

Teen Sleep Deprivation in High Schools Around the World

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Abstract

Sleep has a powerful impact on the body in order to establish a stable internal environment. It is responsible for keeping both the body and mind performing at their maximum capacity. It also energizes the body and mind to confront the challenging demands of everyday life. The goal of my survey is to amplify the perspective on how sleep trends, time management, and mood differ in different countries. This 16 question survey was distributed to nine different high schools (grades 9 to 12) in different countries including; the USA, Colombia, Japan, Bangladesh, Singapore, Mexico, Uganda, Belgium, and Ghana for a total of 999 responses. These schools were all international schools that followed a similar curriculum. According to my survey, students are sleeping an average of 7.31 hours a night, which is less than the recommended 8 to 9 hours for teenagers. Only 11.61% said they are not sleep deprived while 44.68% said that their mental health is affected by a lack of sleep and deal with fatigue and emotional instability on a daily basis. Homework, procrastination, phones/social media, and mental health were the main reasons behind sleep deprivation but varied in degree between countries. My research studies the variability of sleep around the globe and how the perception of sleep quantity and quality varies in different schools depending on the culture and overall perspective. This data will be used to find trends that will hopefully reveal ways to decrease sleep deprivation within the student body in high schools.

Introduction

Sleep has a huge impact on our daily lives because it works to establish and replenish our internal environment. It is responsible for keeping both the body and mind performing at their maximum capacity and is in charge of preparing a person to react, see, and control their surroundings. (Klumpers *et al.*, 2015). After going without sleep for an excessive amount of time, the brain starts shutting down areas that it considers non-vital to survival. Reaction time, vision, and coordination become impaired. (Mednick *et al.*, 2017). Excessive daytime somnolence is a common feeling which refers to having difficulties in remaining awake and fully alert and an increased tendency to fall asleep (Benoit *et al.*, 2001) This feeling is usually the direct cause of lack of sleep. The body eventually has to cope with this loss, and microsleeps are the immediate response. (Benoit *et al.*, 2001) They lead to people losing control over their surroundings and it puts them in dangerous situations that might even be life-threatening. Daytime sleepiness, sleep deprivation, and irregular sleep schedules are also highly prevalent among high school students. Effective and viable solutions to decrease sleepiness and sleep deprivation are sleep education classes, online programs, encouragement of naps, and adjustment of class times. (Hershner *et al.*, 2014). Every student and individual has their own circadian physiology. Class times are often scheduled without consideration of young adults' circadian patterns. Additionally, inadequate sleep hygiene is common and leads students to use substances to delay their sleep cycle. Technology also compromises sleep quality and quantity. (Hershner *et al.*, 2014).

My research studies the variability of sleep around the globe and how the perception of sleep quantity and quality varies in different high schools depending on the culture and overall perspective. Further research is needed to really understand the reasons that lead to a severe lack of sleep within the student population as well as the international differences in sleeping habits within teens. Analyzing the sleep patterns of different countries will hopefully reveal trends between academic focus and sleeping

habits within the students. It will also bring an overall perspective to the reasons why teens are sleep deprived.

Methods

I have worked on this project for the past two years and it started with thorough research on sleep and teen sleep which led me to create my research plan and developing my question. I used the experiment.com platform for funding part of my SurveyMonkey subscription and then proceeding to reaching out to schools and asking for permission to distribute my survey and maintained communication with such schools to ensure correct distribution of my survey and I plan to reach back out to the schools with a report of the results so that they can be aware of the sleep habits within their student population. Lastly, I have been analyzing my data, making graphs as well as drawing conclusions to my data. Tools used to analyze the data include standard error bar graphs and box and whisker plots.

My 16 question survey was distributed to nine different high schools in different countries including; the USA, Colombia, Japan, Bangladesh, Singapore, Mexico, Uganda, Belgium, and Ghana for a total of 999 responses. These schools were all international schools that followed a similar curriculum.

Link to survey: <https://www.surveymonkey.com/r/MS567VL>

Results

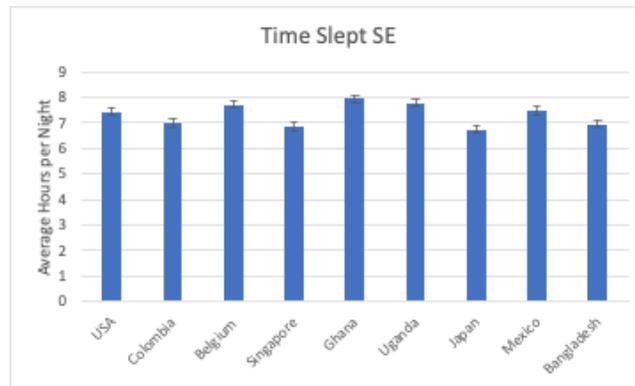


Figure 1: This graph shows the average time slept per night in each country along with the standard error. It was necessary to do standard error instead of standard deviation due to the big distribution of the data in some countries and because of the big sample size difference in some countries. This graph shows that Ghana is the country with the highest time slept per night and Japan with the lowest.

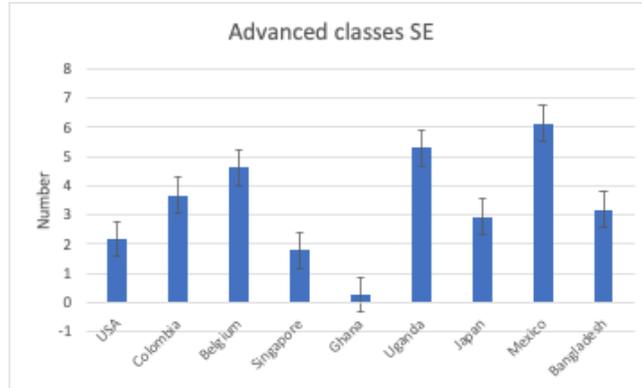


Figure 2: This graph shows the number of advanced classes taken in each country with the standard error. Ghana has the lowest amount of advanced classes taken and Mexico and Uganda have the highest. One factor that could have influenced this data is the number of people per grade that took the survey in each country. It can be predicted that upperclassmen take more advanced classes than underclassmen.

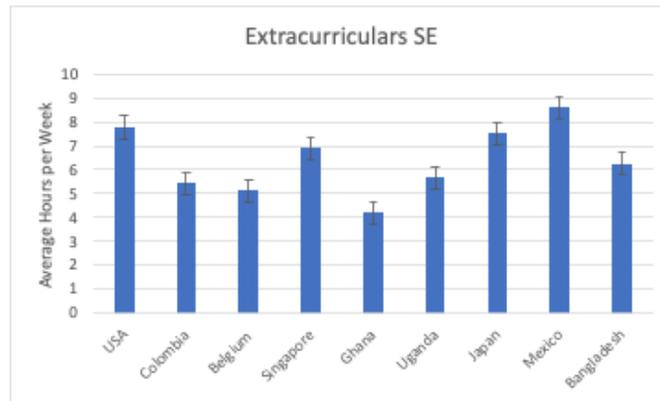


Figure 3: This graph shows the average hours spent per week in extracurricular activities including a job, a sport, a club, community service, or other activities in each country along with the standard errors. Mexico is the country with the highest average hours per week spent on extracurricular activities. Mexico was also the only country that listed sports as the main reason behind sleep deprivation. Ghana had the lowest amount of time spent on extracurricular activities.

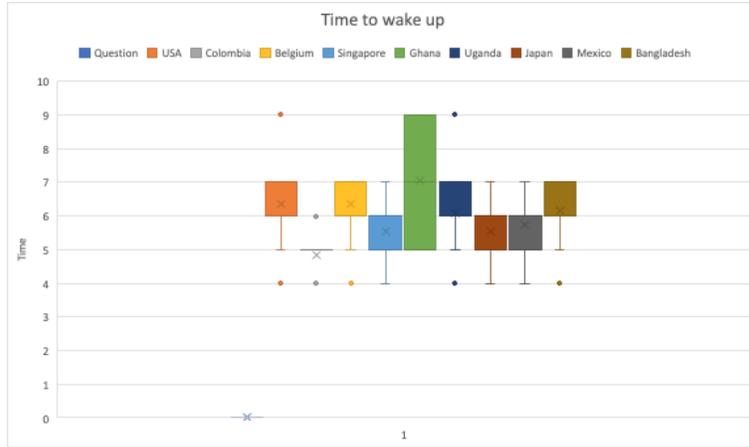


Figure 4: This is a box and whisker plot that shows the time to wake up in each country. Ghana has the highest average which means that most students wake up later in Ghana. Singapore and Japan had the lowest average which means that students tend to wake up earlier. The x represents the mean and the line represents the median.

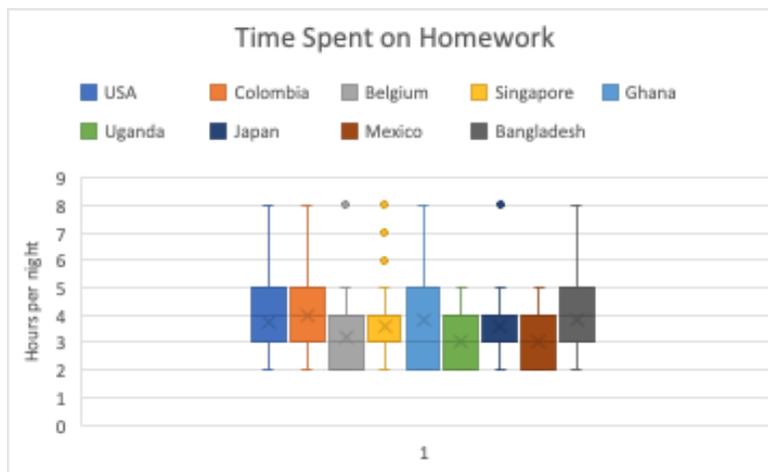


Figure 5: This is a box and whiskers plot that shows the time spent on homework per night in each country. All of the averages are around 3 to 4 hours per night and there is not a significant difference between the different countries.

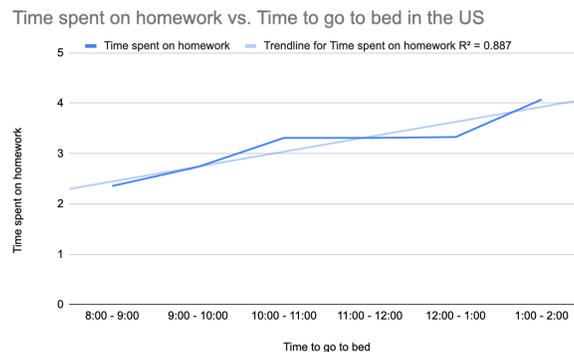


Figure 6: This graph is specific to the United States and it shows a positive correlation with an r squared value of 0.88 that shows that students who go to sleep later tend to spend more time on homework which can prove that time spent on homework is directly correlated to the time to go to sleep.

Discussion

According to the results, students are sleeping an average of 7.3 hours a night, which is less than the recommended 8 to 9 hours for teenagers. Only 11.6% said they are not sleep deprived while 44.7% said that their mental health is affected by a lack of sleep and deal with fatigue and emotional instability on a daily basis. Homework, procrastination, social media, and mental health were the main reasons behind sleep deprivation but it varied in degree between countries. In the overall data of all the countries, 83.3% of students said that homework was a main factor that affects sleep schedule. In figure 6, which is specific to the USA, there is a clear correlation between time to go to bed and the amount of time spent on homework. With an r squared value of 0.88, it is clear that as the amount of homework increases, the time to go to bed gets later which could be a potential explanation as to why homework has a great effect on time slept and sleep schedules overall.

Ghana was the country that had the highest average time slept with 7.96 hours a night vs the 6.7 hours in Japan. The standard error bars show that it is statistically significant. Ghana also had only 26.1% of students say they are sleep deprived which is a way lower percentage than any other country since the overall data says that 88.39% of students always or sometimes feel sleep deprived. Ghana was also the country with the lowest average advanced classes taken and the lowest average amount of time spent on extracurriculars with an average of 4.2 hours a week vs the 8.6 hours of Mexico. Fun fact, Mexico was the only country that listed sports as one of the main reasons why they are sleep deprived which could relate to the big sports culture in South America.

As seen in the graph, there was a statistically significant difference between Ghana and most countries regarding the low amount of advanced classes taken. Ghana also had the highest percentage of students that wake up between 9:00 - 10:00. It has been proven that teenagers' circadian rhythm changes as teens prefer to go to bed later and wake up later so students in Ghana waking up later could contribute to why students do not feel sleep-deprived compared to other countries. Ghana had 13.04% say they strongly agree that their parents are strict about bedtimes, which is way higher than any other country. It was also the lowest percentage of people who strongly disagree that their parents are strict about bedtimes. All of these factors tell the story of what could potentially lead to healthier sleeping habits. Unlike most of the other countries, Ghana was the country with the lowest amount of students feeling sleep deprived. It was the country with the lowest amount of time spent on extracurriculars and the lowest number of advanced classes taken. When thinking of the importance of healthy sleeping habits, looking at the trends of different countries will hopefully reveal important points as to what could contribute to a less sleep-deprived student population.

Analyzing the sleep patterns of different countries will reveal trends between academic focus and sleeping habits within the students and solutions to the problem of chronic sleep deprivation can be proposed through discoveries from the data. My hypothesis was that having a more challenging academic life and more time spent on extracurriculars will lead to less sleep and a greater negative effect on mood. Students were surveyed about the amount of sleep, amount of time spent on homework and other daily

activities, and how that affects mood. Statistics were utilized to explore correlations between these different factors. The data shows that sleep patterns do differ in different countries which supports my idea that the culture of a country will impact the approach students take to school and the way they deal with stress.

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