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A study on assessment of sleep pattern among school-going adolescents in semi-urban Chennai

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ABSTRACT

Adolescent sleep pattern exerts an influence on their physical and mental wellbeing. Several factors such as academic stress, biological and psychosocial factors contribute to adolescent sleep. Reduction in the quantity and quality of sleep can lead to increased daytime sleepiness, interfere with cognitive functioning, memory as well as can lead to behavioural problems.300 adolescent school children in semi-urban Chennai participated by filling a questionnaire which was based on self- reporting of sleep pattern and sleep hygiene. On an average, most adolescents obtained inadequate sleep during the weekdays. The adolescents commonly reported daytime sleepiness, difficulty in falling asleep after going to bed, anxiety, morning headache and feeling tired of waking up in the morning. About half of the participants reported that parents exerted an influence on waking up time. Many adolescents reported the use of social media while going to bed which can reduce sleep duration. Paediatricians can play an important role in promoting healthy sleep practices by providing anticipatory guidance to adolescents and their parents.

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INTRODUCTION

Sleep is not only a biological necessity but also a physiological drive during adolescence as almost one-third of time is spent in sleep. According to the National Sleep Foundation, adolescents require approximately 8.5 to 9.5 hours of sleep each night. Impaired sleep can affect the physical and mental wellbeing in many ways. The adolescence period is associated with increased independence, autonomous functioning and social behaviour. They are vulnerable to sleep difficulties due to academic pressure, examinations, finishing homework, socializing and activities such as television watching, using mobile phones and video games. Adolescent sleep is compromised with the delay in bedtime, more so for late adolescents compared to early adolescents. Also, during adolescence, there is a change in the biological sleep pattern toward later times for both sleeping and waking up (Talbot *et al*., 2010). During early adolescence parents usually, exert a significant influence on sleep pattern by regulating the time of going to bed and waking up compared to late adolescence period. Brain activity during sleep may provide a unique window onto adolescent cortical maturation and compliment waking measures.

There is concern about inadequate sleep during adolescence as it has been observed that sleep deprivation can lead to excessive daytime sleepiness (Carskadon, 2011). Sleep deprivation can also lead to behavioural problems such as hyperactivity, irritability and depression. Several studies have linked association of poor sleep habits with cognitive impairment, reduced academic performance, attentional difficulties, school absences and poor memory. Sleep deprivation

leads to anxiety which in turn affects cognitive performance (Carskadon, 2011).

Measurement of sleep behaviours can be done by self -reporting of sleep or by using actigraphy and polysomnography. Actigraphs are wristwatch-like devices that provide an estimate of the sleep/wake cycle via movement using a sensor, a processor and memory (Talbot *et al.,* 2010). This study was undertaken to assess the sleep pattern of adolescent children with respect to sleep duration and sleep hygiene practices. Sleep hygiene has been defined as those behaviours that are believed to promote improved quantity and quality of sleep.

MATERIAL AND METHODS

This cross-sectional observational study was conducted from June till August 2018. Participants were selected from a secondary school in semi-urban Chennai, Tamil Nadu. Institutional ethics approval was obtained. Children studying in 8th to the 12th standard were included. Written parental consent was obtained. Only those children who had written consent form signed by their parents were included. Assent from adolescents for their willingness to participate in the study was obtained since all were less than 18 years. Children who had any chronic illness or those on long term medications were excluded from the study. The questionnaire had two parts; the first part included demographic data such as age, class and questions such as 'At what time do you go to bed? (school days /weekends) "How many hours on an average do you sleep at night?" "Do your parents influence the time of going to sleep and getting up from bed?" "Do you experience difficulty falling asleep immediately after going to bed?" "Do you have trouble staying awake in the day while performing daily tasks?" "Do you rely on an alarm to wake up in the morning? "Do you feel tired when you wake up in the morning?" Do you experience morning headaches? "The face validity was done. The second part of the questionnaire included the Sleep Hygiene Index. The questionnaire was handed to 300 children, and data collection was done obtained from all the participants.

The Sleep Hygiene Index (SHI) (Mastin *et al*., 2006) was selected to measure sleep practices for this study. It is a self-rated instrument which has 13 items which assess the presence of behaviours that are thought to compromise sleep hygiene. Participants are asked to rate their responses on a 5 point Likert scale depending on how often they engage in specific behaviours as always, frequently, sometimes, rarely and never. Each item is then coded with scores ranging from 5 (always) to 1 (never). The items are added yielding a global assessment score for sleep hygiene ranging from 13 to 65. Higher scores are indicative of more maladaptive sleep hygiene practices.

RESULTS

300 participants were comprised of 150 boys and 150 girls. All the participants completed the questionnaire. They were in the age group from 13 to 18 years. An equal number of boys and girls participated.

Table 1: Demographic features of Participants

	Age(years)	Boys	Girls
Standard VIII	13-14	27	44
Standard IX	14-15	27	14
Standard X	15-16	21	26
Standard XI	16-17	46	42
Standard XII	17-18	29	24
Total		150	150

Table 2: Average hours of night sleep during weekdays and weekends

	Boys		Girls	
Standard	Weekdays hr	Weekend hr	Weekdays Hr	Weekend Hr
VIII	8 .00	9 .50	7 .40	10
IX	7 .30	9.20	8.00	9 .40
X	7.40	9.10	7.40	9.50
XI	7 .40	9.20	7 .40	9 .10
XII	6.50	9.10	6 .20	8 .20

Table 3: Sleep Hygiene Index Global scores

SHI Global scores	Number (n=300)	Percentage
13-25	70	23.33 %
26-38	200	66.66 %
39-51	30	10 %
52-65	0	0

The adolescent girls slept on an average for 6-8 hours during weekdays and 8-10 hours during weekends. On average boys slept for 7-8 hrs on weekdays and 9-10 hrs on weekends. Adolescents studying in higher standards slept lesser on weekdays compared to others.

Out of 300 adolescents, 39 girls (13 %) had complaints of daytime sleepiness while 37 boys (12.3%) gave complaints of daytime sleepiness. Out of 300 adolescents, 34 girls gave reasons for late night sleeping (watching television-8, using mobile phones-14, reading story books-2) while 37 boys gave reasons for late night sleeping (watching television-4, using mobile phones-25 and reading books-8).

31 children (10.3%) stated that they take frequent short naps during the daytime, school hours or tuition hours. Parents influence the time of going to bed for 85 children (28.3%) while parents exert influence on getting up from bed for 171 children (57%).88 children (29.3%) rely on an alarm to

Table 4: Sleep Hygiene Index questions

SHI questions	Never or rarely	Sometimes	Frequent/always
I go to bed at different times from day to day	142(47.3%)	69(23%)	89 (29.6%)
I get out of bed at different times from day to day	167(55.6%)	78(26%)	55(18.3%)
I go to bed feeling stressed, upset or nervous	153(51%)	87(29%)	60(20%)
I use my bed for things other than sleeping(watch TV etc.)	120(40%)	65(21.6%)	115(38.3%)
I do important work before bedtime(reading, writing, studying)	52(17.3%)	84(28%)	164(54.6%)
I think, plan or worry when I am in bed	72(24%)	61(20.3%)	167(55.6%)

wake up in the morning. Some children who experienced difficulty in falling asleep immediately after going to bed were 104 (34.6%). 45 children wake up during the night, and 32 children had problems going back to sleep after waking up at night. 3 children (1%) relied on frequent medications to get better sleep at night.

About 32(10.6%) children complained of a morning headache, and 77 (25.6 %) complained of feeling tired of waking up in the morning. 31 (10.3%) children had trouble staying awake in the day while performing daily tasks.

Almost 54 % of children did important work before bedtime like reading, writing and studying. About 55.6% said that they think, plan or worry when they are in bed. 38.3 % children use the bed for other things like watching television.

DISCUSSION

Inadequate sleep during adolescence has been associated with daytime sleepiness, fatigue, poor academic outcomes and risk of depression and anxiety. Several factors such as academic stress, biological and psychosocial factors contribute to adolescent sleep.

According to studies conducted worldwide, it has been observed that during middle and late adolescence period, the timing of bedtime during weekdays is later. In a study in Okinawa Island, a survey was made of the sleep and lifestyle activity of 3754 students from 14 different junior high schools on Okinawa Island which showed that bedtimes became progressively and significantly later as students ascended to higher grades, resulting in adolescent sleep debt (Arakawa M *et al*.,2001).

Another study conducted in Ontario high school revealed that 70 % of students had the sleep of less than 8.5 hours during school nights. (Gibson *et al*.,2006) In the present study, similarly, it has been observed that all children between 13-18 years had less than 8 hours sleep during weekdays. Most of the children between 13-15 years slept by 10-10.30 pm whereas children between 16-18 years went to bed later between 11-12 am. The quantity of sleep was reduced among adolescents of all ages during weekdays. Many adolescents experienced daytime sleepiness. Today's adolescents are growing up in the electronic age, and they have easy access to electronic equipment like mobile phones, computers, video games and television. Several studies have proven that electronic media are the cause of sleep deprivation and sleep disruption. In this study, students gave reasons for late night sleeping, due to the usage of computers, mobile phones and video games. The use of multiple electronic devices at the same time has been associated with less sleep at night and a greater degree of sleepiness during the daytime.

A smaller, focused study of South Australian adolescents found that adolescents who reported a parental-set bedtime versus those without a set bedtime reported earlier bedtimes, more sleep, and less daytime fatigue experienced. As adolescents mature, they display an increased sense of autonomy and set their bedtime and waking up patterns. In the present study, 28 % of adolescents reported that parents set bedtime and 57 % of adolescents said that parents regulated wakeup time in mornings. Whenever parents were involved in the regulation of sleep timings, it led to better sleep practices among children.

Significant personal and public health issues, such as depression and accidental injury and mortality, are associated with insufficient sleep (Short *et al*., 2013). In the present study students reported getting up with a morning headache and feeling tired on waking in the morning. Some students also found it difficult to stay awake while performing tasks. This can lead to poor academic scores due to poor concentration and health issues. There is also growing evidence regarding the link between short sleep duration and increase in obesity due to an alteration in metabolic profiles like insulin, ghrelin and cortisol due to the occurrence of insulin resistance, increased sympathetic nervous system activity, increased hunger and decreased satiety

(Judith Owens, 2014). Sleep Hygiene Index is defined as practices relating to sleep routine, stimulus control, health, environmental, and cognitive/affective variables that impact the quality and quantity of sleep. In our study, it was observed that 23 % of adolescents had normal Sleep Hygiene Index, 66 % were mildly affected while 10 % were moderately affected Sleep Hygiene Index. It is concerning that 20 % of adolescents go to bed feeling stressed and nervous while almost half of them think or worry while in bed.

CONCLUSION

Adolescent sleep loss poses a serious risk to the physical, emotional health and academic success. A large number of adolescents are sleep deprived with less than 8 hours of night sleep on weekdays. There is high variability in time of going to bed and waking up on a day to day basis. Parents can influence the bedtime as well as wakeup time, leading to better sleep patterns and duration. It is important to create awareness among adolescents about limiting the use of electronic media at bedtime which can disrupt sleep. Paediatricians can play an important role in encouraging healthy sleep practices by promoting anticipatory guidance among adolescents and their parents in the clinical setting.

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