

SIESTA: SLEEPINESS INDICATORS IN ELEMENTARY STUDENTS & TEEN ADOLESCENTS

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Objective

Daytime sleepiness in children and adolescents deserves careful attention from parents and school authorities. Sleep hygiene refers to proper sleep practices which maximize restful sleep leading to increased daytime alertness. This project studied one aspect of this problem.

A Sleep Survey was used to obtain relevant information from students in Pearland, and the data analyzed to test the hypothesis.

The results support the basic hypothesis and raise interesting future areas of investigation.

Background

- The Epworth Sleepiness Scale is commonly used in the medical community to determine the level of daytime sleepiness. The Epworth Scale uses the following method to choose the most appropriate number for multiple situations:

- 0 = would *never* doze or sleep.
- 1 = *slight* chance of dozing or sleeping
- 2 = *moderate* chance of dozing or sleeping
- 3 = *high* chance of dozing or sleeping.

- The Epworth Scale questionnaire was modified to remove references to alcohol reducing the scenarios to 7 instead of 8. A subject with a score more than 9 is considered sleepy. A score more than 15 corresponds to being very sleepy.

- Assessment of technology in the room uses the methodology used by Dr. Mary Carskadon, who is a sleep researcher at Brown University.

Hypothesis

- The hypothesis is that the easy access to technology devices (TV, computers, game players etc.) in the bedroom and stimulating activities before bedtime adversely impact a child's daytime alertness.

- Other factors like the age, BMI, gender, ethnicity, and the sleep times will be recorded, and may be used during the hypothesis test.

Study Aims

- Use a modified Epworth Scale to measure daytime sleepiness of children in Pearland schools, and show the impact of technology factors affecting their daytime alertness.
- Determine if the BMI, bed time and sleep duration are significant factors in the analysis of the variables affecting daytime sleepiness.
- Ensure respondents understand that the survey is voluntary, and that complete anonymity is maintained during the data collection process.

Study Design and Procedure

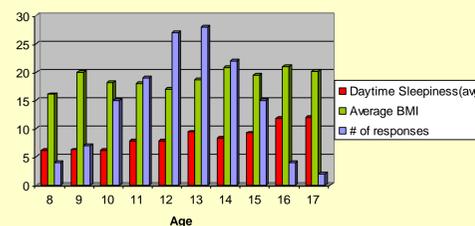
A Sleep Survey was designed to elicit information using the modified Epworth scale. Commonly used aspects of technology are presented to the children to determine the number of devices in their rooms. Contact was made with the nurses, counselors and principals of 4 schools in Pearland to get surveys filled out by children from 3rd grade to 11th grade. Additional data was obtained by distributing survey forms through other channels in Pearland like student club sessions, swim practices, heritage classes, language classes and cub scout den meetings.

The data obtained by the anonymous survey was entered into a Excel spreadsheet. Formulas were embedded to calculate the BMI, the modified Epworth index, indices for Technology and Activities, and the sleep duration statistics. Pivot tables were used to extract trends.

Excel's built-in correlation function was used to determine the correlation of the daytime sleepiness index values with different contributing factors. In particular, the population of students with Epworth scores of 9 or higher was compared with those with lower scores. Also, a comparison was made between the students who had 450 minutes or less of weekday sleep hours versus those who had more.

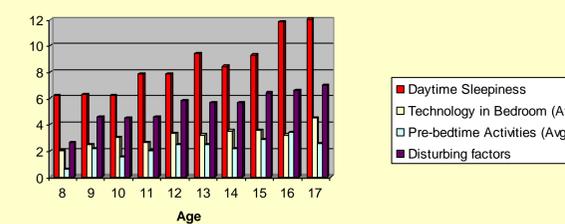
Analysis

Age Trends for BMI and Daytime Sleepiness



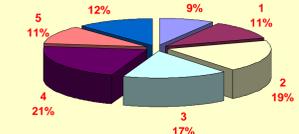
150 students ranging in age from 8 to 17 filled out the survey. 88% of these students were between the ages of 10 and 15. The trend above shows that with increasing age the Daytime Sleepiness as measured by the Epworth scale steadily increases without corresponding increase in BMI. The trend below shows that with increasing age, there are more technological devices like computers and TVs in the bedroom, as well as more activities like pre-sleep text messaging. These disturbing factors correlate directly with increasing daytime sleepiness.

Influence of Disturbing Factors on Daytime Sleepiness



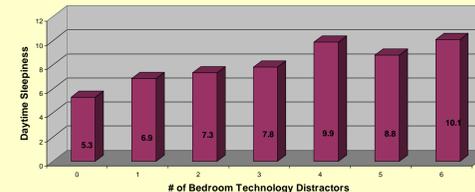
Data below shows that over 60% of the children have 3 or more devices in their bedrooms.

% Surveyed with Bedroom Technology Distractors



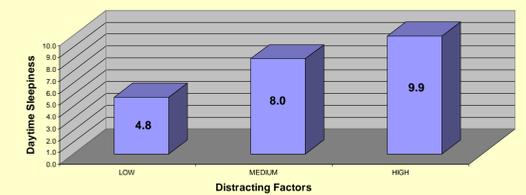
These devices negatively affect sleep leading to increased daytime sleepiness. The combined effect is obtained by adding the two indices and categorizing as LOW, MEDIUM and HIGH.

Effect of Bedroom Technology on Daytime Sleepiness



Results

Technology Distractions Affect Daytime Sleepiness



Our analysis showed that the mean bedtime for the group was 9:52 p.m. and the mean weekday wake time was 6:23 a.m. The mean sleep time for the group was 506 minutes on weekdays and 563 minutes on weekends.

49% of those surveyed had an Epworth score of 9 or higher corresponding to high daytime sleepiness. Interestingly, there was no correlation between Epworth scores and sleep duration. Both weekday and weekend sleep durations were almost identical for those with normal and high Epworth scores. The Epworth score for those with weekday sleep times of 450 minutes or less is 8.6 versus a score of 8.1 for in excess of 450 minutes of sleep.

Future Research

Further research is needed to test the hypothesis in a randomized double blinded fashion. One specific area of research could be the prevalence of energy drinks like Red Bull and its effect on daytime sleepiness. Another direction of study is to determine the impact of light on student alertness.

Conclusions & Discussion

In this survey study of 150 children, the hypothesis about the negative impact of technology on daytime alertness was confirmed. The National Sleep Foundation has said that poor sleep hygiene is a major factor in children having problems like poor grades, hyperactivity and depression.

As a society, we need to focus on sleep hygiene as a priority like other health issues such as drug abuse and wearing seat belts are targeted. One component of this could be educating our children to follow practices like removing TVs, computers and cell phones from the bedroom, and creating a healthy bedtime routine.