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Analysis of the Impact of Sleep Deprivation on Adolescent Health as a Hidden Crisis in Modern Society

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Abstract: *Research aims to analyze the relationship between sleep duration and adolescents' health and academic performance. Adequate sleep is a vital biological need during adolescence because it plays a role in growth, cognitive function, emotional stability, and learning ability. This study employs a literature review approach by examining various research findings from different countries regarding adolescents' sleep patterns and their impact on academic performance and mental health. The findings indicate that adolescents who consistently sleep below the recommended duration tend to achieve lower academic performance, experience reduced concentration, memory impairments, and diminished problem-solving abilities. Additionally, adolescents with insufficient sleep face a higher risk of psychological disorders such as anxiety, stress, and depression. Conversely, adolescents who get sufficient sleep at night demonstrate better learning performance, higher levels of focus, and more stable emotional well-being. Although some students are able to maintain high academic grades by reducing their sleep time, this practice has the potential to increase the risk of mental health disorders in the long term. Research confirms the need for policy interventions and changes to the educational environment, such as adjusting school start times, reducing excessive academic pressure, and educating students about the importance of healthy sleep habits. Thus, adequate sleep not only plays a role in maintaining adolescents' physical and mental health but is also a key factor in supporting academic success and overall quality of life.*

Keywords: *Sleep duration, lack of sleep, teenagers, mental health, physical health, academic performance*

Introduction

There are numerous factors that help to maintain both physiological and physical well-being and sleep is one of them. Many people underestimate the value of sleep and sacrifice it to accomplish their deadlines or just surf on social media, without knowing the number of vital processes happening while a person is sleeping.

Compared to adults, teenagers are more vulnerable to the consequences of insufficient sleep since adolescence is a period of rapid physical growth and emotional development. However, a growing number of adolescents today are experiencing sleep deprivation, and one of the primary causes is academic pressure. In the pursuit of academic excellence, they are dedicating a huge amount of time to studying, and during exam periods, this number increases significantly. Another reason is expanded screen time spent on social media. While some use them to widen their knowledge in specific areas, others just waste their time by consuming useless content. In most cases they lose control of time and may spend the whole night scrolling videos. In addition, what makes teenagers struggle to fall asleep early is biological changes in circadian rhythms. Since they adjust to late bedtime, waking up to school becomes a challenge for them. As a result, they are already

tired when a day just started and less focused or emotionally disbalanced throughout the day.

Insufficient sleep has more severe consequences on youth than many people expect. It can lead to mental health issues like anxiety, which in turn can cause depression. Also, many teenagers are becoming more irritable, and scientists are linking these problems to poor sleep habits. Moreover, lack of sleep is associated with physical health problems, such as obesity, weakened immunity and fatigue. This research is aimed to find a link between sleep duration and adolescents' well-being. The existing international studies are used to highlight the urgent need to promote healthy sleep patterns among teenagers.

Many studies suggest that the recommended amount of sleep for adolescents aged 12-19 is 8 to 10 hours per night. At the same time these studies report that more than half of surveyed students do not get at least 8 hours of sleep, and this affects their school performance and health.

One such study was conducted by Lin, L., Somerville, G., Boursier, J., Santisteban, J. A., & Gruber, R. (2020) to examine the relationship between objective measures of sleep during the school week and academic performance in mathematics and languages among 80 adolescent girls aged 12 to 17. Data, collected by using an actigraph for five consecutive weeknights, showed that 48.8% of the participants slept for the recommended range of 8 to 10 hours, while others (51.2%) slept below the recommended amount. This study also found that those who obtained the recommended amount of sleep had higher grades in mathematics compared to those who slept less. However, the study did not find a noticeable link between sleep duration and performance in language subjects.

In another study by Zhou, T., Cheng, G., Wu, X., Li, R., Li, C., Tian, G., He, S., & Yan, Y. (2021), researchers utilized data from China Family Panel Studies (CFPS) to find relationships between sleep duration, academic pressure and depressive symptoms among Chinese adolescents. They analyzed responses from 3,724 participants and revealed that the emergence of depressive symptoms is strongly associated with both short sleep duration and academic pressure. Specifically, teenagers who slept less than 6 hours per night were 2.39 times more likely to experience depressive symptoms compared to those who slept longer. Moreover, the research found that academic pressure is also a key contributor to depression, especially if it is combined with sleep deprivation. The researchers found that academic pressure, short sleep duration and depressive symptoms are connected with each other. They suggest that stress from school can lead to reduced sleep, which in turn can cause emotional problems such as depression, anxiety, and anger.

With the same purpose Zhang, X., Dimitriou, D., & Halstead, E. J. (2021) conducted a study but the results were surprising. 99 students aged 15-17 from two public schools volunteered to fully complete an online survey. The findings revealed that 79.7% of students slept less than the recommended 8 hours per night, and this affected their mental health. However, what was interesting is that students who sacrificed sleep got higher grades compared to those who did not.

U.S. Centers for Disease Control and Prevention (CDC) utilized data from the 2015 national, state, and large urban school district Youth Risk Behavior Surveys (YRBSs) to find out how widespread the insufficient sleep is among U.S. adolescents. At the middle school level across nine states, the overall prevalence of short sleep duration was 57.8% while the

recommended amount is at least 9 hours for ages 6-12. At the high school level, the figures were 72.7% nationwide. This widespread sleep deprivation raises risks of obesity, diabetes, mental health issues, attention problems, risky behavior and poor academic performance.

A systematic review by Hayes, B., & Bainton, J. (2020) examined the effects of reduced and restricted sleep on school performance, learning and cognitive functions in typically developing adolescents aged 11-19. They utilized correlational and experimental data from 17 studies from seven countries around the world. Although the results across the studies were mixed, they generally indicated the negative effect of insufficient sleep on academic performance. While several studies revealed that short sleep duration was associated with lower grades, reduced attention and executive functioning, few studies did not find effects.

Finally, the study conducted by Vik, F.N., Nilsen, T. & Øverby, N.C. (2022), used data from the 2015 and 2019 "Trends in International Mathematics and Science Study" (TIMSS) surveys and, along with teachers, it included 4499 and 4685 9th grade students, respectively. Researchers used students' and teachers' reports to measure sleep deficits and sleepiness and analyzed their association with science and math scores. The results indicated that poor academic performance was related to the high level of sleepiness and sleep deficit.

Methodology

This study employs a literature review approach by examining various previous studies that discuss the relationship between sleep duration and the well-being and academic performance of adolescents. The studies analyzed in this review utilized qualitative, quantitative, and mixed-methods research designs to gain a comprehensive understanding of the issues under investigation. (Creswell & Creswell, 2018) Most of the referenced studies used a quantitative approach through data collection techniques such as actigraphy, cross-sectional surveys, and standardized questionnaires to measure respondents' sleep patterns, health status, and academic achievement. Additionally, some studies employ qualitative approaches through in-depth interviews and open-ended responses on questionnaires to explore students' sleep experiences, perceptions, and habits in greater depth. Furthermore, there are also studies that employ mixed-methods approaches by combining statistical analysis with narrative data from respondents. The use of these various approaches enables this research to provide a broader and more objective understanding of the impact of sleep duration on adolescents' physical health, psychological well-being, and academic performance. (Johnson & Onwuegbuzie, 2004).

Result and Discussion

All six studies found a strong relationship between insufficient sleep and how it affects school performance and mental well-being. In the study that focused on girls' performance at math, students who slept under 8 hours per night had significantly lower grades compared to those who slept 8 to 10 hours. That indicates the direct impact of sleep deprivation on school achievements in a particular subject. Likewise, the CFPS found that depressive symptoms are more likely to occur among students with short sleep duration and experiencing a high academic pressure.

Furthermore, CDC's study based on U.S.' middle and high school students revealed that the majority of students slept less than 8 hours and had poor academic performance as

a result. The results, found in the Norwegian TIMSS study, were pretty same, showing that greater sleep deficit is associated with lower grades in subjects like math and science. In addition, Hayes, B., and Bainton, J. (2020) review suggests that insufficient sleep over a long period could cause declines in learning ability, memory and academic engagement.

Although Zhang, X., Dimitriou, D., & Halstead, E. J. (2021) reported that top students often sacrifice sleep for academic success, they also reported that those students are experiencing a higher level of anxiety and fatigue during the day.

The analyzed studies highlight the crucial role of adequate sleep duration on adolescents' academic performance and psychological health. Across different countries and cultural values, short sleep duration typically leads to poor academic performance. For instance, girls with sleep deprivation scored lower grades in math, and as TIMSS data noted, students with sleep deficits got lower scores in multiple subjects over time.

CFPS linked sleep deprivation to both academic pressure and depressive symptoms, suggesting that they are connected with each other. In other words, school stress can cause sleep deprivation, which in turn can lead to psychological problems like anxiety, and then depression. However, the study by Zhang, X., Dimitriou, D., & Halstead, E. J. (2021) showed a surprising result. The study revealed that there were some students with reduced sleep hours who reported strong academic performance. On the other hand, because of the "sacrificing sleep for grades" mentality, which is really popular among students, they were at a higher risk of anxiety and fatigue.

The systematic review by Hayes, B., and Bainton, J. (2020) suggested that both the quantity and quality of sleep matter. Even if adolescents sleep extra hours on the weekends, memory, attention and executive functioning, which are important for academic success, might be affected.

While some people believe that short sleep duration is common only among high school students, CDC study showed that even middle school students do not get enough sleep. These trends suggest that early school start times, late-night screen use and academic stress contribute to poor sleep habits and, in turn, weaker academic results.

Another important aspect is the cultural attitude towards sleep. In some societies, sacrificing sleep is considered normal since it indicates a sign of discipline and hard work, especially among top students. However, the results of various studies across the world emphasize that the belief is misleading. While grades may improve for a while, the long-term consequences for mental health overweight the short-term benefits.

In addition to school and family-related factors, the growing usage of technology also plays a major role in getting poor sleep among adolescents. Many of them spend their evening time on smartphones scrolling social media or gaming, which not only delays bedtime, but also reduces sleep quality due to exposure to blue light. Studies also suggest that adolescents who use electronic devices before bed experience more fragmented sleep, which affects their concentration and engagement during classes.

Therefore, addressing sleep deprivation among adolescents requires collective efforts. Schools should consider flexible start times to match the natural sleep cycles of teenagers, while families should encourage healthy evening routines, including limited screen time. At the same time, health professionals and educators need to raise awareness about the importance of sleep hygiene. Only with coordinated action we can reduce the

negative impact of sleep deprivation and ensure that adolescents can thrive both academically and emotionally.

Conclusion

This study confirms that adequate sleep plays a crucial role in supporting adolescents' physical health, mental health, and academic performance. Although the recommended sleep duration for adolescents ranges from 8 to 10 hours per night, in reality, many adolescents still experience sleep deprivation due to academic demands, technology use, and unhealthy lifestyles. Chronic sleep deprivation can lead to various negative effects, ranging from decreased concentration, reduced learning ability, and declining academic performance. In the long term, this condition also has the potential to cause more serious disorders, such as weakened memory, increased anxiety, stress, and the risk of depression. Thus, insufficient sleep duration is one factor that requires serious attention in efforts to improve the quality of life for adolescents. Therefore, educational institutions, families, and policymakers need to implement various strategies to encourage healthy sleep habits. Steps that can be taken include adjusting school start times, providing education on the importance of sufficient sleep, and reducing excessive academic pressure. These efforts are expected to create an environment that better supports the optimal health and academic success of adolescents.

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