table 2 shows the associations between sleep distractors and exercise and sleep duration. The sleep duration (between

Table 1: Association of sleep distractors and exercise on sleep quality

Sleep disruptors		PSQI ≤ 4 N (%)	PSQI ≥ 5 N (%)	Total N
Exercise* (days / week)	<2 Days	64 (50.4)	63 (49.6)	127
	2-4 Days	11 (33.3)	22 (66.7)	33
	5-6 Days	16 (76.2)	5 (23.8)	21
	Everyday	23 (65.7)	12 (34.3)	35
Screen Usage* (in the last hour before Bed)	No	18 (72)	7 (28)	25
	Yes	96 (50.5)	94 (49.5)	190
		PSQI ≤ 4 (Mean $\pm$ SD)		PSQI ≥ 5 (Mean $\pm$ SD)
Screen Time (Weekend) (hrs)		6.04 $\pm$ 3.01		7.56 $\pm$ 4.28*
Duration between Dinner and Bed (hrs)	Weekdays	2.74 $\pm$ 1.31		3.10 $\pm$ 1.43*
	Weekend	2.77 $\pm$ 1.36		3.52 $\pm$ 1.90*

PSQI = Pittsburgh Sleep Quality Index (≤ 4 = Good sleep quality and ≥ 5 = Poor sleep quality); SD = standard deviation; * indicates $p < 0.05$.

4 groups, i.e., >7, 6-7, 5-6, <5 hours of sleep/day) had a statistically significant association with exercise ($F = 20.86$, $p = 0.008$) using Fisher's Exact test. Also, the duration between dinner and bedtime for both weekdays ($t = 4.37$, $p = 0.005$) and weekends ($t = 9.91$, $p = 0.001$) was determined using ANOVA. Post hoc tests reveal an association between sleep duration groups (>7 & <5 hours) for the duration between dinner and bedtime on weekdays, as well as between sleep duration groups (>7 & 5-6, <6, 6-7 & <5 hours) for the duration between dinner and bedtime on weekends. There was no statistical significance observed for sleep duration with screen usage before bed (t and p -values 1.031; 0.817), screen time weekdays (F and p -value 1.139; 0.334), screen time weekends (F and p -values 1.537; 0.206), and sitting (F and p -values 0.773; 0.510).

Table 3 shows the association of sleep distractors with sleep latency. Sleep latency across 4 groups (<15, 16-30, 31-60 & >60 minutes) showed a statistically significant association with screen time before bedtime ($F = 8.23$, $p = 0.02$) and with screen time/day on weekends ($t = 2.68$, $p = 0.04$). Post hoc tests of the screentime/day indicate that the association between the sleep latency group (<15 & 31-60 minutes). There was no statistical significance attained for exercise (t and p -value 13.57; .103), screen time weekdays (F and p -values 1.114; 0.334), duration between dinner and bedtime on weekdays and weekends (F and p -values 0.487; 0.692), F and p -values 1.112; 0.345) and sitting (F and p -values 1.742; 0.519) with sleep latency.

Table 4 shows the association of sleep distractors with sleep disturbances. A statistically significant association between the 4 groups of sleep disturbances (nil, mild, moderate, & severe) and screentime/day on weekends ($F = 2.704$, $p = 0.04$), as well as for the duration between dinner and bedtime on weekends ($F = 2.72$, $p = 0.04$) and weekdays ($F = 2.94$, $p = 0.03$).

Table 2: Association of sleep distractors and exercise on sleep duration

Lifestyle parameters		Sleep Duration (hours)				
		>7 hours N (%)	6–7 hours N (%)	5–5.9 hours N (%)	<5 hours N (%)	Total N
Exercise* (days /week)	<2 Days	58 (45.7)	39 (30.70)	25 (19.7)	5 (3.9)	127
	2–4 Days	12 (36.4)	15 (45.5)	4 (12.1)	2 (6)	33
	5–6 Days	17 (81)	3 (14.2)	0 (0)	1 (4.8)	21
	Everyday	11 (31.4)	13 (37.1)	6 (17.1)	5 (14.3)	35
Sleep distractors (Mean $\pm$ SD)		>7 hours	6–7 hours	5–5.9 hours	<5 hours	
Duration between dinner and bedtime	Weekday (hours) *	2.65 $\pm$ 1.38*	2.91 $\pm$ 1.12	3.29 $\pm$ 1.65	3.88 $\pm$ 1.29 *	
	Weekend (hours) *	2.66 $\pm$ 1.48	3.10 $\pm$ 1.27	3.90 $\pm$ 2.25	4.69 $\pm$ 1.60	

* ≤ 0.05 denotes statistically significant, SD-standard deviation

Table 3: Association of sleep distractors on sleep latency

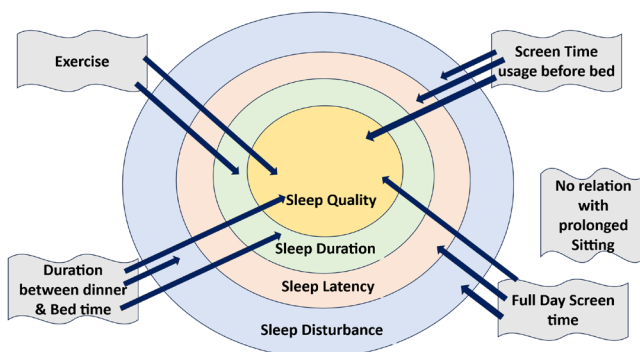
Sleep distractors		Sleep latency				Total N
		[<15 min] N (%)	[16–30 min] N (%)	[31–60 min] N (%)	[> 60 min] N (%)	
Screen usage in the last 1 hour before bed *	No	19 (76)	5 (20)	0 (0)	1 (4)	25
	Yes	85 (44.7)	75 (39.5)	17 (8.9)	13 (6.8)	190
		[<15 min] (Mean $\pm$ SD)	[16–30 min] (Mean $\pm$ SD)	[31–60 min] (Mean $\pm$ SD)	[> 60 min] (Mean $\pm$ SD)	
Screen Time (Weekend) (hrs) *		6.35 $\pm$ 3.60	6.97 $\pm$ 3.77	8.94 $\pm$ 4.45	6.0 $\pm$ 2.82	

*p-value ≤ 0.05 denotes statistically significant, SD-standard deviation

Table 4: Association of sleep distractors on sleep disturbances

Sleep distractors		Sleep disturbances (Mean $\pm$ SD)			
		Nil	Mild	Moderate	Severe
Screen Time (Weekdays) (hrs) *		4.96 $\pm$ 2.16	6.21 $\pm$ 3.38	6.97 $\pm$ 3.13	8.00 $\pm$ 4.00
Duration between dinner and bedtime	Weekdays (hrs) *	2.47 $\pm$ 1.18	2.92 $\pm$ 1.29	3.34 $\pm$ 1.71	2.20 $\pm$ 1.35
	Weekend (hrs) *	2.52 $\pm$ 1.39	3.13 $\pm$ 1.63	3.69 $\pm$ 1.90	2.60 $\pm$ 1.71

*p-value ≤ 0.05 denotes significant, SD- standard deviation

**Figure 1:** Diagrammatic presentation of the effect of lifestyle parameters and sleep disruptors upon sleep parameters

Post hoc tests reveal that the association between the sleep disturbance (nil and moderate) groups is significant for sleep behaviors, including daily screen time on weekdays and the

time between dinner and bedtime on both weekdays and weekends. There was no statistically significant association for exercise (t and p-values 4.84; 0.839), weekend screen time (2.54; 0.057), screen time before bed (t and p-values 1.533, 0.623), or sitting (F and p-values 0.745, 0.527) with sleep disturbances (Figure 1).

DISCUSSION

Sleep and Physical Activity

The present study reveals a notable association between sleep quality and duration with exercise. Among subjects who engaged in minimal physical activity (<2 days/week), 49.6% reported poor sleep quality, and 45.7% had sleep duration >7 hours. Interestingly, among subjects performing moderate to high physical activity (5–6 days per week and every day), 30.4% reported poor sleep quality, and 10.7% had sleep duration <5 hours, whereas 50% had sleep duration >7

hours. These findings may be attributed to the modulation of the circadian rhythm, primarily through interactions between the muscle and the suprachiasmatic nucleus (SCN).¹³ Arakaki *et al.*¹⁴ observed a positive correlation between low physical activity levels and poor sleep quality, which aligns with the current study's findings. Koohsari *et al.*¹⁵ explored the relationship between sedentary behavior, light-intensity physical activity, and vigorous physical activity, revealing a stronger association between vigorous physical activity and improved sleep quality. Regular, consistent exercise has been proposed as an effective treatment for insomnia and other sleep disorders, underscoring its importance in enhancing sleep quality.¹⁶ The observed short sleep duration in both the low- and high-physical-activity groups may be influenced by the subjective nature of sleep measurement in this study. However, objective measurements, such as polysomnography, have demonstrated increased NREM sleep following moderate or vigorous late-night exercise in another study.^{9,17}

Sleep latency and Bedtime Technology Use

Around 49.5% of individuals who used screens before bedtime had poor sleep quality, and 39.5 % experienced sleep latency of 16 to 30 minutes. The association between screen usage before bedtime and sleep latency is due to the displacement of sleep time and emotional engagement. Cerebral arousal, cognitive alertness, and physiological arousal can impair the initiation of sleep, leading to increased sleep latency and poor sleep quality.¹⁸ The study by Gradisar *et al.*¹⁹ showed that active device usage has affected the sleep latency and quality of the study participants, which aligns with our study outcome. Similarly, Higuchi *et al.*'s study showed the effects of interactive devices before sleep and found difficulty with sleep initiation among study participants, with shorter rapid eye movement (REM) sleep on electroencephalogram (EEG).¹⁷ The Weaver *et al.* study demonstrated an increase in sleep onset latency and subjective sleepiness after a pre-sleep video gaming session, which aligns with our research findings.²⁰

Sleep and Screen Time

The present study revealed a significant association between screen time usage and sleep parameters, including sleep quality, latency, and disturbances. For screen time/day during weekends, an association is observed between groups with sleep latency (<15 minutes & 31 to 60 minutes), and also between the nil and moderate sleep disturbance groups. The screen time includes mobile usage, television viewing, mobile gaming, office work, and social media browsing. Prolonged screen time can lead to a gradual decline in sleep, resulting in reduced sleep duration, poor sleep quality, and sleep disturbances due to the blue-light suppression of the pineal gland and melatonin secretion.²¹ The significant relationship between screen time on the weekend and sleep quality was found in the current study, which aligns with the longer total screen time of 30 days, and poor sleep quality

observed by Arshad *et al.*²² The survey by Levenson *et al.*²³ identified factors contributing to sleep disturbance and found that higher mobile phone usage significantly increased the odds of experiencing sleep disturbances. Various researchers have identified the negative impact of screen time on both weekends and weekdays on sleep quality, sleep disturbances, and sleep latency.^{18,24}

Sleep and Chrono Nutrition

The study reveals that participants with a 3-hour gap between dinner and bedtime exhibited poor sleep quality, reduced sleep duration, and moderate disturbances. In contrast, participants with less than 3 hours between dinner and bedtime experienced longer sleep duration and good sleep quality, without disturbances. Notably, a shorter sleep duration was observed with dinner far from bedtime, whereas a longer sleep duration was observed with dinner closer to bedtime. These findings align with those of Kim *et al.*, a longer interval between the last meal and bedtime was linked to poorer sleep duration.²⁵ Also, Chung *et al.* found that consuming the evening meal within 3 hours of bedtime was positively correlated with nocturnal awakening and sleep disturbances.²⁶ Sleep hygiene guidelines emphasize aligning meal timing with circadian rhythms to optimize sleep health, as food intake influences neurohumoral mechanisms that govern sleep in a bidirectional manner.²⁷ The current study, however, lacks data on food quantity, composition, density, and caloric intake, which warrants further investigation. Additionally, relying on self-reported sleep duration may introduce bias, as participants are more likely to underestimate their actual sleep duration.

CONCLUSION

This study highlights the significant associations between physical activity, screen time, meal timing, and sleep quality and duration. Participants who engaged in minimal physical activity and excessive screen use before bedtime experienced poorer sleep outcomes, while those who engaged in regular physical activity reported better sleep quality. Additionally, a strong association was found between a shorter duration between dinner and bedtime and improved sleep quality. These findings emphasize the importance of managing lifestyle factors to optimize sleep health and suggest the need for further research, particularly with objective sleep measures, to refine these recommendations.

ACKNOWLEDGMENT

The authors are thankful to the participants.

FUNDING DECLARATION

No funding

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- Fleming L, Crawford M, Martin B, Patience M, Fisher-Hicks S. Sleep and medical disorders. In *Disorders of Sleep and Circadian Function: Life Span Issues and Special Populations*, (Espie CA, Zee PC, Morin CM, eds), *The Oxford Handbook of Sleep and Sleep Disorders*, 2nd edn, Oxford Library of Psychology (2025; online edn, Oxford Academic, 22 May 2025), pp 1183-1218. DOI: 10.1093/oxfordhob/9780197602751.013.30.
- India is the second most sleep deprived country: What we can do to fix our sleep habits. The Times of India [Internet]. 2023 Mar 17 [cited 2025 Jun 12]. Available from: <https://timesofindia.indiatimes.com/life-style/health-fitness/health-news/india-is-the-second-most-sleep-deprived-country-what-we-can-do-to-fix-our-sleep-habits/articleshow/98728738.cms?from=mdr>
- Chattu VK, Manzar MdD, Kumary S, Burman D, Spence DW, Pandi-Perumal SR. The global problem of insufficient sleep and its serious public health implications. *Healthcare*. 2018;7(1):1. DOI:10.3390/healthcare7010001.
- Maurya C, Muhammad T, Maurya P, Dhillon P. The association of smartphone screen time with sleep problems among adolescents and young adults: Cross-sectional findings from India. *BMC Public Health*. 2022;22(1):1686. DOI:10.1186/s12889-022-14076-x.
- Zou H, Zhou H, Yan R, Yao Z, Lu Q. Chronotype, circadian rhythm, and psychiatric disorders: Recent evidence and potential mechanisms. *Front Neurosci*. 2022;16:811771. DOI:10.3389/fnins.2022.811771.
- Alanazi EM, Alanazi AMM, Albuhairey AH, Alanazi AAA. Sleep hygiene practices and its impact on mental health and functional performance among adults in Tabuk city: A cross-sectional study. *Cureus*. 15(3):e36221. DOI:10.7759/cureus.36221.
- Rosa CC, Tebar WR, Oliveira CBS, et al. Effect of different sports practice on sleep quality and quality of life in children and adolescents: Randomized clinical trial. *Sports Med - Open*. 2021;7(1):83. DOI:10.1186/s40798-021-00376-w.
- Xie Y, Liu S, Chen XJ, Yu HH, Yang Y, Wang W. Effects of exercise on sleep quality and insomnia in adults: A systematic review and meta-analysis of randomized controlled trials. *Front Psychiatry*. 2021;12:664499. DOI:10.3389/fpsy.2021.664499.
- Alnawwar MA, Alraddadi MI, Algethmi RA, Salem GA, Salem MA, Alharbi AA. The effect of physical activity on sleep quality and sleep disorder: A systematic review. *Cureus*. 2023;15(8):e43595. DOI:10.7759/cureus.43595.
- Shahid A, Wilkinson K, Marcu S, Shapiro CM. Pittsburgh Sleep Quality Index (PSQI). In: Shahid A, Wilkinson K, Marcu S, Shapiro CM, editors. *STOP, THAT and One Hundred Other Sleep Scales* [Internet]. New York, NY: Springer New York; 2011 [cited 2024 Jun 19]. p. 279–83. DOI:10.1007/978-1-4419-9893-4_67
- Sleep Hygiene Index.pdf [Internet]. [cited 2024 Jun 19]. Available from: <https://www.med.upenn.edu/cbti/assets/user-content/documents/Sleep%20Hygiene%20Index.pdf>
- IPAQ-TM.pdf [Internet]. [cited 2024 Jun 19]. Available from: <https://youthrex.com/wp-content/uploads/2019/10/IPAQ-TM.pdf>
- Healy KL, Morris AR, Liu AC. Circadian synchrony: Sleep, nutrition, and physical activity. *Front Netw Physiol*. 2021;1:732243. DOI:10.3389/fnetp.2021.732243.
- Arakaki FH, De Angelis K, Hachul H, Morelhão PK, Tufik S, Andersen ML. Is physical inactivity or sitting time associated with insomnia in older men? A cross-sectional study. *Sleep Epidemiol*. 2022;2:100023. DOI:10.1016/j.sleepe.2022.100023
- Koohsari MJ, Yasunaga A, McCormack GR, et al. Sedentary behaviour and sleep quality. *Sci Rep*. 2023;13(1):1180. DOI:10.1038/s41598-023-27882-z.
- Passos GS, Poyares DLR, Santana MG, Tufik S, de Mello MT. Is exercise an alternative treatment for chronic insomnia? *Clinics*. 2012;67(6):653–9. DOI:10.6061/clinics/2012(06)17.
- Higuchi S, Motohashi Y, Liu Y, Maeda A. Effects of playing a computer game using a bright display on presleep physiological variables, sleep latency, slow wave sleep and REM sleep. *J Sleep Res*. 2005;14(3):267–73. DOI:10.1111/j.1365-2869.2005.00463.x.
- Rafique N, Al-Asoom LI, Alsunni AA, Saudagar FN, Almulhim L, Alkaltham G. Effects of mobile use on subjective sleep quality. *Nat Sci Sleep*. 2020;12:357–64. DOI:10.2147/NSS.S253375.
- Gradisar M, Wolfson AR, Harvey AG, Hale L, Rosenberg R, Czeisler CA. The sleep and technology use of Americans: Findings from the National Sleep Foundation's 2011 Sleep in America Poll. *J Clin Sleep Med*. 09(12):1291–9. DOI:10.5664/jcsm.3272.
- Weaver E, Gradisar M, Dohnt H, Lovato N, Douglas P. The effect of presleep video-game playing on adolescent sleep. *J Clin Sleep Med*. 2010;6(2):184–9. PMID: 20411697.
- Shanahan TL, Czeisler CA. Light exposure induces equivalent phase shifts of the endogenous circadian rhythms of circulating plasma melatonin and core body temperature in men. *J Clin Endocrinol Metab*. 1991;73(2):227–35. DOI:10.1210/jcem-73-2-227.
- Arshad D, Joyia UM, Fatima S, et al. The adverse impact of excessive smartphone screen-time on sleep quality among young adults: A prospective cohort. *Sleep Sci*. 2021;14(4):337–41. DOI:10.5935/1984-0063.20200114.
- Levenson JC, Shensa A, Sidani JE, Colditz JB, Primack BA. The association between social media use and sleep disturbance among young adults. *Prev Med*. 2016;85:36–41. DOI:10.1016/j.ypmed.2016.01.001.
- Alshoaibi Y, Bafil W, Rahim M. The effect of screen use on sleep quality among adolescents in Riyadh, Saudi Arabia. *J Fam Med Prim Care*. 2023;12(7):1379. DOI:10.4103/jfmpc.jfmpc_159_23.
- Kim N, Conlon RK, Farsijani S, Hawkins MS. Association between chrononutrition patterns and multidimensional sleep health. *Nutrients*. 2024;16(21):21. DOI:10.3390/nu16213724.
- Chung N, Bin YS, Cistulli PA, Chow CM. Does the proximity of meals to bedtime influence the sleep of young adults? a cross-sectional survey of university students. *Int J Environ Res Public Health*. 2020;17(8):2677. DOI:10.3390/ijerph17082677.
- Iao SI, Jansen E, Shedden K, et al. Associations between bedtime eating or drinking, sleep duration and wake after sleep onset: findings from the American time use survey. *Br J Nutr*. 127(12):1888–97. DOI:10.1017/S0007114521003597.

PEER-REVIEWED CERTIFICATION

During the review of this manuscript, a double-blind peer-review policy has been followed. The author(s) of this manuscript received review comments from a minimum of two peer-reviewers. Author(s) submitted revised manuscript as per the comments of the assigned reviewers. On the basis of revision(s) done by the author(s) and compliance to the Reviewers' comments on the manuscript, Editor(s) has approved the revised manuscript for final publication.

Gymguard-SCD Clinical Decision Support System

GYM GUARD-SCD: THE FUTURE OF SPORTS CARDIOLOGY AND PREVENTIVE CARDIOLOGY



DR. SUJOY MUKHERJEE,
MBBS, MD (Physiology),
DM Resident, AIIMS Patna

Dr. Sujoy Mukherjee (Inventor):
dr.sujoywbmes123@gmail.com
Mobile: +91-8620937923

SYSTEM AND METHOD FOR PRE-EXERCISE DYNAMIC ELECTRO-AUTONOMIC INSTABILITY DETECTION

Assistant Professor, WBMES

Contact number: +91-8620937923
Email ID: dr.sujoywbmes123@gmail.com

MISSION IS ATMANIRBHAR BHARAT & VIKSIT BHARAT

* GymGuard-SCD is an advanced clinical support system designed for multi-parametric sudden cardiac death risk stratification. This innovative device performs pre-exercise electro-autonomic instability detection, representing the future of sports cardiology and supporting the vision of Atmanirbhar Bharat.