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The Influence of Social Support, Sleep Patterns, and Physical Activity on Adolescent Mental Health

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ABSTRACT

Adolescence is a critical developmental period during which mental health is associated with various psychosocial and behavioral factors, including social support, sleep patterns, and physical activity. This study examined the relationships between these three factors and mental health among 60 participants aged 12–24 years. A quantitative correlational design was employed, and data were collected using an online questionnaire distributed through social media. Linearity, normality, and multicollinearity tests were conducted before multiple linear regression analysis using SPSS. The instruments demonstrated acceptable reliability, with Cronbach's alpha values ranging from 0.726 to 0.762. Pearson correlation analysis revealed a moderate, statistically significant positive association between sleep patterns and mental health ($r = 0.563$, $p < 0.001$) and a weak, statistically significant positive association between social support and mental health ($r = 0.304$, $p = 0.018$). Physical activity was not significantly associated with mental health ($r = 0.016$, $p = 0.901$). The multiple regression model was statistically significant, $F(3, 56) = 9.161$, $p < 0.001$, and explained 32.9% of the variance in mental health ($R^2 = 0.329$). Sleep patterns were the only statistically significant individual predictor ($\beta = 0.534$, $p < 0.001$). These findings indicate that sleep patterns had the clearest independent statistical association with mental health in this sample, whereas social support and physical activity were not significant independent predictors after controlling for the other variables. Larger and more diverse samples are needed to confirm these findings.

Keywords: social support; sleep patterns; physical activity; adolescent; mental health

INTRODUCTION

Mental health is one of the most pressing public health concerns among adolescents worldwide. During adolescence, individuals undergo rapid biological, cognitive, and social changes that make them particularly vulnerable to emotional and psychological difficulties such as depression, anxiety, and stress. Understanding the factors that protect or undermine adolescent mental health is therefore essential for designing effective preventive interventions.

Among the various determinants of adolescent mental health, social support, sleep patterns, and physical activity have received substantial attention in recent literature. Social support from family, peers, and teachers has consistently been shown to act as a protective factor against anxiety and depression; adolescents who report low social support tend to show increasing anxiety over time, while those with strong and cumulative support from multiple sources display more stable emotional functioning (Spence et al., 2022). Support from close friends and classmates is particularly influential, while family emotional support can buffer

the negative effects of social anxiety on school satisfaction and attendance (Halidu & Kotera, 2024).

Sleep patterns also play a central role in adolescent emotional regulation. Poor sleep quality and irregular sleep schedules are strongly associated with increased emotional reactivity, reduced self-control, and a higher risk of depression and anxiety (Parsons et al., 2022). The relationship between sleep and emotion regulation appears to be bidirectional, so that difficulties in emotional regulation can, in turn, worsen sleep habits, creating a cyclical pattern that is especially pronounced during adolescence (Chen et al., 2024; Gilchrist et al., 2023).

Physical activity has similarly been linked to better psychological outcomes in adolescents. Regular physical activity and participation in organized sports are associated with reduced depressive symptoms, lower stress, and improved overall well-being (Francisquini et al., 2024; Ruiz-Ranz & Asín-Izquierdo, 2025). However, the strength of this relationship appears to vary across populations and may be moderated by other factors such as self-esteem, sleep quality, and social support (Hicks et al., 2026; Wang & Zhou, 2025).

Although social support, sleep patterns, and physical activity have been widely studied in relation to adolescent mental health, limited research has examined their combined and independent associations within a single statistical model. To address this gap, the present study examines the bivariate relationships between each predictor and adolescent mental health, as well as their independent associations when analyzed simultaneously using multiple linear regression. Specifically, this study aims to investigate the relationships of social support, sleep patterns, and physical activity with adolescent mental health through Pearson correlation and multiple linear regression analyses. Accordingly, it was hypothesized that social support (H1), sleep patterns (H2), and physical activity (H3) would each be positively associated with adolescent mental health, and that the three predictors would jointly predict adolescent mental health (H4).

METHODS

This study used a quantitative correlational design to examine the relationship between three independent variables — social support (X1), sleep patterns (X2), and physical activity (X3), and one dependent variable, adolescent mental health (Y). The population targeted was adolescents aged 12–24 years, and a total of 60 respondents participated in the study. The age range of 12–24 years follows the extended definition of adolescence proposed by Sawyer et al. (2018), which covers the period from 10 to 24 years.

Data were collected using a structured online questionnaire distributed through social media platforms. Each study variable was measured using 10–11 Likert-scale items. Instrument validity was assessed using the Pearson product–moment correlation coefficient by comparing the calculated correlation coefficient for each item (r-count) with the critical value (r-table) of 0.254 at a significance level of 0.05 ($df = n - 2 = 58$). Instrument reliability was evaluated using Cronbach's alpha, with values greater than 0.700 considered acceptable.

Prior to hypothesis testing, classical assumption tests were performed, comprising a linearity test (Deviation from Linearity in the ANOVA table), a normality test using the one-sample Kolmogorov–Smirnov test on the regression residuals, and a multicollinearity test using the Variance Inflation Factor (VIF), with VIF < 10 indicating no multicollinearity. Hypotheses were tested using Pearson correlation analysis and multiple linear regression analysis. All statistical procedures were carried out using IBM SPSS Statistics.

RESULT AND DISCUSSION

This section presents the results of the instrument testing, descriptive statistics, classical assumption tests, and the correlation and regression analyses, followed by a discussion linking each finding to the relevant literature.

Instrument Validity and Reliability

Validity testing was carried out on 60 respondents, yielding an r-table value of 0.254 (*df* = 58, α = 0.05). Item 8 of the social support (X1) questionnaire produced an r-count below the r-table value and was therefore declared invalid, while all items in the sleep patterns (X2), physical activity (X3), and mental health (Y) questionnaires were declared valid. All four instruments were reliable, as their Cronbach's alpha coefficients exceeded the 0.700 threshold, as summarized in Table 1.

Table 1. Summary of Validity and Reliability Testing

Variable	Items Tested	Invalid Items	Cronbach's Alpha	Decision
Social Support (X1)	11	1 (item 8)	0.741	Reliable
Sleep Patterns (X2)	11	0	0.762	Reliable
Physical Activity (X3)	11	0	0.731	Reliable
Mental Health (Y)	11	0	0.726	Reliable

Source: SPSS output, processed by the authors (2024).

Central Tendency and Distribution of Variables

The descriptive statistics of the four variables are presented in Table 2. On average, respondents' social support was in the "agree" category, their sleep patterns fell in the "neutral" category, their physical activity fell in the "often" category, and their mental health fell in the "good" category, based on the dominant frequency interval for each variable.

Table 2. Descriptive Statistics of Research Variables (N = 60)

Variable	Mean	Median	Mode	Dominant Category
Social Support (X1)	36.40	37.00	38.00	Agree (35–42)
Sleep Patterns (X2)	35.23	36.00	37.00	Neutral (32–39)
Physical Activity (X3)	31.65	33.00	33.00	Often (32–39)
Mental Health (Y)	34.00	34.00	32.00	Good (32–39)

Source: SPSS output, processed by the authors (2024).

Classical Assumption Tests

The linearity test results showed that the significance values for Deviation from Linearity were greater than 0.05 for social support (p = 0.054), sleep patterns (p = 0.124), and physical activity (p = 0.079). These findings indicate no statistically significant deviation from linearity in the relationships between the three predictors and adolescent mental health. The reported F-statistics were also lower than the stated critical F-value of 1.85 (*df* = 20, 38).

The Kolmogorov–Smirnov normality test on the regression residuals produced an Asymp. Sig. (2-tailed) of 0.200, which is greater than 0.05, indicating that the residuals are normally distributed.

The multicollinearity test showed VIF values of 1.050 for social support, 1.057 for sleep patterns, and 1.107 for physical activity, all well below the threshold of 10. This indicates that the three independent variables are free from multicollinearity and can be used together in the regression model (Table 3).

Table 3. Multicollinearity Test

Variable	Tolerance	VIF	Conclusion
Social Support (X1)	0.952	1.050	No multicollinearity
Sleep Patterns (X2)	0.946	1.057	No multicollinearity
Physical Activity (X3)	0.903	1.107	No multicollinearity

Source: SPSS output, processed by the authors (2024).

Correlation Analysis

Pearson correlation analysis (Table 4) revealed a weak but statistically significant positive relationship between social support and adolescent mental health ($r = 0.304$, $p = 0.018$). Sleep patterns were moderately and positively correlated with mental health, and this relationship was statistically significant ($r = 0.563$, $p < 0.001$). In contrast, physical activity showed a negligible and statistically non-significant relationship with mental health ($r = 0.016$, $p = 0.901$). These bivariate findings indicate statistical associations and should not be interpreted as evidence of causality.

Table 4. Pearson Correlation between Predictors and Mental Health

Variable	r	Sig. (2-tailed)	Strength	Conclusion
Social Support (X1)	0.304	0.018	Weak	Significant
Sleep Patterns (X2)	0.563	< 0.001	Moderate	Significant
Physical Activity (X3)	0.016	0.901	Very weak	Not significant

Source: SPSS output, processed by the authors (2024).

Multiple Linear Regression Analysis

The multiple regression analysis (Table 5) yielded an R value of 0.574 and an R^2 value of 0.329, indicating that social support, sleep patterns, and physical activity collectively explained 32.9% of the variance in adolescent mental health in this sample. The remaining 67.1% of the variance was not explained by the predictors included in the model.

The ANOVA results indicated that the multiple regression model was statistically significant, $F(3, 56) = 9.161$, $p < 0.001$. Given the three predictors and 60 observations, the regression and residual degrees of freedom were 3 and 56, respectively. The statistically significant F-test indicates that the three predictors, considered jointly, were significantly associated with variation in adolescent mental health within the regression model. However, this result does not establish a causal relationship.

Table 5. Model Summary and ANOVA for the Regression Model

R	R Square	Adjusted R Square	F	Sig.
0.574	0.329	0.293	9.161	0.000

Source: SPSS output, processed by the authors (2024).

At the individual predictor level, the regression results (Table 6) showed that only sleep patterns were statistically significant ($\beta = 0.534$, $t = 4.421$, $p < 0.001$). In contrast, social support ($\beta = 0.099$, $p = 0.424$) and physical activity ($\beta = -0.086$, $p = 0.450$) were not statistically significant predictors after controlling for the other variables in the model. Notably, although social support was significantly associated with mental health in the bivariate analysis, this association was no longer statistically significant in the multiple regression model. This difference suggests that the relationship between social support and mental health may overlap with the contributions of sleep patterns and physical activity. However, mediation or indirect effects cannot be established without a dedicated mediation analysis (Mitchener et al., 2024).

Table 6. Multiple Linear Regression Coefficients

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	18.868	4.702	-	4.013	0.000
Social Support (X1)	0.090	0.111	0.099	0.806	0.424
Sleep Patterns (X2)	0.410	0.093	0.534	4.421	0.000
Physical Activity (X3)	-0.081	0.107	-0.086	-0.761	0.450

Source: SPSS output, processed by the authors (2024). Dependent variable: Mental Health (Y).

$$Y = 18.868 + 0.090X1 + 0.410X2 - 0.081X3$$

Multiplying each standardized regression coefficient by its corresponding zero-order correlation ($\beta \times r$) yielded approximate values of 0.030 for social support, 0.300 for sleep patterns, and −0.001 for physical activity. These values sum to approximately $R^2 = 0.329$, corresponding to the model's explained variance. However, they should not be interpreted as unique or causal contributions because the predictors may share variance. In this sample, sleep patterns accounted for the largest component of the model's explained variance and were the only statistically significant individual predictor.

The finding that sleep patterns are the strongest and only statistically significant predictor of adolescent mental health in this study is consistent with a substantial body of literature showing that sleep quality and duration are fundamental to emotional regulation. Poor sleep has been repeatedly linked to increased emotional reactivity, reduced self-control, and a higher risk of depression and anxiety among adolescents (Li et al., 2024; Parsons et al., 2022; Sesso et al., 2024). Sleep problems and emotional dysregulation also appear to reinforce each other over time, forming a cycle that can be difficult to break without targeted intervention (Chen et al., 2024; Gilchrist et al., 2023).

Although social support was not a statistically significant predictor in the multiple regression model, its bivariate correlation with mental health was statistically significant ($r = 0.304$). This finding is consistent with previous studies suggesting that support from family, peers, and teachers is associated with lower levels of anxiety and depression among adolescents (Pontes et al., 2024; Spence et al., 2022). One possible explanation for the weaker association after controlling for sleep patterns and physical activity is that social support may be related to sleep quality. Adolescents who perceive greater social support may also

experience better sleep and less daytime sleepiness (Mitchener et al., 2024). However, the present study did not test mediation; therefore, a potential indirect pathway involving sleep should be considered a hypothesis for future research rather than an established mechanism.

The absence of a significant relationship between physical activity and mental health in this study contrasts with much of the international literature, which generally reports that regular physical activity reduces depressive symptoms and improves psychological well-being in adolescents (Francisquini et al., 2024; Murphy et al., 2022; Ruiz-Ranz & Asín-Izquierdo, 2025). This discrepancy may be explained by the moderating role of other variables such as self-esteem and the specific context or intensity of activity, factors that have been shown to influence whether physical activity translates into mental health benefits (Hicks et al., 2026; Wang & Zhou, 2025). It may also reflect limitations of the present sample, including its relatively small size (n = 60) and the self-reported nature of the physical activity measure.

This study has several limitations. First, the sample size (n = 60) was modest for a model with three predictors, which reduced the statistical power to detect small independent effects. Second, participants were recruited online through social media, which may limit the representativeness of the sample. Third, all variables were measured using self-report questionnaires, which are susceptible to common-method and social-desirability bias. Finally, the cross-sectional correlational design does not permit causal inferences.

Taken together, these findings suggest that social support, sleep patterns, and physical activity are all theoretically relevant to adolescent mental health. However, sleep patterns demonstrated the clearest independent statistical association with mental health in this sample. This finding highlights the potential value of prioritizing sleep health in future intervention research. Meanwhile, the associations of social support and physical activity with adolescent mental health warrant further investigation using larger, more diverse samples and more comprehensive measurement instruments.

CONCLUSION

This study examined the relationships of social support, sleep patterns, and physical activity with mental health among 60 participants aged 12–24 years. The research instruments met the reported validity and reliability criteria, and the data satisfied the reported assumptions of linearity, normality, and absence of multicollinearity. Pearson correlation analysis revealed statistically significant associations between social support and mental health, as well as between sleep patterns and mental health, whereas physical activity was not significantly associated with mental health. Given the correlational design and relatively small online sample, these findings should be interpreted as statistical associations rather than causal effects.

The multiple regression model was statistically significant and explained 32.9% of the variance in mental health. When all three predictors were examined simultaneously, only sleep patterns remained statistically significant, indicating the clearest independent statistical association with mental health among the variables examined. The academic contribution of this study lies in distinguishing bivariate associations from independent associations within a multivariable regression model. Practically, these findings may inform future prevention and intervention research on adolescent sleep health, while the potential roles of social support and physical activity warrant further investigation. Future studies should recruit larger and more diverse samples, provide clearer descriptions of sampling and recruitment procedures, and consider objective measures of physical activity to improve the robustness and generalizability of the findings.

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