Prevalence and Predictors of Sleep Wake Disturbances Among Adolescents

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ABSTRACT

Introduction: A sound, restorative sleep is the foundation of a healthy life. A wholesome sleep ensures that your moods, emotions, reflexes, and cognitive ability are at their best when you are awake. Addressing sleep disorders is a very important step one can take to have a healthy, wholesome life. The aim of the study was to identify sleep quality of school going adolescents from 8th to 12th standard and to determine predictors of disturbed sleep patterns.

Material and Methods: A community based cross-sectional analytical study compromising 1000 school going adolescents between 8th to 12th standard studying in government and private schools of city of Gwalior for duration 1 year. Questionnaire prepared on Pittsburg Sleep Quality Index guidelines were distributed to them. They were asked to be filled by the students along with their parents on occasions of parent-teachers meetings and taken back on the same day and evaluated.

Results: In a study of 1000 school going adolescents, prevalence of poor sleep quality (PQSI score>5) is more in adolescents with age 15-17years, class standard 11th and 12th, lower economic status and children with poor school performance. The mean time of sleeping was 7.1±.67 hours on weekdays and 7.42±0.35 hours on weekends. Poor sleep was found in children with increased use of mobiles. Most common sleep disturbance found in the adolescents was nightmares.

Conclusion: With increase in academic pressure, introduction of newer technologies and change in the sleep pattern of children ("enjoying up late"), they are suffering from sleep debt and decrease in school performance. The pattern of sleep wake disturbances was found to vary compared to other studies (nightmares and recurrent washroom use being more common).

Keywords: Adolescents, Pittsburg Sleep Quality Index, class standard 8th to 12th, government schools, private schools

INTRODUCTION

Sleep is a primary aspect of adolescent development. The way adolescents sleep critically influences their ability to think and work. Likewise, daytime activities and personal habits have significant impact on adolescents' sleeping pattern.

Over last 2 decades, researchers, teachers, parents and adolescents themselves have consistently reported that they are not getting enough sleep. This is not because they have decreased requirement of sleep but change in sleeping habits like "enjoying stay up late". Adolescents are in a development stage that involves biological changes and changes in the social roles which have great impact. This has a repercussion on their sleep habits and patterns, since they are in a transition stage between the child sleep pattern and that of the adults. The study of sleep in this juvenile population is of great interest because it can contribute to knowledge on the external and internal influences in the establishment of sleep patterns.[1]

The concept of sleep quality is a construct that may be evaluated using self-report scales. The resulting elements vary according to the individuals surveyed. The evaluation is basically subjective and depends on various variables like total duration of sleep, work and study times, mood etc. Nine scales or questionnaires to evaluate sleep in adolescents were found in the bibliography reviewed. The modified Pittsburg sleep quality index (19 items) was used to assess and evaluate the sleep of adolescents studying in different government and private schools in the last month.

Various behavioral factors (social, academic, work related), environmental constraints (school schedule) and individual factors influence the child's sleep patterns. This leads to going to bed late in the night and difficulty in waking up in the morning. Adolescents struggle to stay alert and function successfully during the daytime.

This study aims at determining sleep quality of the adolescents in last one month. Also determine whether he/she is good sleeper or poor sleeper. It also aims at finding the association of sleep quality of adolescents with various individual, social and environmental factors.

MATERIAL AND METHODS

It was a cross-sectional study done in higher secondary schools of city of Gwalior. By multi-stage random sampling method one government and one private school was selected randomly. Permissions were taken from school authorities. Institutional ethical committee approval and written informed consent were taken. The estimated sample size is 1000 determined by statistical calculation based on prevalence of sleep wake disturbace disorders among adolescent.

The proformma included the assessment of sleep quality for which modified Pittsburgh Sleep Quality Index scale was used and Pittsburgh sleep quality index score was calculated. A score less than 5 is considered as "good sleeper" and above 5 is considered as "poor sleeper". Information regarding age, sex, socio-economic status, last class test result, hours of home-work, hours of T.V. viewing and mobile use, time taken for falling asleep, total hours of sleep etc was included. The questionnaires were filled by the adolescents and parents together and were

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collected on the same day (day of gathering like parents-teachers meet). Collected data was compiled and analyzed.

Inclusion criteria

School going adolescents between 8th to 12th (Government and private schools).

Exclusion criteria

Adolescents who have chronic illness and on medication for the illness (excluding sleep medicines)

Adolescents who are staying away from home and parents.

Adolescents whose parents had not given written consent.

Pittsburgh Sleep Quality Index - PSQI (Buysse et al. 1989)[2]

The PSQI was validated in Portuguese by A.N. Bertolazi, unpublished data. The PSQI instrument is reliable and employed internationally to assess sleep quality in aretrospective manner. The PSQI score evaluates sleep quality during the last month and is composed of 19 (nineteen) self-evaluating items whose overall score ranges from 0 to 20 (zero to twenty). Individuals with score of less than 5 were supposed to have good sleep and those with more than 5 to have poor sleep. The PSQI evaluates various items like subjective sleep quality, latency of sleep, duration of sleep, habitual efficiency of sleep, disturbances of sleep, use of drugs and daytime sleepiness.

STATISTICAL ANALYSIS

The data was compiled and entered in the Microsoft excel sheet. It was analyzed using statistical software SPSS IBM (CHICAGO) version 21. the data was represented in tables and charts. the frequency displayed of all variables and mean and standard deviation was calculated for quantitative variables. Unpaired student t-test was applied for comparing means (quantitative data) and chi square test for qualitative data. The test was considered significant if $p<0.05$, at 95%confidence level.

RESULTS

Total 1000 cases were enrolled in the study. Out of which 500 cases were taken from government school and 500 from private school. The mean age of the participant was 14.9 years (standard deviation of 1.35). Out of the total adolescents included, 37.6% are poor sleeper and 63.4% were good sleepers.

The word sleep quality denotes subjective assessment of an individual of poor sleep in the form of delayed awakening in the morning (taking more than 10 min), staying up late, poor day time functioning, taking sleep medicine and poor academic performance. The mean duration of sleep was 7.1±0.67 hours during weekdays and 7.42±0.33 hours during weekends which was statistically insignificant (p value =0.09). The study found significant co-relation with poor sleep quality and PQSI score more than 5. Prevalence of higher PQSI score (>5) was found significantly if the total duration of sleep was less than 6 hours as compared to PQSI (<5) if total sleep duration of more than 6 hours (p value<0.001) (figure 1).

The number of boys and girls were 59.7% and 40.3% respectively. There was no statistical difference in sleep quality between girls and boys found in the study (p value=0.126).

The PQSI score in the age groups made between 12 to 14 years (38.5%) and 15 to 17 years (61.5%) was calculated. The sleep quality was found significantly poorer in the later age group ($p<0.001$) (table 1). The PQSI score was found higher in the children studying in higher class standards (10th to 12th) as compared to children studying in lower class standards (8th to 9th) with significant p value of 0.001.the percentage of children in each class standard with poor sleep quality -8th (30%), 9th standard (28.8%), 10th standard (35.9%),11th standard (41.4%) and 12th standard (44%).

It was found, those with higher PQSI score more than 5 had lower grades – grade B,C and those with lower PQSI less than 5 had higher grade (grade A,A+) which is significant (p value=0.003). There was no significant difference found when PQSI score was compared among lower grades between grade B and C.

When the PQSI was compared between hours of self-study less than 2 and more than 2 hours it was found that the prevalence of poor sleep quality was more if adolescents do self-study for more than 2 hours. it was statistically significant ($p<0.001$).

It was found that if the frequency of home work increased to more than 3 times in a week, the sleep quality of adolescents decreased with the increase in the in PQSI score more than 5. This was found significantly higher as compared to home work given less than 3 times in a week with the p value <0.001.

When the sleep latency was more than 30 min, the quality of sleep was found to be less (PQSI score more than 5). Out of 367 adolescents with poor sleep quality (PQSI>5), 134 adolescents (35.6%) had sleep latency of more than 30 min. Out of these children, those who had sleep latency of more than 60 minutes (47 children) all of them had sleep quality score more than 5 (100% children). This denotes that with the increase in sleep latency from 30 minutes to 60 minutes the quality of sleep decreases from 70.1% to 100% (figure-2).

In the study, out of all chidren with poor sleep quality (376), 185 children (49.2%) were taking less than 10 minutes to get up

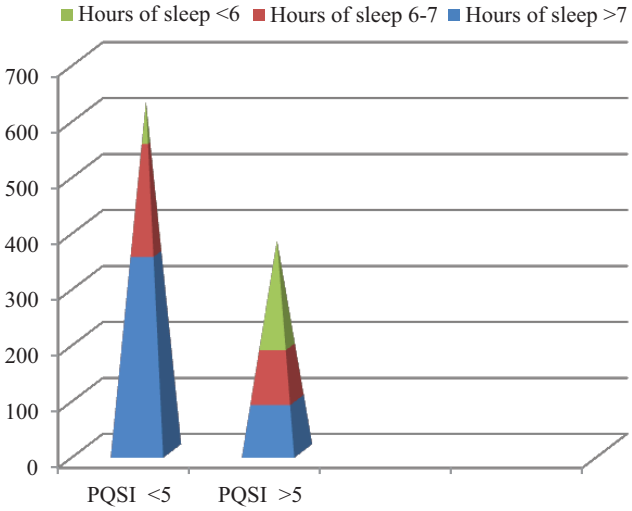

Figure-1: Effect of decrease in total sleep time on sleep efficiency

Age	No. of adolescents	Mean PQSI	± standard deviation
<15 years of age	386	4.28	2.74
>15 years of age	614	4.84	2.71
p value =0.02 (significant), This shows poor sleep quality is found in adolescents with age group more than 15 years.			

Table-1: Age wise distributions of poor sleep quality of adolescents

from bed whereas 191 children (51.8%) were taking more than 10 minutes. This was found to be statistically significant. Out of those children with time taken from getting from bed was more than 30 min, the sleep quality was found low in 87.5% as compared to those with awake time (between 10-30min) in which it was low in 59.8%.

There was no significant association was found in the prevalence of poor sleep quality of children with the education of parents. Also, there was no co-relation was found between the children with poor sleep quality and their habits of watching T.V. (more than 2 hours). When the poor sleep quality was compared with the ecomomic status of the parents, there was statistical difference found with increase in the sleep quality with parents earning more than 16,000 (p value=0.036).It was found that sleep quality was poor in the children who use mobile for more than 2 hours as compared to those with use for less than 2 hours with statistical difference of 0.013 (table-2).

In the study, the prevalence of individual sleep disturbances among 433 children who were found to have sleep disturbances for more than 3 per week are snoring (5.7%), leg twitching (7.1%), sleep walking (0.6%), sleep latency more than 30 min (14.5%), sleep awakening (11%), recurrent use of bathroom (15.9%),sleep apnea (1.1%), excessive cold (9.7%), excessive warmth (12%), nightmares (16%), bodyache (5.3%) and others (0.6%).

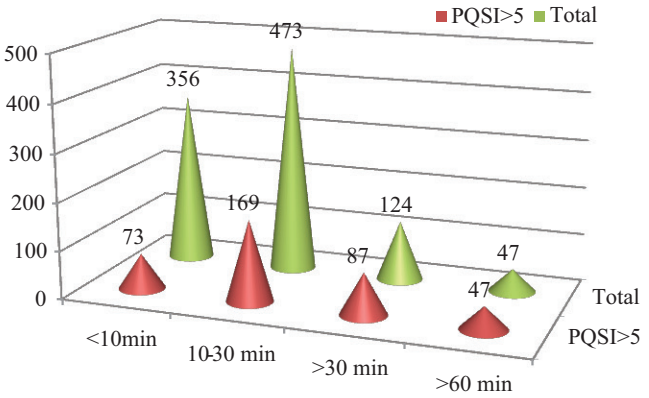

Figure-2: Association between sleep latency with sleep quality

Mobile time	PQSI		Total
	<5	>5	
Less than 2 hours	17	2	19
More than 2 hours	607	374	981
Total	624	376	1000
p value=0.013 (significant), The increase in use of mobiles is depicted here, It is also well seen that most of the children use it for more than 2 hours for various purposes. Increase in use of mobile now-a-days plays role in disturbed sleep of adolescents.			

Table-2: Effect of increasing mobile use on sleep quality

DISCUSSION

Adolescents are most vulnerable age group which suffers the transition from childhood to adulthood in all forms including sleep.

The present study aims to find out two major outcomes. The primary outcome was to determine the sleep qualtiy and sleep distubances among the adolescents.Second outcome was to determine the factors affecting sleep quality.

In this study of 1000 students,the proportion of children with assessment of good sleep and poor sleep by the pittsburgh sleep quality index were 62.6% and 37.6% respectively.In Bakootic M, Vidacek RB, Koscec et al[3] study, sleep quality was found to be poorer in later ages of adolescent similar result was found in our study.The mean age of the participants in the study was 14.9 years with 59.7% boys and 40.3% girls.

The prevalence of poor sleep quality were same in both sex as compared to Patil R, Mittal A.et al[4]. This could be due to unequal distribution of gender (59.7% males and 40.3% females).

A study was conducted in India to analyze the variance in sleep habits of adolescents of different high school grades[5]. A total of 1920 adolescents aged 12-18 years were included in the study. The mean total sleep time was 7.8hrs/day which found similar in this study total sleep time 7.1

hours/day When total hours of sleep decreases below 6 hours significant reduction in sleep quality is found in adolescents.[6]

The study found co-relation of increase academic pressure on children with sleep quality in the form of increase in the time of self- study more than 2 hours and increased frequency of home-work (more than three times a week) given to them. As Indian adolescents enter the higher grades, they spend considerable time in completing their school works, assignments and projects and in addition, go to tuitions to compete in various entrances exams. This significantly affects their sleep quality and quantity[7]. Similar findings were found in this study this out of total children with poor sleep quality, maximum children were of higher class standard 11th (46.4%)and 12th (48%). The performance of a child depends on his sleep. A sound sleep leads to a sound mind. This is well depicted in the study that children with poor sleep quality had poor performance in the last class test (grading as B or C).

Children with poor sleep quality have difficulty in going to bed with sleep latency of more than 30min and also difficulty in getting up from bed in the morning (taking more than 10 min). This shows shift of their sleep rhythm. Sleep latency of more than 30 minutes is well noticed in the children with poor sleep quality. It is a sleep problem that many of the children faced (14.5% of all children and 35.6% of children with sleep difficulty)[8] The study high lightens the fact that if the sleep latency increases to more than 60 minutes, majority of adolescents will face poor sleep quality (graph-2).

Riter et al, in 2004[9] found that poor socio-economic status is associated with over-crowding, bed-sharing and child labour in developing countries' leading to poor physical health of child and poor quality of sleep. In this study also, poor sleep quality was found in the children whose parents earned more than 16,000 rupees per month [9,10]. Although, no co-relation was found between father's and mother's education and sleep quality of their children.

The study found no increase in percentage of children with poor sleep quality with the hours of television watching or computer use. There was no significant difference found in sleep quality when compared with presence of media in bedroom and outside it. A study conducted in Shanghai Institute for Pediatric Research, found that presence of media (television) in the bedroom and media use were positively correlated with later bedtimes, later awakening times, and a shorter duration of sleep during weekdays and weekends.[11]

The use of mobile has increased in the present few years among adolescents. As many studies, this study also shows that use of mobiles for more than 2 hours has negative effects on adolescents sleep[12] (table-2).

The most common sleep disturbance [13] among adolescents with poor sleep quality found in the study (each occurring more than thrice a day) is was nightmares (16%), followed by recurrent use of bathroom (15.9%)and sleep latency more than 30 min. the less common sleep disturbance were sleep walking (0.6%) and others (0.6%) including bruxism and excessive passage of cervical discharge hamering sleep.

RECOMMENDATIONS

Many internal and external pressures act on adolscelents which silently affect their sleep and increase the threat to their health like increasing accidents, anxiety,depression and other psycological problems. Much can be done to prevent and treat various sleep wake disorders; professional and public awareness are the first steps to action and next step is evaluation and treatment as sleep disorders are preventable and treatable medical conditions.

Sleep quality assessment questionnaires must be included in the assessment of adolescents well-being. This simple tool takes less than 30 minutes for sleep quality evaluation and must be included in school medical check-ups and adolescent clinic visits.

CONCLUSION

In the study, most common sleep disturbance found is nocturnal awakening among late adolescents. Late night television watching, use of mobile phones and increased access to internet have negative effect on sleep.

Sleep latency more than 60 min need evaluation. A sleep assessment questionnaire is effective tool in determining sleep wake disturbance in adolescents. As sleep quality is well related to mental and physical health, it affects academic performance of adolescents.

REFERENCES

1. Introduction to sleep disorder. Holistic online 2010 may 04]; Available from: URL: http://www.holisticonline.com/remedies/Sleep/sleep_ introduction.htm
2. Buysse DJ, Reynolds CF, Monk TH, Berman SR et al: The Pittsburg sleep quality index: a new instrument for psychiatric practice and research, Psychiastry Res. 1989;28:193-213.
3. Bakootic M, Vidacek RB, Koscec A: Educating adolescents about healthy sleep, Croat MedJ. 2010;50:174-181.
4. Patil R. A study of sleeping habits and disorders among school students of Pondicherry. Journal of clinical and diagnostic research. 2010;4:2036-2040.
5. Dement W: Adolescent sleep. HON code principles 2000 October 10; Available from: URL: http://www.stanford.edu/~dement/adolescent.html
6. Lam LT and Yang L: Short duration of sleep and unintentional Injuries among adolescents in China, American journal of epidemiology, 2010;166:1053-1058.
7. Gau SS, Soong WT, Merikangas KR. Correlates of sleep-wake patterns among children and young adolescents in Taiwan. Sleep. 2004;27:512-9.
8. Kaur G, Kalra M etal: Prevalence of sleep disorders among urban Indian seven-year-old children, Sleep 2004; Suppl A: 102.
9. Riter S, Wills L. Sleep wars: research and opinion, Pediatr Clin North America 2004; 51: 1-13.
10. Singh H, Gill PJS, Soni RK, Raizada N: Sleep pattern and awakening in healthy infants. Indian Pediatr 1991;29: 1373-1377.
11. Kuriyan R, Bhat S, Thomas T, Mario V and Kurpad AV: Television viewing and sleep are associated with overweight among urban and semi urban south Indian children, Nutrition journal 2007;6:1475-1483.
12. Hogg M, editor: Mobile phone use causes sleep problems andother symptoms. The environmental illness resource. 2010 may 9; Available from: URL: http://www.ei-resource.org/news/related-conditions-news/mobile-phone-use-causes-sleep-problems-and-other-symptoms/
13. Gupta R, Bhatia MS, Chabra V, Sharma S, Dahiya D, Semalti K, et al. A study of sleeping habits and disorders among school going adolescent. 2008;45:183-189.

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