RESEARCH PAPER

An Analysis of Secondary School Students in Jabalpur City, on Adolescent Sleep Quality, Emotional Development and Cognitive Performance

[*1]Madhu Sudhan Patel, [2]Sudeep Majumdar, [3]Dr. Manoj Kumar Jhariya, [4]Vineeta Patel, [5]Dr. Neeta Deepaware

[*1] Assistant Professor Department Of Psychology, Gyan Ganga College Of Excellence, Mangalayatan University, Jabalpur (M.P.), Email ID: Rockskaran007@Gmail.Com

[2]P.Hd Scholar, Psychology, Mangalaytan University Jabalpur, Email ID:Sudeep.Majumdar@Gmail.Com

[3]Associate Professor, Department Of Psychology, Mangalayatan University, Jabalpur, Email ID: Manoj@Mangalayatan.Ac.In

[4]Nursing Officer, Department Of Mental Health, NSCB Nursing College, Jabalpur, MPMSU, Email ID: Pvineeta0007@Gmail.Com

[5]Associate Professor, Department of BBA HM, Gyan Ganga College Of Excellence, RDVV, Email ID: Neetadeepaware.Ggce@Gmail.Com

***Corresponding author:** Madhu Sudhan Patel

Email ID: rockskaran007@Gmail.Com

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Abstract

Adequate sleep is essential for adolescents' emotional balance, cognitive functioning, and overall psychological well-being. Sleep disturbances during adolescence may adversely influence mental performance and emotional regulation. The purpose of this study was to look into the relationship between Jabalpur City secondary school students' emotional development, cognitive function, and sleep quality. The study also looked at how adolescents' emotional maturity is predicted by their cognitive performance. A descriptive-correlational research design was used in the study. Using stratified random sampling, a sample of 354 secondary school pupils from different Jabalpur City schools was chosen. Standardised instruments such as the Emotional Maturity Scale (EMS), Montreal Cognitive Assessment (MoCA), and Insomnia Severity Index (ISI) were used to gather data. SPSS version 25 was used to perform statistical analyses, including multiple regression analysis, correlation analysis, normality testing, and descriptive statistics. The findings demonstrated significant relationships among sleep quality, emotional maturity, and cognitive performance. Adolescents with poor sleep quality exhibited reduced cognitive functioning and higher levels of emotional immaturity. Regression analysis further indicated that cognitive performance significantly contributed to emotional maturity. Emotional development was strongly correlated with cognitive domains like executive functioning, attention, and abstract reasoning. The study emphasizes that healthy sleep patterns are important for improving adolescents' emotional stability, cognitive abilities, psychological health, and academic functioning.

Keywords: Adolescence, Sleep Disturbance, Cognitive Functioning, Emotional Development, Psychological Well-being

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1. Introduction

It is a critical period of human development because it encompasses fast physical, mental, emotional, and cognitive development. Adequate sleep is very essential at this particular stage because it is needed for healthy brain development and learning among other things. The average sleep duration required by teenagers should be between eight and ten hours per day. However, several factors make it difficult to achieve this. Sleep problems are increasingly recognized as a problem among adolescents, as they impact mental health, regulation and cognition. Galván (2020) points out that sleep is an important component of adolescent brain development and a key factor in learning, memory and emotional processing.

Sleep quality is defined as the amount, continuity and restfulness of sleep. Good sleeping habits promote optimal focus, emotional stability and mental performance, while poor sleeping habits can result in fatigue, irritability, anxiety and poor school performance. Adolescent sleep deficits have been correlated with psychological distress and difficulty functioning during the day. Even in healthy young adults (not depressed or anxious), poor sleep quality is associated with less cognitive functioning, according to Benitez and Gunstad (2012). Likewise, sleep problems

in adolescents have a negative impact on their wellbeing, emotional and social function (Sneha, 2025).

Another crucial factor of adolescence is emotional growth. Emotional maturity is the capacity to identify, manage and respond to emotions with balance and socially appropriate responses. Adolescents who are emotionally mature tend to be more adaptable, resilient, and will react positively to stress. Emotional instability socially appropriate responses. Adolescents who are emotionally mature tend to be more adaptable, resilient, and will react positively to stress. Emotional instability could lead to anxiety, aggression, frustration and interpersonal relationship issues. Psychological well-being and mental health outcomes have been intimately associated with emotional regulation. Patel et al., 2025 pointed out that coping skills that are effective in emotional regulation positively impact mental health and emotional stability. Additionally, Sahoo et al. (2025) discovered a positive relationship between adolescents' emotional intelligence and cognitive development, suggesting that emotional intelligence enhances psychological and intellectual functioning.

Cognitive performance is the ability to carry out mental activities like problem solving, reasoning, decision making, attention and memory. These are the skills that are necessary for learning, school achievement, and socialization. During adolescence, the brain continues to change rapidly, which is due to the maturation of its nervous system and its responses to its surroundings. Optimising cognitive function requires adequate sleep, and sleep deprivation affects judgement, attention, and memory formation. Sleep restricted adolescents experience a decrease in both cognitive and mood function (Short & Chee, 2019). Similarly, Sharma (2024) found that sleep deprivation has a negative impact on the cognitive function of adolescents in rural and urban settings. TD and Kaur (2024) also found that the habits of adolescents were found to be closely related with cognitive ability for secondary school students in another study.

The dimensions of sleep quality, emotional maturity and cognitive performance are tightly linked in relation to mental health in adolescents. Not sleeping well not only affects cognitive function, it also makes people more emotionally unstable and stressed. Adolescents who sleep in a healthy manner have an increased risk of emotional balance, better concentration and better academic performance. These correlations have been demonstrated in research on a consistent basis. Adolescents' sleep quality, emotional maturity, and cognitive performance were significantly related (Casavi et al., 2022). Similarly, Quevedo-Blasco, Diaz-Román, and Quevedo-Blasco (2023) found deficits in cognitive functioning in adolescence to be related to sleep disturbances and depression. Moreover, Tavakoli and Ahmadi (2025) found a significant correlation between emotional maturity and cognitive competence with sleep quality of secondary school students.

Other factors, including the environment and lifestyle, impact adolescent sleep and emotional health. The growing trend of urbanization, the competitive academic atmosphere and overuse of digital devices have all been factors in sleep issues among school children. Singh et al (2024) concluded that urbanization has an adverse impact on sleep health and mood of adolescent female students in North India. The authors' findings reflect the need to investigate the quality of sleep and its psychological implications in various social and educational contexts during adolescence.

Previous research has demonstrated that sleep quality consistently affects adolescents' emotional and cognitive functioning. Poor quality sleep has been shown to negatively affect cognitive function, especially memory and attention by Benitez and Gunstad (2012). More studies found that sleep restriction has adverse impacts on mood and mental functioning of adolescents (Short & Chee, 2019). A few studies have also examined the connection between emotional development and sleep quality. Adolescents with poor sleep quality showed decreased emotional maturity and cognitive performance, according to Casavi et al. (2022). Tavakoli and Ahmadi (2025) found significant relationships between sleep quality, emotional maturity and cognitive competence among secondary school students, supporting the above findings. Research in adolescents has also pointed to environmental and life style effects on sleep. Poor sleep health and mood disturbances in adolescents are associated with urbanization, Singh et al. (2024) found. In the same manner, Quevedo-Blasco et al. (2023) found that sleep disturbances, depression, and cognitive decline were significantly related in adolescence. While many studies have looked at sleep and cognitive functions, few have looked at the combined effects of sleep quality, emotional development, and cognitive functioning in Jabalpur City secondary school students. As a result, the current study aims to bridge this research gap.

The findings of the present study may also be interpreted through the framework of connectivism, which highlights the role of digital interaction, social networks, and technology-based learning in shaping cognitive development. Connectivist learning environments require learners to process information from multiple sources, maintain attention, and actively participate in online interactions (Siemens, 2005; Downes, 2022). Previous studies have also suggested that social networking activities can influence executive functioning, self-regulated learning, and cognitive flexibility (Khoo & Yang, 2020; Al-Rahmi et al., 2022). In the present study, poor sleep quality among adolescents may have reduced their ability to manage attention, process information efficiently, and engage effectively in digital learning environments. At the same time, excessive use of social networking platforms and screen-based activities may contribute to disturbed sleep patterns, creating a cycle that affects both emotional well-being and cognitive performance. Thus, the present findings support the view that adolescent cognitive functioning should be understood within the broader context of technology use, digital learning, and connected social environments.

Objectives of the Study

1. To examine the relationship between sleep quality, emotional maturity, and cognitive performance among secondary school students.
2. To analyze the effect of sleep quality on adolescents' emotional development and cognitive functioning.
3. To determine whether cognitive performance significantly predicts emotional maturity among adolescents.

*Author for Correspondence: Rockskaran007@Gmail.Com

Hypothesis:

1. There is a significant relationship between emotional maturity and cognitive performance among adolescents.
2. There is a significant relationship between sleep quality and cognitive performance among adolescents.
3. There is a significant relationship between sleep quality and emotional maturity among adolescents.

2. Methodology

2.1 Research Design

To determine the relationship between secondary school students' cognitive performance, emotional maturity, and sleep quality, the current study used a descriptive-correlational research design. The descriptive approach was employed to understand the existing conditions of adolescents' sleep pattern, emotional development and cognitive functions while the correlational approach was used to identify the association between the selected variables without manipulation.

2.2 Sample of the Study

354 secondary school pupils from the city of Jabalpur were used in the study. To ensure equal opportunity of participation and to reduce selection bias, the participants were selected by stratified random sampling. The selected students were of adolescent age group and were representative of target population of the study.

2.3 Tools Used for Data Collection

The necessary data for this study were obtained by means of standardized psychological instruments. Participants were evaluated for cognitive functioning using the Montreal Cognitive Assessment (MoCA) which covers attention, memory, reasoning and executive functioning. Adolescent's emotional maturity level was measured with the Emotional Maturity Scale (EMS) and emotional stability and adjustment was assessed. Students' sleep quality and degree of sleep-related problems were assessed using the Insomnia Severity Index (ISI).

2.4 Procedure of Data Collection

School authorities were approached beforehand for permission to undertake study. The objectives and purpose of the research was explained to the participants and their consent was obtained before data collection. The tools were administered to the students in a proper classroom environment under the supervision of the researcher. The participants were asked to answer honestly and independently all the items in the scales.

2.5 Data Analysis

Data collected were analysed descriptively and inferentiallyDescriptive statistics, such as mean and standard deviation, were used to characterise the nature and distribution of the data. The association between sleep quality, emotional development, and cognitive function was investigated using correlation analysis. Regression analysis was used to determine the predictive relationship between adolescents' emotional maturity and cognitive performance.

2.6 Ethical Issues

Ethical standards were adhered to very well throughout the research process. After being fully briefed on the purpose and nature of the study, every respondent was willing to participate in the research. The anonymity and confidentiality of the respondents were protected very much in the course of the research, and their information was used for academic purposes only.

3. Results

3.1 Participants' Demographic Features

The demographic data of the participants are shown in Table 1. The secondary school students selected in the study were from various classes and belonged both to the male and female gender so as to have a good coverage of secondary school adolescents in Jabalpur city.

Table 1. Demographic Characteristics of the Contributors (N = 354)

Variable	Category	Frequency	Percentage
Gender	Female	189	53.4%
	Male	165	46.6%
Grade Level	10th	144	40.7%
	11th	132	37.3%
	12th	78	22.0%
Total		354	100%

Demographic distribution shows that participants were well distributed across the gender and the grade categories. Figure 2 shows the grade levels of the participants. The participants comprised representatives from three grades in secondary schools to cover the learners of secondary school at various stages of learning in Jabalpur City.

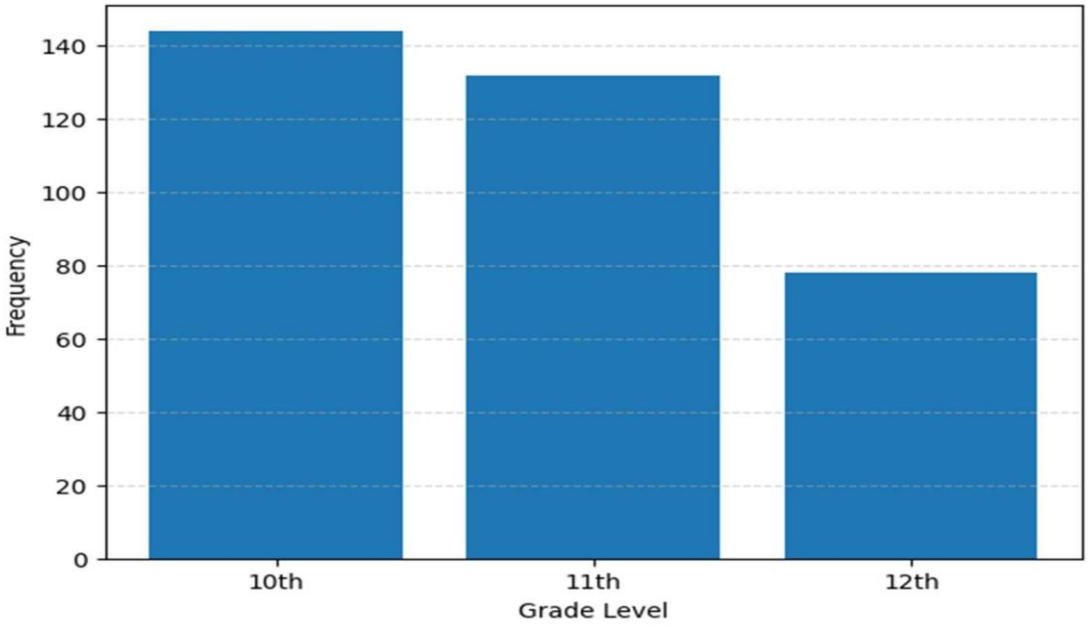

Figure 2. Grade-wise Distribution of Participants

3.2 Descriptive Statistics of Sleep Quality, Cognitive Performance, and Emotional Maturity

Table 2 displays the descriptive statistics for emotional maturity, cognitive function, and sleep quality. For the main study variables, mean scores, standard deviations (SD), and score ranges were employed.

Table 2. Descriptive Statistics of Major Study Variables

Variable	Mean	Std. Deviation	Minimum	Maximum
Sleep Quality (ISI)	17.41	6.20	-	28
Cognitive Performance (MoCA)	27.75	1.34	25	30
Emotional Maturity (EMS)	130.11	23.90	50	218

The results suggest that the participants had moderate sleep-related problems. In general, cognitive score was within normal range, while the emotional maturity score showed significant differences in emotional adjustment among adolescents. The mean scores of the major study variables, namely sleep quality, cognitive performance and emotional maturity of secondary school students of Jabalpur City are shown in Figure 3.

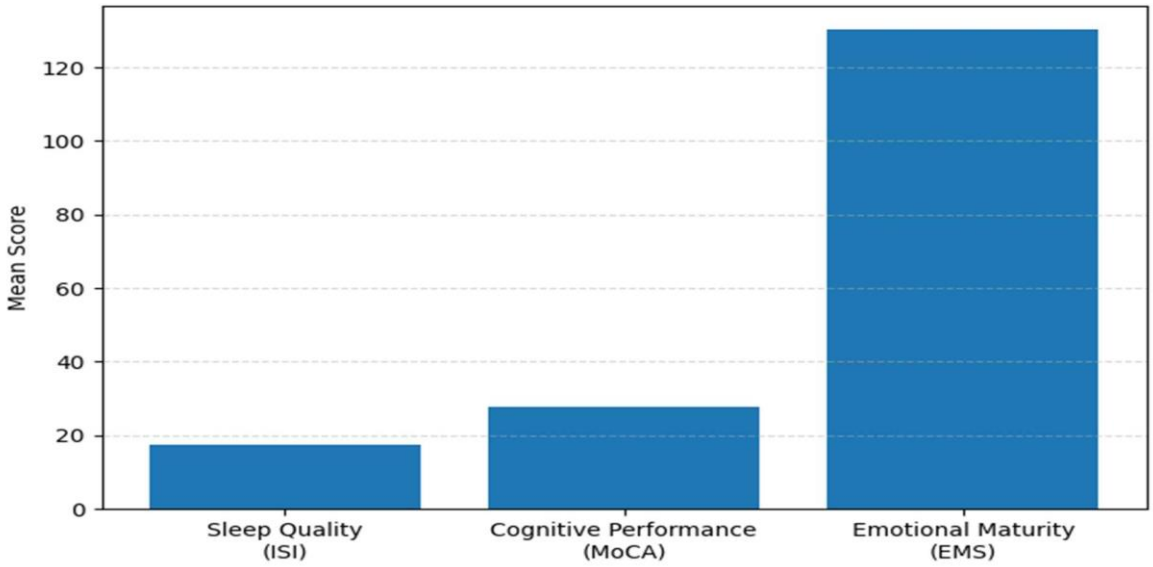

Figure 3. Mean Scores of Major Study Variables

3.3 Normality Assessment of Study Variables

Table 3 shows skewness and kurtosis statistics of the study variables were found to be normal. Analysis was done to see if the variables met the requirements for parametric statistical analysis.

Table 3. Normality Assessment of Study Variables

Component	Skewness	Kurtosis
Sleep Quality	0.193	0.975
Short-term Memory	0.970	1.064
Spatial-Temporal Reasoning	1.834	1.835
Executive Functions	-0.502	0.867
Attention/Concentration	1.743	1.043
Emotional Maturity (Total)	0.425	4.923

The skewness and kurtosis values for most variables were in acceptable statistical range, showing that the data distribution for most variables is approximately normal. Therefore, the data were considered suitable for further inferential statistical analyses. The values of skewness and kurtosis of major study variables in the present investigation are displayed in Figure 4.

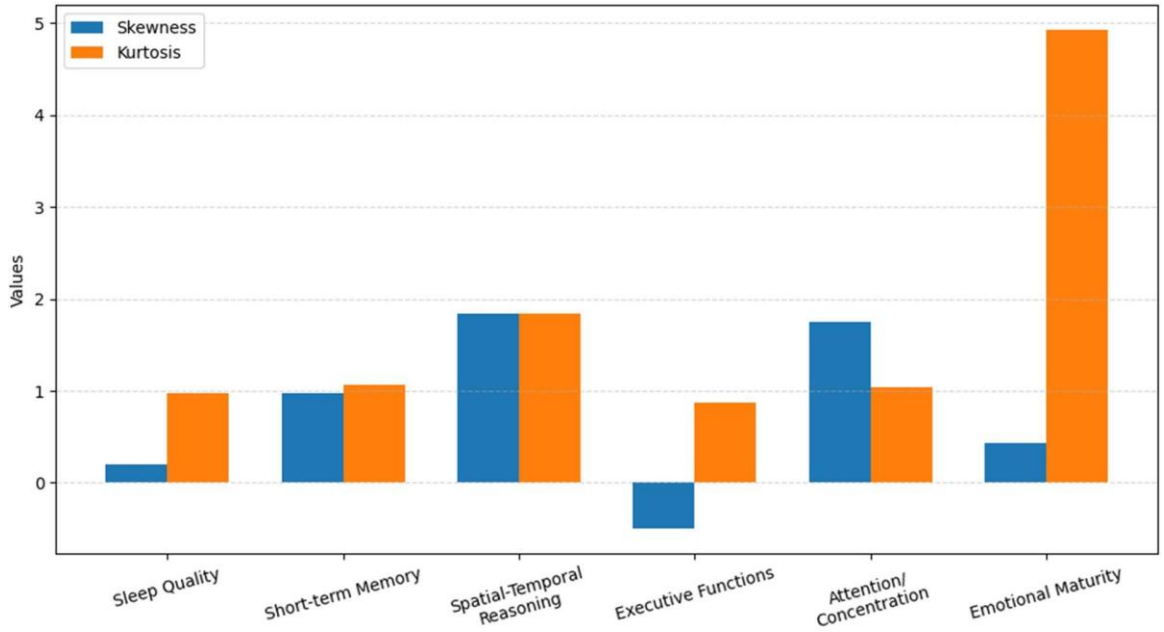

Figure 4. Normality Assessment of Study Variables

3.4 Regression Analysis of Cognitive Performance and Emotional Maturity

The regression analysis that looks at the predictive relationship between cognitive performance and emotional maturity is then presented in Table 4. A simultaneous multiple regression model was used to test the contribution of cognitive performance to emotional maturity in adolescents.

Table 4. Regression Model Summary

Model	R	R^2	Std. Error	F	Sig.
Regression	0.412	0.170	21.807	72.071	0.001

The regression model was shown to be statistically significant. The results indicated that cognitive performance was a significant factor in emotional maturity in adolescents and accounted for an important amount of variance in the scores for emotional maturity.

3.5 Regression Coefficients of Cognitive Domains Predicting Emotional Maturity

The regression coefficients for each cognitive domain predicting emotional maturity are given in Table 5. This analysis focused on the role played by various cognitive facets towards emotional development of secondary school learners.

Table 5. Regression Coefficients of Cognitive Domains Predicting Emotional Maturity

Cognitive Predictor	B	Std. Error	Beta (β)	t	Sig.

Constant	304.399	27.217	-	11.184	0.001
Spatial-Temporal Reasoning	9.455	2.992	0.154	3.161	0.002
Executive Functions	7.505	1.640	0.220	4.577	0.001
Attention/Concentration	8.329	3.087	0.132	2.698	0.007
Language	-6.150	2.725	0.241	4.978	0.001
Abstract Reasoning	13.565	1.675	0.176	3.671	0.001
Total Cognitive Score	7.306	0.861	0.412	8.489	0.001

The findings show that there were significant predictions of emotional maturity in several cognitive domains among adolescents. Executive functioning, abstract reasoning, language ability and spatial-temporal reasoning had significant predictive influence on emotional maturity outcomes.

3.6 Multivariate Regression Analysis of Cognitive Components and Emotional Maturity Dimensions

Multivariate regression analysis of the relationship between cognitive domains and emotional maturity dimensions is shown in Table 6. The purpose of the analysis is to clarify how particular cognitive processes contribute to each of the components of emotional maturity.

Table 6. Multivariate Regression Analysis of Cognitive Components and Emotional Maturity Dimensions

Criterion (Maturity Sub-scale)	Predictor (Cognitive Domain)	Beta (β)	Sig.
Emotional Unstability	Executive Functions	0.177	0.001
	Abstract Reasoning	0.180	0.001
Emotional Regression	Spatial-Temporal Reasoning	0.141	0.006
	Executive Functions	0.164	0.001
	Language	0.171	0.001
Social Maladjustment	Attention/Concentration	0.154	0.003
	Language	0.193	0.001
Personality Disintegration	Executive Functions	0.168	0.001
	Attention/Concentration	-0.111	0.036
Lack of Independence	Spatial-Temporal Reasoning	0.147	0.003
	Executive Functions	0.169	0.001
	Abstract Reasoning	0.175	0.001

The results indicate that each cognitive dimension made a unique contribution with regard to the dimensions of emotional maturity. Adolescent abstract reasoning and executive functioning were significant predictors across several of the emotional maturity dimensions.

4. Discussion

The current study sought to determine how Jabalpur City secondary school students' emotional development, cognitive function, and sleep quality relate to one another. The findings showed a strong correlation between each of these factors, indicating that adolescents' emotional and cognitive abilities are greatly impacted by the quality of their sleep. The results also showed that adolescents' emotional maturity was significantly predicted by higher cognitive functioning and that poor sleep quality was linked to lower cognitive functioning. The observations suggest a tight coupling of sleep, cognition and emotional control throughout the adolescent period.

The descriptive results indicated that a significant proportion of the adolescents were having moderate sleep related problems, implying that sleep problems are becoming more prevalent in school going adolescents. Adolescence is known as a transition developmental period, characterized with changes in biology, emotions, social and academic lives, that can affect regular sleep patterns. This is consistent with the findings of Illingworth (2020) who noted that adolescents frequently have a problem with sleep timing and sleep quality because of academic demands, social involvement and time spent on screen. Similarly, Kansagra (2020) reported that adolescence is a time of high prevalence of irregular sleep patterns and sleep disorders which can be detrimental to mental and physical health. Sleep loss is also another important public health problem that affects emotional and cognitive functioning in youth (Mahowald, 2007).

The study additionally found a significant relationship between cognitive performance and emotional maturity. Those adolescents who exhibited greater executive functioning, attention and abstract reasoning were found to have better emotional regulation and psychological adjustment. These results reflect the developmental research which holds that cognitive development has a positive influence on emotional regulation in adolescence. Tarokh, Saletin, and Carskadon (2016) also noted that the interconnections between sleep, cognition, and emotional health are critical during the adolescent development period. They reported that poor sleep was related to impaired executive functioning and emotional regulation, which results in higher vulnerability for emotional instability. The present study also provided further support for the significance of cognitive performance in predicting emotional maturity among adolescents through the regression analysis. This

suggests that adolescents with better cognitive competence may be more capable of coping effectively with emotional stress and environmental challenges. Similar findings were reported by Palmer and Alfano (2017) who reported that sleep quality directly impacts emotional regulation processes. They said that sleep loss affects performance in the prefrontal cortex and can lead to less control over emotions and more impulsiveness. Poor sleep quality was found to negatively affect attention, memory, emotional regulation, and overall cognitive performance among adolescents. The findings of the present study may also be interpreted through the framework of connectivism, which highlights the role of digital interaction, social networks, and technology-based learning in shaping cognitive development. Connectivist learning environments require learners to process information from multiple sources, maintain attention, and actively participate in online interactions (Siemens, 2005; Downes, 2022). Previous studies have also suggested that social networking activities can influence executive functioning, self-regulated learning, and cognitive flexibility (Khoo & Yang, 2020; Al-Rahmi et al., 2022). In the present study, poor sleep quality among adolescents may have reduced their ability to manage attention, process information efficiently, and engage effectively in digital learning environments. At the same time, excessive use of social networking platforms and screen-based activities may contribute to disturbed sleep patterns, creating a cycle that affects both emotional well-being and cognitive performance. Thus, the present findings support the view that adolescent cognitive functioning should be understood within the broader context of technology use, digital learning, and connected social environments. The present findings are also consistent with Lo et al. (2016) who showed that partial sleep loss profoundly impaired cognitive function, arousal and mood control in adolescent participants. Their results showed that sleep restriction has adverse effects on memory, attention and emotional functioning, findings that are consistent with the present study. Likewise, Becker et al. (2018) reported association between sleep-related problems and psychological distress and mental health issues among the young population. This study builds on this research within the Indian educational framework since it shows that sleep quality is correlated not only with emotional functioning, but also with adolescents' cognitive ability.

A second key finding of the study was the predictive value of executive functioning and abstract reasoning for various aspects of emotional maturity, such as emotional instability, social maladjustment and non-independence. The results suggest that adolescents with better cognitive control skills can more easily suppress their emotional reaction and control their interpersonal relationships effectively. This was echoed by Glavin, Matthew, and Spaeth (2022) who established that there were significant correlation between sleep quality and mood and sleep quality and psychological functioning among young adult. They concluded that positive emotional regulation and psychological health are related to healthy patterns of behaviour and sufficient sleep.

The results of this study have also made for important practical implications. Due to the important role sleep plays in emotional and cognitive functioning, parents, teachers and educational institutions should promote healthy sleep patterns in adolescents. Schools can implement sleep hygiene education, counseling services, and/or mental health awareness efforts to support students in stress management and maintaining healthy sleep patterns. Dewald-Kaufmann, Oort, and Meijer (2014) also demonstrated that sleep extension and sleep hygiene education were effective in improving sleep quality and decreasing depressive symptoms among adolescents. Likewise, Owens et al. (2017) suggested that earlier or later school start times could have a positive effect on length of sleep and academic outcomes in adolescents. Therefore, healthcare providers need to routinely evaluate sleep problems in adolescents to identify those who are at risk for emotional and cognitive problems. Although it has made contributions, the present study has some limitations. In the first place, in this study only secondary school students of a particular city Jabalpur were involved and hence it is not applicable in wider population. Secondly, there was a possibility of response bias and interpretation in the self-report psychological scales. Third, causal conclusions about the connections between emotional maturity, cognition, and sleep quality cannot be made due to the cross-sectional design. In order to better understand the long-term effects of sleep deprivation and sleep disorders among adolescents, Ramos, Wheaton, and Johnson (2023) also noted the need for longitudinal studies in sleep research.

More and varied samples across regions are needed for generalizability in subsequent studies. Longitudinal and intervention studies can provide information about the causal nature of the relationship between sleep quality, emotional regulation and cognitive functioning. Academic stress, social media use, family environment, physical activity are some of other factors that could affect adolescent sleep and psychological health and might be investigated in future studies. Emotional stability, cognitive efficiency and mental wellness of adolescents might also be enhanced by intervention programs that teach them about sleep hygiene and emotional regulation strategies.

5. Conclusion

The current study examined the relationship between emotional maturity, cognitive function, and sleep quality in Jabalpur city secondary school students. The results showed sleep quality is an important factor in the psychological and cognitive development of adolescents. Healthy sleep practices during adolescence are crucial, as poor sleep quality has been linked to reduced cognitive functioning and increased emotional immaturity. The study also demonstrated that emotional maturity is significantly influenced by cognitive ability, which means that improved executive functioning, attention, reasoning, and cognitive control are linked to

improved emotional functioning and adolescents' ability to adapt to social and academic demands. The findings underscore that sleep, cognition and emotional control are interrelated in adolescent development. Academic load, inconsistent bedtime routine and lifestyle changes can have a harmful impact on children's and youth mental health and educational results. Thus, the encouragement of good sleep and emotional health should be a key focus for schools, parents and healthcare providers. Interventions, counseling, and awareness programs about sleep health can help enhance the emotional stability and cognitive functioning of adolescents. In conclusion, the study underscores the significance of providing good sleep-in care for the mental health, emotional development, academic achievement, and well-being of adolescents.

Conflict of Interest: The author declared that there was no conflict of interest associated with the present study.

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