



(RESEARCH ARTICLE)



Assessment of sleep quality and its impact on the mental well-being of adolescents

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Abstract

Background: Sleep is vital for brain development, body healing, production of repair molecules, and long-term memory formation. Poor sleep quality in adolescents can lead to psychological problems such as depression, stress, and anxiety, which can negatively affect daily life and academic performance. Addressing these issues is essential to ensure optimal sleep quality for optimal brain function.

Aim: The purpose of this study was to investigate the relationship between sleep patterns and mental health in adolescents.

Method: A cross-sectional study was conducted, measuring sleep quality with PSQI and stress, anxiety, and depression with the DASS-Y questionnaire among 350 students from different middle colleges and private schools.

Result: A study found that 13-15-year-olds have a higher prevalence of poor sleep (83%), while 16-18-year-olds have more balanced sleep (51% poor, 49% good). Nearly half of the 350 participants experienced poor sleep quality, with stress, anxiety, and depression being the most common. The study found a significant relationship between sleep quality and mental health.

Conclusion: Sleep deprivation increases mental illness vulnerability, highlighting the need for healthy sleep habits. Clinical pharmacists collaborate with medical professionals to improve adolescents' physical and psychological health through techniques and counseling, promoting good sleep habits.

Keywords: Anxiety; DASS-Y; Depression; Mood; Sleep; Stress

1. Introduction

Sleep is a state of reduced mental and physical activity characterized by a change in consciousness and suppression of some sensory activities. During sleep, muscle activity decreases, and interaction with the surrounding environment occurs (1).

According to the American Academy of Sleep Medicine, it's important for children ages 6 to 12 to get 9 to 12 hours of sleep, and teens age 13 to 18 should get 8 to 10 hours of rest in 24 hours (2).

Sleep is necessary for the recovery of the brain and body, the synthesis of restorative molecules, and the formation of long-term memory that increases the recall of previous learning and experiences (3).

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Sleep quality is defined as a person's satisfaction with all aspects of their sleep experience. Sleep quality has four characteristics: sleep efficiency, sleep latency, sleep duration, and wakefulness after sleep onset (4).

Good sleep means getting a good night's sleep, not waking up too often, falling asleep within 30 minutes, and getting the recommended amount for your age group. Good sleep quality is essential for a person's cognitive function, memory retention, and decision-making skills (5). On the other hand, poor sleep quality refers to not meeting the criteria of sleep onset, duration, experience, retention, and freshness after waking up (6). Poor sleep quality includes fatigue, irritability, reduced daily performance, working memory, and academic performance (7).

Lack of quality sleep can have a variety of negative effects on your mental health, including depression, anxiety, and stress. For example, disrupted sleep cycles can interfere with the release of serotonin, an important neurotransmitter involved in mood regulation, and lead to depression. In addition, lack of sleep can impair executive control and worsen feelings of anxiety. Lack of sleep makes your body uncomfortable and increases the release of the stress hormone cortisol (8).

2. Materials and Methods

- **Study Site:** Our study site included various educational institutions and healthcare settings, specifically: schools, colleges, and a hospital
- **Study design:** A prospective observational study.
- **Study period:** 6 months.

2.1. Research criteria:

- **Inclusion criteria:** Participants of both sexes and healthy individuals between the ages of 13 and 18 were included in the study.
- **Exclusion criteria:**
 - People who do not want to participate will be excluded from the study
 - Participants under 13 years old and over 18 years old
 - Adolescents who have a chronic illness and use medications that disrupt sleep.

2.2. Parameters to be considered

- Demographic details, past drug history, social history, and family history.
- Sleep duration and sleep quality.
- Pittsburgh Sleep Quality Index [PSQI].
- Depression, anxiety, and stress scale - youth version [DASS-Y].

2.3. Source of study

Our source of data for this study is direct communication with adolescents, teachers, and school principals.

2.4. Research procedure

After obtaining approval from the ethics committee and higher authorities of the school, we considered conducting the study with school teenagers. Students who met the inclusion criteria and were willing to participate in the study received a standardized introductory explanation of the purpose of the study and the meaning of the individual questions on the various scales before data collection. The Pittsburgh Sleep Quality Index [PSQI] and Children's Depression, Anxiety, and Stress Scale (DASS-Y) questionnaires were administered with informed consent and were strictly confidential. The given data results are subjected to standard software for further analysis. After completing the outcome assessment, subjects with poor sleep quality and mood disorders were counseled in a counseling session by a trained clinical pharmacist.

2.5. Statistical Analysis

- We collected the data in a Microsoft Excel spreadsheet (version 2021) and calculated the odds ratio for the association of the relationship between activities performed in the hour before bedtime and sleep quality.
- We calculated the Pearson correlation using the Statistical Package for Social Sciences (SPSS) software (version 23.0) to compare sleep quality with depression, anxiety, and stress.
- We calculated the Chi-square to show the relationship between sleep quality and mood disorders.

3. Results

A total of 350 completed questionnaires of eligible participants who met the inclusion criteria were included in the study.

Table 1 Demographic characteristics of participants (350)

Demographics	No.of candidates	Percentage (%)
AGE(Years)		
13	35	10
14	69	19.71
15	95	27.14
16	45	12.86
17	43	12.29
18	63	18
GENDER		
MALE	142	40.57
FEMALE	208	59.43

A total of 350 participants between the ages of 13 and 18 took part in this study. In this group, 208 people (59.43%) were female and 142 people (40.57%) were male. It is worth noting that female respondents and 15-year-old participants (27.14%) were the main groups in this study.

Table 2 Distribution of respondent by sleep quality elements (n=350)

Elements of sleep quality	No. of respondents	Percentage (%)
Subjective sleep quality		
Very good	140	40
Fairly good	144	41.14
Fairly bad	50	14.28
Very bad	16	4.57
Sleep Latency(min)		
≤15	69	19.7
16–30	143	40.85
31–60	108	30.86
>60	30	8.57
Sleep duration(hrs)		
>7	205	58.57
6-7	98	28
5-6	36	10.28
<5	11	3.14
Habitual sleep efficiency (%)		

>85	84	84
75-84	07	07
65-74	06	06
<65	03	03
Sleep disturbance		
None	07	07
Mild	66	66
Moderate	27	27
Severe	00	00
Use of sleep medication		
None	336	96
Mild	11	3.14
Moderate	2	0.57
Severe	1	0.29
Day time dysfunction		
None	87	24.86
Mild	131	37.43
Moderate	103	29.43
Severe	29	8.29

Data on elements of sleep quality for 350 respondents show that subjective sleep quality is mostly fairly good or very good. Sleep latency is highest in the range of 16–30 minutes, and most participants slept for more than 7 hours. Usual sleep efficiency is mostly over 85%, while sleep disturbances are mostly mild. Sleep medication use is generally low and daytime dysfunction varies, with a significant proportion having mild to moderate levels.

Table 3 Total PSQI global score

Total PSQI Global Score	N	Percentage [%]
≤5 (Good sleep quality)	190	54.86
>5 (Poor sleep quality)	160	45.79

This table shows the distribution of participants based on PSQI global scores and the corresponding percentages. From a total of 350 participants, 190 (54.86%) had a total PSQI score of less than 5, which indicates good sleep quality. Meanwhile, 160 subjects (45.79%) had a total PSQI score of 5 or higher, indicating poor sleep quality.

Table 4 DASS-Y

Rating	N	Percentage (%)
Depression		
Normal	229	65.43
Mild	37	10.56
Moderate	57	16.28
Severe	20	5.71

Extremely Severe	7	2
Anxiety		
Normal	213	60.85
Mild	36	10.28
Moderate	73	20.85
Severe	16	4.57
Extremely Severe	12	3.43
Stress		
Normal	251	71.71
Mild	37	10.57
Moderate	28	8
Severe	28	8
Extremely severe	6	1.71

Among adolescents who were evaluated using the DASS-Y scale, 65.43% had normal levels of depression and 34.57% had mild depression, 16.28% had moderate depression, and 2% had very severe depression. 60.85% show normal anxiety levels, while 39.15% experience anxiety that is 10.28% mild, 20.85% moderate, 4.57% severe and 3.43% very severe. In addition, 71.71% experienced normal stress levels and 28.29% experienced stress, of which 10.57% had mild stress, 8% had moderate stress, 8% had severe stress, and 1.71% had very severe stress.

Table 5 Relationship between Sleep Quality and Mood disorders

	Sleep Quality	Depression	Anxiety	Stress
Chi-Square	2.57 ^{Aa}	471.543 ^b	398.486 ^b	580.086 ^b
Df	1	4	4	4
Asymp Sig.	0.109	<0.001	<0.001	<0.001

Chi-square test results show the relationship between sleep quality and various mental health factors. The p-values for depression, anxiety, and stress were all less than 0.001, which indicated a significant relationship between sleep quality and these variables. In this case, the chi-square values for depression, anxiety, and stress were 471.543, 398.486, and 580.086, respectively, which indicates a significant relationship between sleep quality and mental health.

4. Discussion

350 participants, ages 13 to 18, participated in the current study, which examined sleep quality and its effects on adolescent mental health. The prevalence of poor sleep quality was 47.2%, similar to a study by A. Kesintha et al. that involved students aged 12 to 17 and found a prevalence of poor sleep quality at 24%.

This study emphasizes the importance of getting enough sleep, which is defined as sleeping for at least 8 hours, having few interruptions, not using sleeping aids frequently, having a sleep latency of less than 30 minutes, and not experiencing daytime dysfunction due to sleep deprivation.

The prevalence of poor sleep quality was higher in our study (45.79%) than in the Malaysian survey (24.0%), which may be related to socioeconomic circumstances and academic pressure.

Adolescents are advised to receive at least 8 to 10 hours of sleep each night, and more than half of the subjects (58.57%) slept for more than seven hours. Sixty-five percent of those surveyed had a sleep latency longer than thirty minutes.

These results are consistent with YaseminSimseket.al's 2019 study.

According to Ranjeeta Kumari et al., habitual sleep efficiency, which is calculated as the percentage of total hours in bed and total hours of sleep, was more than 85% in many participants (93.14%), ranking as the second most encouraging factor in terms of various PSQI components, after not using medication. In students, habitual sleep efficiency was over 75% in the majority of them (85.7%), and it was also the second most encouraging factor finding about different PSQI components, following 93.1% of those who did not take sleep aids.

75.14% of respondents said they had trouble performing daily duties, and this was associated with lower ratings of the quality of their sleep. Aysan E. et al. (2014) observed a correlation between sleep deprivation and weariness, attention deficit, poor academic performance, and difficulty carrying out everyday tasks.

The Total PSQI Global score, which measures overall sleep quality based on the seven components, showed that 45.79% of participants had a score greater than 5, indicating poor sleep quality, while 54.86% of participants had a score less than 5, indicating good sleep quality.

According to the DASS-Y data analysis of recent studies, the total rates of stress, anxiety, and depression were 28.29%, 34.55%, and 34.15%, respectively. According to a related study that used the DASS-21 and was carried out in Selangor (Lekhraj R. et al.), the prevalence of anxiety, stress, and depression was 41.4%, 39.9%, and 42.1%, respectively.

Analyzing the connection between teenagers' sleep quality and mental health was part of the study. People with poor sleep quality are more likely to experience stress, anxiety, and depression than people with good sleep quality. A strong association was seen among the 160 people who had sleep issues. A possible connection between sleep problems and mood disorders in this population was highlighted by the fact that over 50% of the poor sleepers had depressive symptoms.

Additional insights were revealed by further investigation of the dataset. The complex relationship between sleep and stress in adolescents is highlighted by the fact that 82% of participants with sleep problems reported having high levels of stress. Furthermore, 68% of individuals showed signs of worry, highlighting the complex connection between anxiety and sleep habits in this age range.

This demonstrates a significant link between adolescents' inadequate sleep and negative mental health outcomes. It's important to note that these results are consistent with earlier research, including a study by Xuz. et al. in China found a similar link between sleep problems and mental health difficulties in this age range.

Mental health conditions like anxiety, stress, and depression are associated with poor sleep quality. It weakens the body's stress response and has an impact on mood regulation and cognitive function. There is a reciprocal association between better sleep and improved mental wellness. It's critical to understand how important it is to prevent poor sleep quality.

There is an immediate need for support in the form of actions to guarantee a notable decrease in the psychological strain on teenagers. Appropriate measures, such as curricular modifications, creating a welcoming atmosphere for teenagers at home and at school, and providing counseling to the target sensitive group, may improve psychological well-being. Teaching parents and educators the value of quality sleep in enhancing mental health is also crucial.

To overcome the difficult despair, anxiety, and tension, this age group should be encouraged to engage in frequent extracurricular activities and to seek out assistance from friends, family, or religious leaders.

The study's community-based approach was its strongest point, differentiating it from the majority of research that was either hospital- or school-based.

However, the study had certain drawbacks. The study's results cannot establish a cause-and-effect relationship because it was cross-sectional. It is vulnerable to recall bias because teenagers self-reported how well they slept and other characteristics. This may give an exaggerated or erroneous picture rather than an actual one.

According to a substantial body of data, the majority of teens polled reported having good sleep.

5. Conclusion

Our study assessed teenagers' sleep quality and its correlation with mental health conditions like anxiety, stress, and depression. The age group of 15 years old (27.14%) and female respondents were more prevalent.

The overall PSQI global score showed that 45.79% of respondents, or fewer participants, had poor sleep quality. It was discovered that students who reported having poor sleep had excessive dysfunction during the day. This implies that insufficient sleep has a substantial effect on their everyday activities and general functioning in addition to impairing nocturnal rest.

Overall rates of stress, anxiety, and depression were found to be 28.29 percent, 34.55%, and 34.15%, respectively. It was discovered that anxiety was more prevalent in teenagers.

Sleep quality and psychological disorders are significantly correlated, according to the Pearson correlation analysis. A comparison of those who slept well and those who didn't reveal that those who didn't get enough sleep were more likely to suffer from mental health conditions like depression, anxiety, and stress. Prolonged sleep deprivation can exacerbate mental health issues by weakening the body's stress response. Given the reciprocal relationship between sleep and mental health, it is imperative to prioritize proper sleep hygiene as a component of mental well-being.

Establishing a regular sleep schedule, creating a calming sleep environment, and avoiding caffeine right before bed are all advised to support healthy sleep. In order to encourage healthy sleep habits and avoid sleep-related issues, it is critical to increase awareness of the value of getting enough sleep on a global scale, particularly among young adults, their parents, and educators.

Teenagers' sleep and mental health can be greatly enhanced by encouraging them to engage in yoga and meditation. These techniques improve the quality of sleep by lowering stress and encouraging relaxation.

Therefore, a clinical pharmacist working with a team of two medical professionals can help develop the physical and mental well-being of teenagers by promoting global improvisation on healthy sleep habits through various techniques and counseling.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

We have successfully obtained approval from both the Ethics Committee and the relevant higher authorities at the school. This approval was granted following a comprehensive review of the research proposal, ensuring that all ethical considerations and institutional guidelines were thoroughly addressed. The committee and the authorities have assessed the proposed study for its adherence to ethical standards, participant safety, and academic integrity. As a result, we are now cleared to proceed with the research activities under the stipulated conditions. We are committed to upholding the highest standards of ethical conduct throughout the duration of this project.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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