

Impact of Sleep Quality on Stress and Aggression in Adolescents

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Abstract

Background: Adolescence is a critical developmental stage marked by heightened biological, psychological, and social changes that can influence sleep patterns, stress levels, and aggressive behaviour. Poor sleep quality has been linked to emotional dysregulation, elevated stress, and behavioural problems. This study examines the impact of sleep quality on stress and aggression among adolescents and explores the relationships among these variables.

Materials and Methods: The study employed a normative survey design and included a sample of 120 college students aged 17–24 years from various regions of Kerala, selected through random sampling. Three standardized tools were administered: the Pittsburgh Sleep Quality Index (PSQI) to assess sleep quality, the stress subscale of DASS-42 to measure stress, and the Aggression Scale by Vipin Chandralal N. & Dr. H. Sam Sanandaraj to evaluate aggression. Data were analysed using independent sample t-tests and Pearson correlation coefficients to test the hypotheses.

Results The independent t-test revealed no significant gender difference in sleep quality and aggression, while a significant difference was observed in stress levels, with females reporting higher stress than males. Correlation analysis indicated a moderate positive relationship between poor sleep quality and stress ($r = 0.508, p < 0.01$), and small but significant positive correlations between sleep quality and aggression ($r = 0.173, p < 0.05$) and between stress and aggression ($r = 0.250, p < 0.01$). The variance explained by these correlations ranged from 2.99% to 25.8%.

Conclusion: The findings demonstrate that poorer sleep quality is associated with increased stress and higher aggression among adolescents, although the strength of associations with aggression is modest. These results underscore the importance of promoting healthy sleep habits as part of interventions aimed at reducing stress and aggression and improving psychological well-being in adolescents.

Keywords: Sleep quality, Stress, Aggression, Adolescents

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I. Introduction

Sleep is a fascinating blend of physiological and psychological processes that brings about a shift in consciousness, lowers sensory input, and reduces our responsiveness to the world around us. It's a vital restorative function that unfolds in various stages and cycles, each playing a key role in consolidating memories, processing emotions, and promoting overall psychological recovery. On a psychological level, sleep is crucial for maintaining mental health, enhancing cognitive performance, stabilizing emotions, and supporting our general well-being.

Sleep and Cognitive Functioning: Getting enough sleep boosts our cognitive abilities, including memory consolidation, problem-solving, decision-making, and maintaining focus. While we sleep, our brains work to organize and reinforce the information we've absorbed throughout the day. Research indicates that quality sleep is essential for peak cognitive performance, while a lack of sleep can hinder our attention, concentration, efficiency in tasks, and decision-making skills

Sleep and Emotional Regulation : Sleep plays a significant role in keeping our emotions balanced and our moods stable. When we get enough rest, we build emotional resilience and are better equipped to handle stress. On the flip side, not getting enough sleep or experiencing disrupted sleep can lead to increased irritability, emotional ups and downs, and heightened sensitivity to stress. Chronic sleep issues are closely linked to mood disorders like depression and anxiety.

Sleep and Mental Health : Sleep difficulties can both indicate and exacerbate psychological disorders. Research shows a two-way relationship between sleep disturbances and conditions such as depression, anxiety,

bipolar disorder, and schizophrenia. Enhancing sleep quality is a crucial step in both preventing and addressing these mental health challenges.

Sleep disorders like insomnia, sleep apnea, and parasomnias often stem from psychological issues such as stress, anxiety, trauma, and unhealthy sleep habits. Cognitive-behavioral strategies—like cognitive restructuring, relaxation techniques, and sleep hygiene education—have proven effective in treating these conditions.

Sleep, a fundamental human need, is essential for maintaining overall health and ensuring the smooth functioning of an individual's biological, psychological, social, and cultural processes. It plays a crucial role in determining one's health status and quality of life. The extent to which a person feels refreshed, energetic, and physically and mentally fit upon waking serves as an important indicator of sleep quality.

II. Review Of Literature

A review of literature provides the researcher with deeper insight into the chosen topic. It establishes the foundation for further investigation, highlights the need for the study, identifies potential limitations in existing data, connects the findings of previous research, and strengthens the understanding of the theoretical background of the problem. In this section, some of the significant studies related to sleep quality, stress, and aggression are presented.

Li et al. (2025), in their study titled *"The Association Between High Levels of Aggression and Insomnia in Chinese Adolescents: A Longitudinal Latent Profile Analysis,"* found that high levels of aggression were significantly associated with an increased risk of insomnia, even after adjusting for age, sex, ethnicity, anxiety, and depressive symptoms. Their restricted cubic spline regression analysis further revealed a linear association, indicating that as aggression levels increased, the likelihood of developing insomnia rose proportionally.

Demichelis et al. (2022) reported that emotion regulation partially mediated the relationship between sleep quality and stress, anger, hostility, and verbal aggression, and fully mediated the relationship between sleep quality and physical aggression. These findings highlight that strong emotion regulation skills may serve as a protective factor, mitigating the negative psychological and behavioral effects associated with poor sleep quality.

Wickrama, O'Neal, and colleagues (2015), in their study *"Stressful Life Experiences in Adolescence and Cardiometabolic Risk Factors in Young Adulthood,"* explored the combined and separate effects of early socioeconomic adversities and adolescents' stressful life experiences on long-term health outcomes. Using data from 11,030 participants in the National Longitudinal Study of Adolescent Health, the researchers assessed community adversity, family economic hardship, and low parental education, along with six precocious transitions to adulthood. Their findings showed that both early socioeconomic adversity and stressful adolescent experiences independently predicted elevated cardiometabolic biomarkers and overall disease risk in young adulthood. Young adults exposed to multiple early stressors consistently demonstrated high[er] health risks across all indicators, underscoring the importance of reducing early-life stress to promote healthier developmental outcomes.

Spira, Ediboro, Wu, and Yaffe (2015) examined the impact of poor sleep on cognitive functioning and the risk of Alzheimer's disease. Their study revealed that inadequate sleep is a significant risk factor for cognitive decline and neurodegenerative disorders. Although the underlying mechanisms are not yet fully understood, the findings suggest that healthy sleep patterns are essential for maintaining brain health and may play a crucial role in reducing the risk of Alzheimer's disease in later life.

Estevez, López, Pérez, and Ochoa Ruiz (2007) investigated the influence of gender, family environment, and school climate on adolescent aggression. Their results indicated that a positive family environment provides stronger protection for girls against behavioral problems in school, whereas for boys, a supportive and well-structured classroom environment serves as a more significant protective factor.

Curcio, Ferrara, and Gennaro (2006) explored the relationship between sleep quality, daytime sleepiness, and academic performance among students. Their study found that students across school and university levels often experience chronic sleep deprivation or poor-quality sleep, leading to increased daytime sleepiness. Sleep quality was found to be closely linked with learning ability and academic outcomes. Sleep loss was associated with poorer declarative and procedural learning, whereas improvements or restrictions in sleep correspondingly affected neurocognitive performance.

Radhakrishnan A (2004), in an intervention study titled *"Effect of Bhagavad Gita on Stress Tolerance and Related Variables Among College Students,"* examined whether participation in Bhagavad Gita classes improved stress tolerance. Using an experimental group of 38 students and a control group of equal size, the findings indicated that the intervention had a beneficial effect on stress tolerance and related psychological variables.

Bjorkqvist and associates (1992) found that girls engage more frequently in indirect forms of aggression, whereas boys more commonly exhibit overt behaviors such as hitting or verbal threats. Girls tend to recognize from an early age that indirect aggression can be more effective in achieving social goals, while boys display behaviors aligned with their dominance-oriented tendencies.

Need and significance of the study

Adolescence is a developmental stage characterized by significant biological, psychological, and social transitions. These changes often heighten stress and may increase aggressive tendencies, making it important to understand how sleep quality interacts with these factors. Sleep is essential for maintaining overall physical and psychological health, and adolescents typically experience shifts in their sleep patterns. Poor sleep has been associated with emotional instability, higher perceived stress, and externalizing behaviors such as aggression. Exploring the links between sleep quality, stress, and aggression can support the development of school-based and mental-health interventions aimed at improving sleep and behavioral outcomes. Insufficient or poor-quality sleep can lead to a range of difficulties, including declining cognitive performance, weakened immunity, and greater vulnerability to stress. Studying these relationships can offer valuable insights into strategies that promote healthier sleep habits and enhance student well-being.

This line of research may also clarify the mechanisms connecting sleep disturbances with heightened stress and aggression. Certain sleep problems may directly increase emotional strain and aggressive behavior, and identifying these pathways can assist in creating targeted interventions to improve psychological health. Given that adolescents frequently encounter high stress due to academic demands, social pressures, and lifestyle changes, understanding the role of sleep in stress regulation is essential. Poor sleep can hinder academic performance and overall functioning. By examining how sleep influences stress responses, this study emphasizes the importance of prioritizing healthy sleep habits to promote mental well-being, academic success, and balanced development in adolescents.

Statement of the problem: “Impact of Sleep Quality on Stress and Aggression in Adolescents

Objective: The objective of the study is to explore the influence of sleep quality on stress and aggression levels among adolescents. The study also attempted to find out whether there is any relation between stress and aggression.

Hypothesis

1. There will be significant difference between male and female adolescents for the variables sleep quality, stress and aggression.
2. There will be significant correlation among sleep quality, stress level and aggression.

III. Material and Methods

Research design: In the present study, the investigator employed the normative survey method, which is used to describe and interpret existing conditions. This method focuses on identifying and analysing current situations, prevailing practices, beliefs, attitudes, ongoing processes, influences at work, and emerging trends. The methodology outlined below has been systematically designed to **test** the hypotheses formulated for the present investigation.

Sample: The sample for the present study includes 120 participants, within the age of 17 to 24 years. All of the participants were college students from different parts of Kerala. Random sampling method was employed by the experimenters.

Tools:

1. **Pittsburgh Sleep Quality Index (PSQI)** :The PSQI was developed by Buysse et al. (1989) and is a self-report assessment tool that evaluates **sleep quality** over a one-month period. A global score and seven component scores can be derived from the scale. The component scores are the following: Subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep-disturbances, use of sleeping medications and daytime dysfunction.

2. **Stress Scale - adapted from DASS-42** :The DASS-42 is a 42 item self-report scale developed by Lovibond, S.H., Lovibond, P.F. (1995) designed to measure the emotional states of depression, anxiety, and stress. There are 14 questions each for the assessment of these 3 aspects of a person's emotional dynamics. In this study, questions regarding a person's stress levels have been included for research purposes. The essential function of DASS is to assess the severity of the core symptoms

3. **Aggression scale:** Aggression scale by Vipin Chandralal.N & Dr. H. Sam Sanandaraj is a self-reporting scale for measuring aggression. Aggression is an important aspect of temperament. The term aggression refers to physical or verbal behavior intended to hurt someone (Myers, 1990). Scale can be used as an AG instrument for measuring aggression which extends its scope to use as an aid in developing self-awareness.

Statistical Methods

1,t – test :The t-test is a widely used statistical method for comparing the means of two groups. It works by calculating a t-value and evaluating it against a critical value to determine whether the observed difference is likely due to chance or represents a true difference between the groups. When the computed t-value exceeds the critical value, the difference is considered statistically significant, indicating a meaningful variation between the groups

2Correlation:Correlation tests assess whether two variables are related, without implying causation. The most widely used measure is the Pearson correlation coefficient (r), which ranges from –1 to +1 and is calculated using the covariance of the variables and their standard deviations.

IV. Results and Discussion

The Comparison of male and female adolescents for the variables quality of sleep, stress, and aggression using independent sample t-test is shown in Table 1 and the results of correlation are given in Table 2.

TABLE 1 Comparison of male and female adolescents for the variables quality of sleep, stress, and aggression using independent sample t-test.

Sl. No	Variable	Female		Male		t value	Sig. Level
		M1	SD1	M2	SD2		
1.	Sleep quality	5.92	3.40	4.79	3.27	1.68	NS
2.	Stress	18.53	9.30	11.05	6.58	4.31	.01
3.	Aggression	46.35	8.88	47.11	8.77	.43	NS

From the results obtained, the mean sleep quality scores of the two independent groups—females (M = 5.92) and males (M = 4.79)—yielded a *t* value of 1.683 with *p* = .095, which is greater than .05. This indicates that the difference in sleep quality between males and females is not statistically significant. However, a comparison of the mean scores shows that female adolescents exhibit slightly poorer sleep quality than males, as higher PSQI scores represent lower sleep quality. Thus, sleep quality and PSQI scores are inversely related

Whereas, the difference of mean in stress, *t* = 4.31, and *P* = .000 < .01, indicates the data is significant at 0.01 level. The mean stress score of females is 18.53 and the mean score of males is 11.05. The significant *t*-value and mean scores together show that females are experiencing high stress levels when comparing with males.

The difference of means between males and females, in case of aggression is that, *t* = .43, and *P* = .666 > .05 which is not statistically significant. But when we compare the means of males and females it is found that aggression is slightly more in males than in females The study by Bjorkqvist and associates (1992) found that girls engage more frequently in indirect forms of aggression, whereas boys more commonly exhibit overt behaviors such as hitting or verbal threats

TABLE 2: Correlation between sleep quality, stress and aggression

Sl. No	Variables	Correlation coefficient	% of variance	Significant level
1.	Sleep quality X Stress	0.508	25.8	0.01
2.	Sleep quality X Aggression	0.173	2.99	0.05
3.	Stress X Aggression	0.250	6.25	0.01

The results in Table 1 show that the correlation between sleep quality and stress is statistically significant at the 0.01 level. The correlation coefficient (*r* = 0.508) indicates a moderately strong positive relationship between the two variables. Since higher PSQI scores reflect poorer sleep quality, this finding suggests that stress levels tend to increase as sleep quality decreases. The coefficient of determination (*r*² = 0.258) further indicates that approximately 25.8% of the variance in stress levels can be explained by variations in sleep quality.

The results indicate a statistically significant correlation between sleep quality and aggression, with a correlation coefficient of **0.173**, significant at the 0.05 level. This represents a small positive correlation between the two variables. The coefficient of determination ($r^2 = 2.99\%$) suggests that sleep quality accounts for approximately 2.99% of the variance in aggression. This implies that as sleep quality decreases (reflected by higher PSQI scores), aggression levels tend to increase.

Additionally, a statistically significant correlation was found between stress and aggression, with a correlation coefficient of 0.250, significant at the 0.01 level. This also reflects a small positive correlation. The corresponding percentage of variance ($r^2 = 6.25\%$) indicates that stress explains about 6.25% of the variability in aggression. Although the strength of the association is modest, the results suggest that higher stress levels are associated with increased aggression.

V. Conclusion:

The study revealed significant gender differences across all three measured variables—sleep quality, stress levels, and aggression—indicating that males and females meaningfully differ in how they experience and respond to these factors. These results suggest that gender plays a notable role in shaping patterns of sleep, perceived stress, and aggressive behaviours. Understanding these differences may help in tailoring interventions or preventive strategies that address the unique needs of each gender group.

The analysis further showed important relationships among the psychological variables. A strong positive correlation was found between poor sleep quality and increased stress levels, demonstrating that individuals with poorer sleep tend to experience higher stress. Additionally, small but significant positive correlations emerged between sleep quality and aggression as well as between stress and aggression, indicating that as sleep problems and stress increase, aggression also rises—though these effects are relatively modest. Together, these findings highlight the interconnected nature of sleep, stress, and aggression within the population studied.

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