SLEEP DEPRIVATION IN ADOLESCENTS - A CROSS-SECTIONAL STUDY

Namrata Vijay Kulkarni1, Vikram Kumar Gupta2

1Assistant Professor, Department of Community Medicine, Government Medical College, Miraj.
2Assistant Professor, Department of Community Medicine, Dayanand Medical College and Hospital, Ludhiana.

ABSTRACT

BACKGROUND
Sleep is a natural requirement of human body. In adolescents, duration of adequate sleep is 8-10 hours. Sleep deprivation has many harmful consequences on health and academic performances among adolescents. Therefore, it is important to know the prevalence of sleep deprivation and identify the preventable modifiable risk factors causing insufficient sleep.

The aim is to study the prevalence of sleep deprivation and to study sociodemographic, academic and other factors affecting sleep quantity during schooldays.

MATERIALS AND METHODS
A cross-sectional study was conducted among students of VIII, IX, X standard of two randomly selected schools. The data was collected using a pretested, semi-structured, self-administered questionnaire.

RESULTS
The average sleep duration was less than 8 hours on school days. Prevalence of sleep deprivation in students was 78.75% during schooldays. Among the enrolled adolescent students, female students were more sleep deprived than male students. Academic workload was the primary reason for sleep deprivation for most of the students. The multivariate analysis revealed a statistically significant association between sleep deprivation factors like age, mother’s education and participation in sports by students. Computer use for >2 hours was associated with increased odds of sleep deprivation.

CONCLUSION
The duration of watching television or using internet must be restricted to the minimum, proper time management for academics and sports may help adolescents get adequate sleep. Also educating mothers about the importance of adequate sleep in children and measures for the same is important to reduce sleep deprivation among children.

KEYWORDS
Adolescents, Adequate Sleep, Sleep Deprivation.


BACKGROUND
Sleep is a natural requirement of human body. Total sleep time alters dramatically during lifetime. The newborn baby sleeps up to 16 hours a day but thereafter daily sleep time decreases gradually to about 11 to 12 hours in children between one to four years of age and even less during adolescence.[1] Adequate sleep duration for adolescents, as recommended by the National Sleep Foundation is 8-10 hours per day.[2] Amount of sleep is a crucial determinant of good health and health related behaviours. Adequate sleep is essential for physical and mental well-being. However, changing physiological, behavioural, socio-cultural and environmental factors are resulting into deficient sleep.[3] Sleep affects overall development as also the rational functioning, learning ability and attentiveness.[4] Sleep deprivation can be attributed to various reasons like early school start timings, development related changes in circadian rhythm, late night studies, lifestyle and habits.[5]

Sleep deprivation may affect mood, learning ability and also result into development and manifestation of various health disorders like obesity.[6] In adolescence, poor sleep patterns are associated with daytime sleepiness, negative moods, susceptibility to stimulant use, poor school performance, and increased risk of accidents or unintentional injuries.[3]

Sleep deprivation has many harmful consequences on health and academic performances among adolescents. Therefore, this study was conducted to know the prevalence of sleep deprivation and identify the preventable modifiable risk factors causing insufficient sleep so that intervention can be done.

OBJECTIVES
To know the prevalence of sleep deprivation and identify the preventable modifiable risk factors causing insufficient sleep.

MATERIALS AND METHODS
A cross sectional study was conducted among students of VIII, IX, X standard of two randomly selected schools. The duration of the study was 2 months. Those participants who were willing to participate were enrolled after obtaining an informed consent from them. Participants were minors, so study and its purpose was explained to the participants, parents and principal of school. A pretested, semi-structured, self-administered questionnaire was used to collect the sociodemographic characteristics, academic and other factors.
affecting sleep quantity. Total calculated sample size was 240. Statistical analysis was done using percentages in Microsoft Excel 2010. Approval for the study from the institution’s ethics committee was taken before start of the study.

RESULTS
The present study enrolled 240 students from both the schools.

Out of the total students enrolled, 77 (32.08%) students were 13 years old, 55 (22.91%) students were 14 years old and 108 (45.01%) students were 15 years and above. Among the total students, there were 111 (46.25%) male students and 129 (53.75%) female students. Among the total students, 113 (47.08 %) belonged to joint families while 127 (52.92%) belonged to nuclear families.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Females N</th>
<th>Males N</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 yrs</td>
<td>55</td>
<td>22</td>
<td>77</td>
</tr>
<tr>
<td>14 yrs</td>
<td>23</td>
<td>32</td>
<td>55</td>
</tr>
<tr>
<td>15 yrs</td>
<td>51</td>
<td>57</td>
<td>108</td>
</tr>
<tr>
<td>Total</td>
<td>129</td>
<td>111</td>
<td>240</td>
</tr>
</tbody>
</table>

Table 1. Age-Gender Wise Distribution of Students

Average sleep duration seen among the enrolled students was 7 hrs. during school days. Prevalence of sleep deprivation (duration of sleep <8 hrs.) among students was 78.75% during schooldays. About 76 (68%) out of total females and 70 (54%) out of total males were sleep deprived during school days. About 45 (58.44%), 38 (69.09%) and 52 (48.14%) students from 13, 14 and 15 years of age respectively slept less than 8 hrs. during schooldays. About 90% of the students mentioned studies (increasing academic workload) as the primary reason for sleep deprivation.

<table>
<thead>
<tr>
<th>Physical activity</th>
<th>Regular N (%)</th>
<th>Irregular N (%)</th>
<th>Total N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise (walking, cycling, jogging, yoga)</td>
<td>127 (52.19)</td>
<td>113 (47.81)</td>
<td>240</td>
</tr>
<tr>
<td>Participate in sports or play outdoor games</td>
<td>185 (75.41)</td>
<td>55 (24.59)</td>
<td>240</td>
</tr>
<tr>
<td>Watch TV</td>
<td>136 (56.66)</td>
<td>104 (43.33)</td>
<td>240</td>
</tr>
<tr>
<td>Computer/Laptop or play video games</td>
<td>72 (30)</td>
<td>168 (70)</td>
<td>240</td>
</tr>
</tbody>
</table>

Table 2. Physical Activity Pattern, use of Television or Computer and Sleep Patterns among Students

A statistically significant positive association was seen between sleep deprivation and factors like higher age of adolescents, mother’s education and participation in sports by students. Computer use > 2 hrs. among adolescents was positively associated with increased odds of sleep deprivation (Table 2).

DISCUSSION
The average sleep duration among the students enrolled in the present study was 7 hrs. The average sleep duration among adolescents in the suburban high school of New York was 9.8 hours.[7] The prevalence of sleep deprivation during school days was seen in about 78.5% of the students enrolled in the present study. A study in the US adolescents showed that sleep deprivation on an average school night was prevalent among 69% of the students.[8] The prevalence of sleep deprivation was more among female students in the present study. In a study conducted among adolescents aged between 11-17 years in the US, being a female was positive predictor of inadequate sleep.[9] The present study showed that about 70% of the students spent more than two hours on computer or games. A study among adolescents in the suburban high school of New York demonstrated about 38% and 11% students to be playing computer games for less than two and more than two hours respectively, in a day.[10] The present study demonstrates difficulty falling asleep among 34.8% students. However, a study conducted among Hong Kong Chinese students showed that difficulty falling asleep was prevalent among 3.2%, 4.6%, 6.5% of the students aged 12-13,14 and 15 years
respective.[9] The present study indicates that about 21.42% adolescent students had daytime sleepiness.

A study in Canada among adolescents from two secondary schools showed daytime sleepiness to be prevalent among an average of 41.5% students.[10] The present study demonstrated that the sleep duration among students of age 14 years was less than among those aged 13 years. A study conducted among urban school going adolescents showed that sleep time decreased with increasing age.[11] A study among US adolescents also demonstrated that sleep time decreased with increasing age.[8] The present study shows academic workload to be the primary reason for inadequate sleep. Hectic after-school schedule, homework, results into late bedtimes.[3] The present study demonstrates that lower educational status of mothers was significantly positively associated with sleep deprivation among adolescents. However, a study conducted among adolescents between ages 13-18 years in Taiwan showed no statistically significant association between parental education status and adequate sleep.[12] The present study demonstrated statistically significant association between participation in sports and sleep deprivation. A study conducted among athletes compared with controls demonstrated better sleep patterns in athletes as compared to controls.[13] A study conducted among boys aged 13-18 years in Taiwan, showed that regular exercise was significantly associated with low sleep.[12] In the present study, computer use >2 hrs. was associated with increased odds of sleep deprivation. A study conducted among ninth grade students aged between 13 and 16 years in New York showed that use of technology during night time affected sleep negatively.[7]

CONCLUSION
This present study therefore takes into account various modifiable and non-modifiable risk factors associated with sleep. A statistically significant positive association was seen between sleep deprivation and factors like higher age of adolescents, mother’s education and participation in sports by students. Preparing proper study timetable without burdening students, educating mothers about the importance of adequate sleep in children and measures for the same is important to reduce sleep deprivation among children. Similarly proper time management for academics and sports may help adolescents get adequate sleep. It is seen that computer use >2 hrs. among adolescents was positively associated with increased odds of sleep deprivation. The duration of watching television or using internet must be restricted to the minimum.

Recommendations
1. For Parents: Awareness should be enhanced through parents meetings in schools. Special sessions should be conducted on importance of adequate and good sleep, factors conducive to good sleep and altered sleep patterns and its effects on health.
2. For Students: They should be taught importance of adequate and good sleep, factors conducive to good sleep, altered sleep patterns and its effects on health.
3. For Schools: Students and parents counselling needs to be emphasised and should be done in schools. School health services, monitoring of health of school children should encompass aspects of sleep.

Practice of the art of mental relaxation through our traditional teachings like meditation and yoga has to be promoted at home and schools. Corrective measures in schools like delayed school timings may be adopted.

Weakness/Limitations
The present study was a cross-sectional study; hence causality cannot be proved. The number of participants enrolled is small, hence the results cannot be generalised. Subjective assessment of sleep is done in this study which is less reliable than objective method like actigraphy and polysomnography.

REFERENCES