

## Daytime Sleepiness, Sleep Hygiene Practice, myths and concepts about sleep in Indian adolescents – A Public Health Concern

Deepesh Vaidya<sup>1,2\*</sup>, Archita Joshi Bhatt<sup>1</sup>

<sup>1</sup> Department of Pulmonology and Sleep Medicine, Health City Cayman Island, East End, Cayman Islands

<sup>2</sup> Department of Public Health, Texila American University, George Town, Guyana

\*Corresponding Author: [deepesh.vaidya@healthcity.ky](mailto:deepesh.vaidya@healthcity.ky)<sup>1</sup>

### Abstract

*Introduction:* Sleep deficiency among adolescents has been recognized as a serious Public Health concern globally. This study aimed to evaluate relationship between age, gender, ESS, sleep hygiene practice and myths/concepts about sleep among Indian adolescents.

*Material and methods:* After obtaining permission from schools and guardians, a cross-sectional study using an online survey questionnaire was conducted among school-going adolescents in class 8 to 10, between 13-17 years of age, in Mumbai region of India. Daytime sleepiness was assessed using Epworth Sleepiness Scale for children and adolescents (ESS-CHAD). Sleep myths were converted in questions to check awareness about sleep myths/concepts. The data obtained was computed and was analysed using SPSS software.

*Results:* 5041 students were included, of which 2174 were female (43.1%) and 2867 (56.9%) were male. Majority of the students were in Class 10 (n=2237, 44.4%). The mean age of the participants was  $14.98 \pm 0.913$  years. Significant correlation between age, ESS score ( $p=0.00$ ), sleep concept score ( $p=0.001$ ) and sleep practice ( $p < 0.01$ ) was noted. Gender did not affect ESS, sleep concept score and sleep hygiene practice.

*Conclusion:* Significant correlation was observed between the ESS score, sleep concepts and sleep hygiene practice. Gender had no co- relation with ESS, sleep concept score and sleep hygiene practice.

*Keywords:* Sleep hygiene, Public health, Adolescents, sleep-wake cycle, age, gender, and ESS score.

### Introduction

Insufficient sleep among adolescents has become a serious public health concern. Reports have suggested that inadequate sleep along with early school start time is associated with daytime sleepiness, an increase in depression, and negative mood among school-going children (1). It was reported in a recent review that "insufficient sleep syndrome" a condition often characterized by the lesser sleep time has become a public health epidemic. This condition is more commonly found in adolescents. In this age group, the tendency to delay sleep because of cultural, social, and academic pressure overshadows the developmental need for sleep. This finally leads to chronic sleep deprivation (2).

Adolescence is a period of rapid growth and many physiological changes are common along this time including changes in the sleep-wake cycle, sleeping time, the circadian rhythm of

sleeping time, and so on. In a report published by the National Sleep Foundation, it was mentioned that there exists a clear relationship between health, sleepiness, and productivity. Moreover, it was also suggested that a sleep duration of 8 hours to 10 hours is required for any adolescent individual (3). Sleep deprivation or getting less amount of sleep is found to impact the academic success of school-going children and affecting their learning process. Moreover, it was also reported that general sleep concepts regarding adolescent's sleep patterns are also misleading (4).

Several studies done that have investigated the effect of age, gender, and other demographic parameters of the sleeping pattern of adolescents. Previous studies that have evaluated the effect of gender and age on adolescent's sleep patterns have shown inconclusive results. Many of the studies have found no difference in the sleep pattern of boys and girls (5). Whereas in one

study males were shown to have better sleep hygiene scores compared with their female counterparts (6).

Sleep hygiene is a practice that ensures the optimization of daytime functioning and promotes good sleep. This practice again is based on different habits such as maintaining regular bed and rise times, ensuring a favourable bedtime environment, having a relaxing sleeping schedule, etc. Studies have shown that sleep quality in adolescents is affected by the sleep hygiene practices maintained by them (7).

The primary aim of this study is to evaluate the relationship between age, gender, ESS, sleep hygiene practice, and Myth/Concepts about sleep in adolescents.

## Material and methods

### Study participants

This is a cross-sectional study. Before the initiation of the study ethical clearance was obtained from the institutional ethics committee. All the school-going adolescents studying in class 8<sup>th</sup> to 10<sup>th</sup> in the age group of 13-17 years in region of Mumbai and nearby districts of Navi Mumbai, Maharashtra, India, were included in the study. Administrator of various schools and coaching classes were contacted. Aim, objective and importance of the study was explained and institution which were willing to participate were provided with consent forms to be distributed in class to get parental consent. Consent was also taken from students taking part in the study.

### Inclusion criteria

- Students studying in the 8<sup>th</sup> standard to 10<sup>th</sup> standard who have assent were included in this study
- *Exclusion criteria*
- Unwilling participants were excluded
- Parents who did not give consent were also excluded

## Study tools

Sleep myths were converted into questions to find out clarity of the sleep myths/concepts (8). Excessive daytime sleepiness was assessed using the Epworth Sleepiness Scale for children and adolescents (ESS-CHAD) (9). This scale evaluates excessive daytime sleepiness in individuals. This questionnaire consists of 8 questions that reveal chances of dozing in particular situation of an individual. In this scale 1 indicates lower chances of dozing, 2 moderate, and 3 severe chances of dozing. A total score higher than 10 indicates daytime sleepiness. Demographic information including height, weight, date of birth.

## Study protocol

An online survey was designed in survey monkey and was shared with various institutions to get it filled from their students. Once the permission was obtained from the schools the questionnaire was distributed among the students. The chief investigator visited each class and explained them the study survey in detail. The demographic parameters including, age, gender, and other details were also calculated.

## Statistical analysis

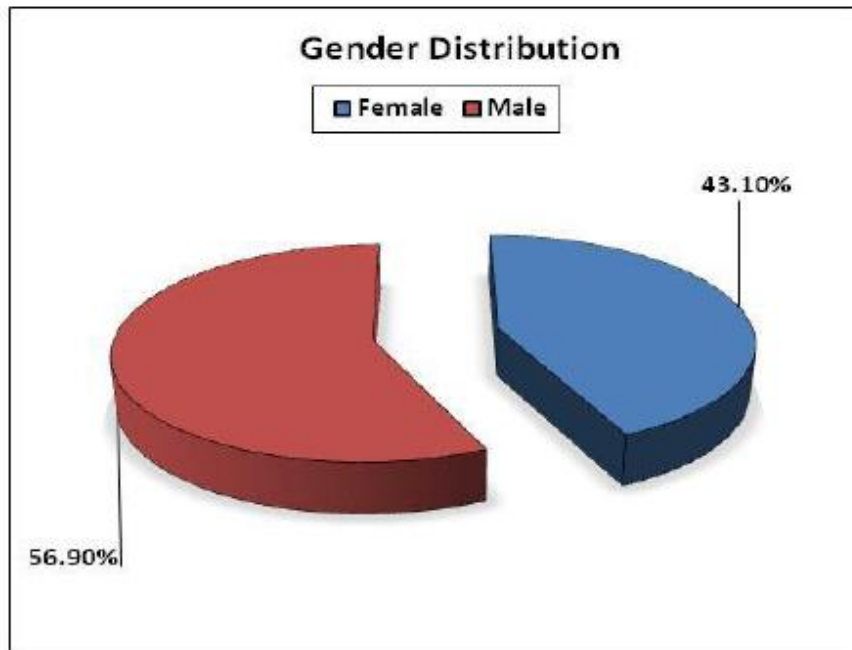
The data was entered and tabulated in Microsoft Excel. After the tabulation was complete it was analysed using SPSS software (version 21.0). The descriptive statistics data were calculated as mean  $\pm$  standard deviation. Pearson's chi-square test was conducted for deduction of significance and a p-value<0.05 was regarded as statistically significant.

## Results

In this study total, 5041 students were included in which 43.1% was female (n=2174), and 56.9% were male participants (n=2867) (Table 1, Figure 1).

**Table 1.** Gender distribution of the study participants

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	2174	43.1	43.1	43.1
	Male	2867	56.9	56.9	100.0
	Total	5041	100.0	100.0	

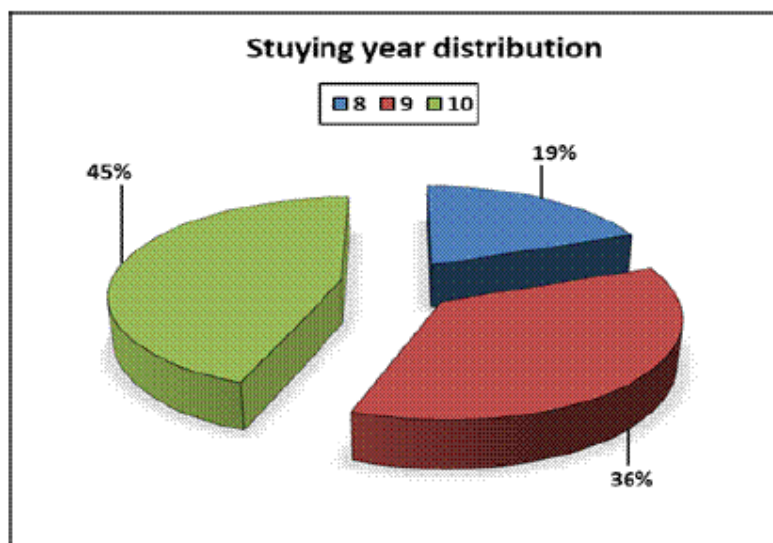


**Figure 1.** Gender Distribution

The maximum of the students was studying in 9th standard (n=1828, 36.3%) and 8th standard the 10th standard (n=2237, 44.4%), followed by 10th standard (n=976, 19.4%) (Table2, Figure 2).

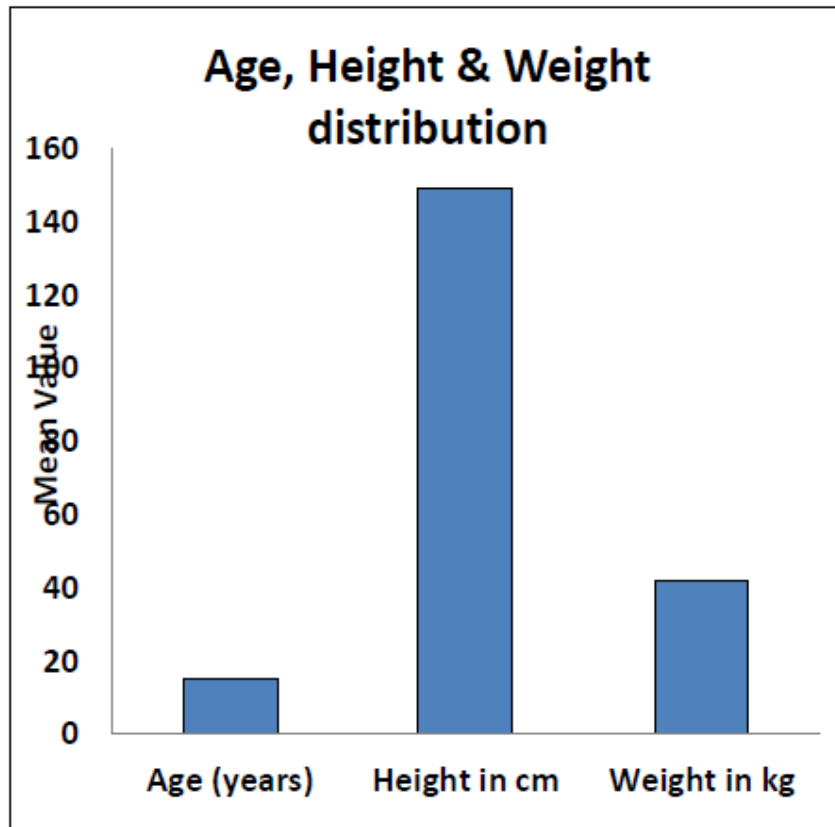
**Table 2.** school years among study Participants

Studying year		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	8	976	19.4	19.4	19.4
	9	1828	36.3	36.3	55.6
	10	2237	44.4	44.4	100.0
	Total	5041	100.0	100.0	



**Figure 2.** School years distribution

The mean age of the participants was 14.98±0.920, mean height of the participants was 149.16±7.281 centimetres' and mean weight was 42.004±6.293 kilograms.



**Figure 3.** Mean Age, Height and Weight distribution

**Table 3.** Mean Age, Height and Weight of participants

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age (years)	5041	13	17	14.59	.920
Height in cm	5041	115	254	149.16	7.281
Weight in kg	5041	23.0	73.0	42.004	6.293

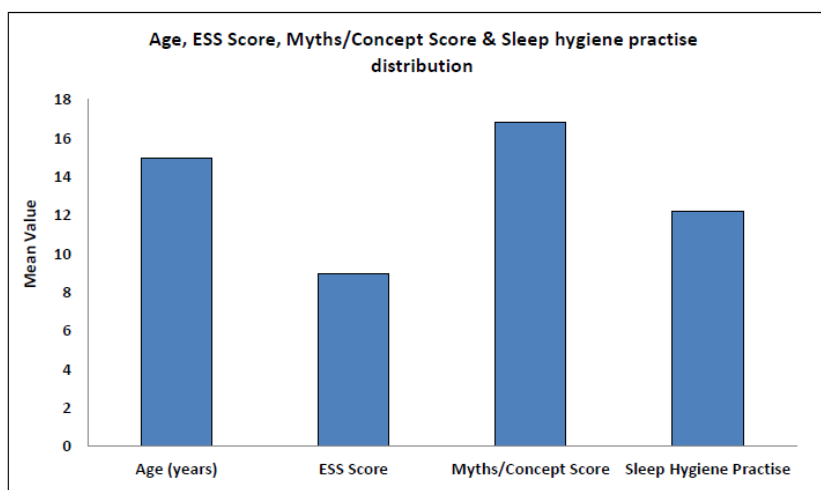
The correlation between the age and ESS scores showed a significant association (P-value=0.00). The sleep Myths/concept was also associated with age. However, no such correlation was reported for sleep hygiene practice and the age of the participants. (table 4).

**Table 4.** Relationship between Age, ESS, Sleep Hygiene Practise, and Myths/concepts about sleep in adolescents

Descriptive Statistics			
	Mean	Std. Deviation	N
Age (years)	14.59	.920	5041
ESS Score	8.94	3.125	5041
Myths/Concept Score	16.82	4.523	5041

Sleep Hygiene Practise	12.16	2.726	5041
------------------------	-------	-------	------

Correlations						
		Age (years)	ESS Score	Concept Score	Sleep wake in school Score	Sleep Hygiene Practise
Age (years)	Pearson Correlation	1	0.056**	-.048**	.105**	.017
	Sig. (2-tailed)		0.000	0.001	0.000	0.218
	N	5041	5041	5041	5041	5041
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						



**Figure 4.** Mean Age, ESS, Sleep Hygiene Practise, and Myths/Concepts about sleep in adolescents

**Table 5.** Scoring key for different parameters of survey

<b>ESS -CHAD</b>	lower normal Daytime sleepiness	Higher normal Daytime sleepiness	Mild Excessive Daytime Sleepiness	Moderate Excessive Daytime Sleepiness	Severe Excessive Daytime Sleepiness
<b>Scores Range</b>	0 to 5	6 to 10	11 to 12	13 to 15	16 to 24

<b>Myths/Concepts</b>	<b>Scores Range</b>
Good Concepts about sleep	6 to 11
Average Myths/Concepts about sleep	12 to 20
Poor Concepts / High Myths about sleep	21 to 30

Sleep Hygiene Practice	Scores Range
Good	1 to 7
Average	8 to 15
Poor	16 to 25

## Discussion

In adolescents sleep loss becoming increasingly common incidents. It has recently become a prime public health concern. Insufficient sleep in the adolescent period results in excessive daytime sleepiness and thus affecting the academic performance of school-going children. Despite the negative consequences and increasing prevalence of sleep loss in adolescents, the awareness related to the health issues associated with insufficient sleep is inadequate among the general public and health professional. The present paper investigated the association of age, gender, excessive daytime sleepiness, sleep hygiene practice and Myths/Concepts about sleep in adolescents.

A significant difference was observed among adolescents in age, ESS score, and sleep hygiene practice. A mean sleep hygiene score as reported in this study was  $12.16 \pm 2.726$ , indicating compromised sleep hygiene among the participants. In one rare study done by Ofovwe in 2008 among Nigerian children, reported high prevalence of poor sleep hygiene among participants. (7).

This study also showed a significant association between the age and the ESS score. Previous studies have shown that age is associated with sleep time. Sleeping time decreases almost by 45 minutes in the age group between 14 years to 18 years (10).

Although daytime napping is not allowed for school-going children, it can help in lessening the sleep debt on weekdays. There exists almost a universal trend about daytime sleepiness in adolescents. Students from higher grades in school often found falling asleep in the classroom and are the most common symptom of insufficient sleep (11). This in turn affects academic performances and subjective capabilities.

A mean sleep myths/concept score as reported in this study was  $16.82 \pm 4.523$ , indicating compromised sleep concepts or prevalence of

myths among the participants. This is a pioneer study that tried to find out prevalence of sleep myths among adolescence.

Despite several strengths, this study also has a few limitations. Firstly, this study couldn't evaluate the effect of other factors affecting sleep such as alertness-promoting behaviors, sharing the bed with other siblings, or usages of electronic gadgets in bed. These areas need to be evaluated in another study. In addition, information gathered using a questionnaire always gets biased by the understanding of the participants about that particular question. Though we have tried to eliminate this possibility still replication of a similar study is warranted for further confirming the findings of this study.

## Conclusion

This study showed that age is associated with the ESS score and sleep myths/concept score. In addition, this study also found out that poor sleep hygiene practice and sleep myths/concepts is prevalent in Indian adolescents. Public Health authorities can work and include study material about sleep awareness in school curriculum, which can create awareness and importance of sleep.

## Acknowledgements

I would like to extend my thanks to all who have helped me in this research along with HCCI management, Dr. Archita Joshi Bhatt (HCCI), Dr. Amol Vaidya (HCCI), Dr. Diwakar Sharma (HCCI), Ms. Jayarani Manikandan (HCCI), Mr. Parag Bane (Parag Vidyalay), Dr. Kusum Bist (Ramkali School), Prof. Vikramjit Singh (Vikarm English Academy), Raji Sir (Students Academy), Mukesh Sir (Mukesh Classes), Rajesh Sir (St. Ignatius High School), Rajesh Sir, (Kanchan Classes), Mr. Shailesh Goregoankar (Kshitij classes), Mr. Chandrakant Waghmare (Kshitij classes), Santosh Gitye (Kshitij classes) Mr. Yogesh Mehrol, Ms. Vidula Abhyankar, Ms. Sneha Sawant, Ms. Seema, Ms. Shruti, and Last

but not least, to all the students who participated in research.

### **Financial support and sponsorship**

Nil.

### **Conflicts of interest**

There are no conflicts of interest.

### **References**

- [1]. Louzada F. Adolescent sleep: a major public health issue. *Sleep Sci.* 2019;12(1):1.
- [2]. Chattu VK, Sakhamuri SM, Kumar R, Spence DW, BaHammam AS, Pandi-Perumal SR. Insufficient Sleep Syndrome: Is it time to classify it as a major noncommunicable disease? *Sleep Sci.* 2018;11(2):56–64.
- [3]. Hirshkowitz M, Whiton K, Albert SM, Alessi C, Bruni O, DonCarlos L, et al. National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health.* 2015;1(1):40–43.
- [4]. Owens J, Group ASW, Adolescence CO. Insufficient Sleep in Adolescents and Young Adults: An Update on Causes and Consequences. *Pediatrics.* 2014 Sep 1;134(3): e921–32.
- [5]. Randler C, Bilger S, Díaz-Morales JF. Associations among Sleep, Chronotype, Parental Monitoring, and Pubertal Development among German Adolescents. *J Psychol.* 2009 Sep 1;143(5):509–20.
- [6]. Thycad B. Sleep duration and sleep hygiene practices in adolescents: Age and gender differences. *Nitte Univ J Health Sci.* 2014 Dec 1;4.
- [7]. Ofovwe G, Ofovwe C. Sleep Hygiene in Nigerian Children. *IFE Psychol.* 2008 Nov 4;16.
- [8]. Sleep Foundation. Myths and Facts about Sleep [Internet]. Sleep Foundation. 2009 [cited 2020 Jun 24]. Available from: <https://www.sleepfoundation.org/myths-and-facts-about-sleep>.
- [9]. Johns MW. A New Method for Measuring Daytime Sleepiness: The Epworth Sleepiness Scale. *Sleep.* 1991 Nov 1;14(6):540–5.
- [10]. Gibson ES, Powles AP, Thabane L, O'Brien S, Molnar DS, Trajanovic N, et al. "Sleepiness" is serious in adolescence: Two surveys of 3235 Canadian students. *BMC Public Health.* 2006;6(1):116.
- [11]. Pallesen S, Saxvig IW, Molde H, Sørensen E, Wilhelmsen-Langeland A, Bjorvatn B. Brief report: behaviorally induced insufficient sleep syndrome in older adolescents: prevalence and correlates. *J Adolesc.* 2011;34(2):391–395.