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*Original Research*

# Sleep Disturbances and Mental Health Among Adolescents: A Cross-Sectional Study

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## Abstract

**Background:** Sleep is essential for the physical, cognitive, and emotional development of adolescents. Despite its importance, sleep disturbances are increasingly prevalent in this population and may contribute to mental health problems.

**Objective:** This study analyzed the relationship between sleep disturbances and mental health among adolescents

**Methods:** Sleep disturbances and mental health were measured using the Sleep Disturbance Scale for Children (SDSC) and the Strengths and Difficulties Questionnaire (SDQ), respectively. Data analysis employed the Spearman rank correlation test.

**Results:** Results indicated that 79.7% of adolescents experienced sleep disturbances, most frequently related to sleep–wake transitions (29.6%). Additionally, a considerable proportion demonstrated abnormal mental health profiles, with emotional (30.4%) and conduct problems (28.1%) being most prominent. Correlation analysis showed a statistically significant positive relationship between sleep disturbances and both total difficulties ($r = 0.145$, $p = 0.007$) and the hyperactivity subscale ($r = 0.116$, $p = 0.031$).

**Conclusion:** These findings suggest that compromised sleep quality is closely associated with mental health problems in adolescents. In conclusion, sleep disturbances are significantly associated with mental health outcomes among adolescents in Manado. Addressing sleep quality, particularly sleep–wake transitions, may be a critical intervention to reduce psychological difficulties, underscoring the importance of targeted sleep hygiene programs in adolescent healthcare.

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## Keywords

Adolescents; Mental Health; Sleep Disturbance

## Background

Sleep disturbances among adolescents represent a growing global health concern**.** Individuals aged 12 to 15 years are especially susceptible to these disturbances due to substantial physical, psychological, and social-environmental changes associated with puberty (1). Sleep constitutes a fundamental biological requirement that underpins physiological, emotional, and neurocognitive development during adolescence (2). The American Academy of Sleep Medicine recommends that adolescents aged 13 to 18 years obtain 8 to 10 hours of sleep within each 24-hour period (3).

The prevalence of sleep disturbances among adolescents remains substantial. A global adolescent health survey spanning 35 countries and territories, with a sample of 189,619 adolescents, found that 61.2% experienced moderate to severe sleep disturbances (4). In China, 20.1% of 320 children and adolescents reported sleep disturbances (5). In Kolaka, Southeast Sulawesi, Indonesia, the prevalence among adolescents aged 12 to 15 years reached 78.1% in a sample of 104 individuals (6).

Multiple psychosocial and environmental factors contribute to sleep disturbances in adolescents. These factors include academic demands, social and extracurricular activities, excessive internet use, use of information and communication technologies in bed, peer influence, household stress, socioeconomic status, and limited knowledge and attitudes regarding healthy sleep (7);(8);(9). Sleep disturbances significantly influence the development of emotional problems. Adolescents experiencing sleep disturbances frequently report anxiety symptoms, such as difficulty falling asleep, resistance to bedtime, nightmares, and nocturnal fears (10). Furthermore, adolescents with sleep problems are more likely to exhibit behavioral issues, including depression, anxiety, irritability, and norm-violating behaviors (8). Prolonged sleep disturbances may exacerbate mental health conditions such as depression and anxiety (2);(11);(12). Both male and female adolescents are at considerable risk of developing mental health problems, particularly conduct issues and difficulties in peer relationships (13).

The Indonesian National Adolescent Mental Health Survey (I-NAMHS), the first national survey in Indonesia to assess the prevalence of mental disorders among adolescents, found that one in three adolescents experiences mental health problems, while one in twenty has had a diagnosable mental disorder within the past 12 months (14). Adequate sleep is essential for supporting adolescents' emotional well-being, including mood regulation and emotional stability (15). The rapid eye movement (REM) phase of sleep plays a significant role in emotional processing. During REM sleep, activation occurs in the prefrontal hyperlimbic, dorsolateral, and medial prefrontal cortex regions, underscoring the importance of sleep in managing emotional experiences (16).

Multiple studies have demonstrated an association between sleep disturbances and mental health problems (17–19). However, nationally and locally representative data in

Indonesia, particularly for adolescents aged 12 to 15 years, remain limited. This study seeks to address this gap through a comprehensive cross-sectional survey examining the relationship between sleep disturbances and mental health among adolescents aged 12 to 15 years. The findings are expected to inform the development of more effective interventions and policies to improve psychological well-being among Indonesian adolescents.

## Methods

A quantitative approach with a cross-sectional research design was utilized. Research sites comprised several junior high schools selected through cluster sampling. Three junior high schools in Manado were randomly selected, and within each school, two classes were randomly selected. G*Power version 3.1.9.7 was used to determine the appropriate sample size for correlation analysis, assuming a small effect size ($r = 0.2$), $\alpha = 0.05$, and a power of 0.95. The minimum required sample size was 314 participants. To account for potential non-completion or dropout, the final sample included 345 respondents. Inclusion criteria were adolescents aged 12–15 years. Exclusion criteria included the presence of chronic or psychiatric illnesses and current use of sleep medications. Adolescents unwilling to participate or lacking parental or guardian consent were also excluded. Incomplete questionnaire responses were systematically excluded from the final analysis.

Sleep disturbances were assessed using the *Sleep Disturbance Scale for Children* (SDSC), while mental health was measured with the *Strengths and Difficulties Questionnaire* (SDQ). The SDSC comprises 26 items evaluating six domains: disorders of initiating and maintaining sleep, sleep breathing disorders, disorders of arousal, sleep–wake transition disorders, excessive somnolence, and sleep-related hyperhidrosis. Adolescents completed the questionnaire at home under parental supervision. Response options included "always" (every day), "often" (3–5 times per week), "sometimes" (1–2 times per week), "rarely" (1–2 times per month or less), and "never" (not experienced). The SDSC assessed disturbances over the previous six months, with total scores ranging from 26 to 130. Scores greater than 39 indicated the presence of sleep disturbances.

Diagnostic assessment for each sleep disorder domain utilized specific cutoff scores. A disorder of initiating and maintaining sleep was identified if the total score for items 1, 2, 3, 4, 5, 10, and 11 exceeded 16. Scores greater than 6 on items 13, 14, and 15 indicated sleep breathing disorders, while scores above 5 on items 17, 20, and 21 indicated disorders of arousal. For sleep–wake transition disorders, a total score of 13 or higher on items 6, 7, 8, 12, 18, and 19 was used. Excessive somnolence was identified by scores exceeding 12 on items 22–26, and sleep-related hyperhidrosis was indicated by scores greater than 6 on items 9 and 16 (20). The Indonesian version of the SDSC has been validated and demonstrated reliability. According to Natalita *et al.* (2016), the instrument showed a sensitivity of 71.4% and a specificity of 54.5%, supporting its use as a screening tool for sleep disturbances among Indonesian adolescents (1).

The Strengths and Difficulties Questionnaire (SDQ) consisted of 25 items aThe Strengths and Difficulties Questionnaire (SDQ) comprises 25 items assessing five subscales. Four subscales represent difficulties: emotional problems, conduct problems, hyperactivity, and peer relationship problems. The fifth subscale measures prosocial behavior as a strength domain. Each item is rated on a 3-point Likert scale: 0 for "not true," 1 for "somewhat true," and 2 for "certainly true." Each subscale yields a score ranging from 0 to 10.he four difficulty subscales, excluding the prosocial scale, resulting in a possible range of 0 to 40. Final scores were classified into one of three categories: normal, borderline, or abnormal. According to the scoring guidelines, the cut-off scores are as follows: a total difficulties score of 0–15 is considered normal, 16–19 is borderline, and 20–40 is abnormal. For the emotional difficulties subscale, a score of 0–5 is normal, 6 is borderline, and 7–10 is abnormal. For conducted problems, a score of 0–3 is normal, 4 is borderline, and 5–10 is abnormal. For hyperactivity, a score of 0–5 is normal, 6 is borderline, and 7–10 is abnormal. For peer problems, a score of 0–3 is normal, 4–5 is borderline, and 6–10 is abnormal. In contrast, the prosocial behavior subscale was interpreted in the opposite direction: 6–10 were classified as normal, 5 as borderline, and 0–4 as abnormal (21). Aian version of the SDQ has been validated and its reliability assessed. The Cronbach's alpha coefficient for the Strengths domain (prosocial behavior) was reported at 0.675, while the Difficulties domain (hyperactivity, emotional problems, conduct problems, and peer problems) showed a reliability coefficient of 0.705. Validity testing via item analysis for the Strengths domain indicated that the discrimination indices ranged from 0.391 to 0.503 (22).

Data analysis was conducted using IBM SPSS software, version 26. Univaria analysis described sociodemographic characteristics, including gender, age, grade level, alcohol consumption, smoking habits, sleep disturbances, and mental health status, using frequency and percentage distributions. The Spearman rank correlation test was used to examine the association between sleep disturbances and mental health. A 95% confidence interval was applied, and a p-value less than 0.05 was considered statistically significant.

This study received ethical approval from the Health Research and Development Ethics Committee of Sint Carolus School of Health Sciences (ethical clearance number 055/KEPPKSTIKSC/V/2024). This approval confirmed that all stages of the research process, including planning, data collection, and analysis, adhered to ethical research principles, including respect for participants' rights, data confidentiality, and assurance of participants' safety and well-being. Informed consent forms were distributed to all respondents prior to data collection.

# Result and Discussion

## *Respondent Characteristics*

**Table 1.**Distribution of Respondent Characteristics (n =345)

| Variable | f | % |
|---|---|---|
| sex | | |
| Male | 146 | 42.3 |
| Female | 199 | 57.7 |
| Age (Year): Mean ± SD | 13.16 ± 0.972 | |
| Caffeine consumption | | |
| Yes | 320 | 92.8 |
| No | 25 | 7.2 |
| Cigarette consumption | | |
| Yes | 15 | 4.3 |
| No | 330 | 95.7 |
| Alcohol consumption | | |
| Yes | 6 | 1.7 |
| No | 339 | 98.3 |

Based on Table 1, the total sample in this study consisted of 345 respondents, of whom 199 (57.5%) were female, with a mean age of 13.16 years. Caffeine consumption was notably high, reported by 320 students (92%), whereas cigarette and alcohol consumption were relatively low. Only 15 students (4.3%) reported smoking, and 6 students (1.7%) reported consuming alcohol.

**Table 2**. Frequency and Percentage Distribution of Sleep Disturbance Among Adolescents

| Variable | Yes | | No | |
|---|---|---|---|---|
| | f | % | f | % |
| Sleep Disturbance | 272 | 79.7 | 73 | 20.3 |
| Type of sleep Disturbance | | | | |
| Problem of starting and maintaining sleep | 68 | 19.7 | 277 | 80.3 |
| Respiratory distress during sleep | 38 | 11 | 307 | 89 |
| Consciousness disorder | 49 | 14.2 | 296 | 85.8 |
| Sleep-wake transitional disorder | 102 | 29.6 | 243 | 70.4 |
| Excessive somnolence disorder | 67 | 19.4 | 278 | 80.6 |
| hyperhidrosis disorder | 34 | 9.9 | 311 | 90.1 |

Based on Table 2, the majority of respondents reported experiencing general sleep disturbances, accounting for 275 students (79.7%). Among specific types of sleep disturbances, disorders related to the sleep–wake transition were the most commonly reported, affecting 29.6% of participants. Other specific disturbances, such as the problem of starting and maintaining sleep, Respiratory distress during sleep, Consciousness disorder, Excessive somnolence disorder, and hyperhidrosis disorder, were also reported, although with lower prevalence rates.

**Table 3.** Frequency and Percentage Distribution of Mental Emotional Problems among Adolescents

| Mental Emotional Subscale | Normal | | Borderline | | Abnormal | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Total Difficulty | 155 | 44.9 | 95 | 27.5 | 95 | 27.5 |
| Emotional | 187 | 54.2 | 53 | 15.4 | 105 | 30.4 |
| Conduct | 171 | 49.6 | 77 | 22.3 | 97 | 28.1 |
| Hyperactivity | 283 | 82.0 | 35 | 10.1 | 27 | 7.8 |
| Peer Problem | 184 | 53.3 | 67 | 19.4 | 94 | 27.2 |
| Prosocial | 298 | 86.4 | 30 | 8.7 | 17 | 4.9 |

Based on Table 3, the majority of students exhibited abnormal scores across several difficulty subscales. A total of 105 students (30.4%) scored in the abnormal range on the emotional problems subscale, followed by 97 students (28.1%) on the conduct problems subscale, 95 students (27.5%) on the total difficulties subscale, and 94 students (27.2%) on the peer problems subscale. In contrast, the proportion of students scoring abnormally on the hyperactivity and prosocial behavior subscales was considerably lower: 27 students (7.8%) on the hyperactivity subscale and 17 students (4.9%) on the prosocial behavior subscale.

**Table 4.** Correlation of Mental Health and Sleep Disturbance in Adolescents

| Mental Emotional Subscale | | Sleep Disturbance | | Correlation | |
|---|---|---|---|---|---|
| | | Yes | No | Coefficient (r) | P value |
| 1. | Total Difficulty | | | 0.145 | 0.007 |
| | Normal | 114 | 41 | | |
| | Borderline | 74 | 21 | | |
| | Abnormal | 84 | 11 | | |
| 2. | Emotional | | | 0.088 | 0.105 |
| | Normal | 141 | 46 | | |
| | Borderline | 44 | 9 | | |
| | Abnormal | 87 | 18 | | |
| 3. | Conduct | | | 0.028 | 0.603 |
| | Normal | 135 | 36 | | |
| | Borderline | 53 | 24 | | |
| | Abnormal | 84 | 13 | | |
| 4. | Hyperactivity | | | 0.116 | 0.031 |
| | Normal | 217 | 66 | | |
| | Borderline | 30 | 5 | | |
| | Abnormal | 25 | 2 | | |
| 5. | Peer Problem | | | 0.029 | 0.594 |
| | Normal | 144 | 66 | | |
| | Borderline | 51 | 5 | | |
| | Abnormal | 77 | 2 | | |
| 6. | Prosocial | | | 0.043 | 0.430 |
| | Normal | 233 | 65 | | |
| | Borderline | 24 | 6 | | |
| | Abnormal | 15 | 2 | | |

Table 4 presents an analysis of the relationship between sleep disturbances and mental health among adolescents using Spearman's rank correlation. The results demonstrate a statistically significant association, with p-values less than 0.05 for total difficulties (r = 0.145) and hyperactivity (r = 0.116). Despite statistical significance, the correlation coefficients reflect a small effect size, indicating a weak relationship between sleep disturbances and these specific mental health components.

## DISCUSSION

The findings of this study indicate that 79.7% of adolescents experienced sleep disturbances. This result is consistent with previous research, which reported that 78.1% of adolescents experienced sleep problems (6), suggesting that sleep disruption is widespread among this demographic. In the present study, disorders related to the sleep–wake transition were among the most commonly reported, affecting 29.6% of participants. Although some literature emphasizes insomnia as the primary sleep issue, these results align with specific previous studies that also identified sleep–wake transition disturbances as the most prevalent among adolescents (1);(6). Within the framework of the Sleep Disturbance Scale for Children (SDSC), sleep–wake transition disorders typically manifest as rhythmic movement disorders, sleep talking (somniloquy), or sudden hypnic jerks at sleep onset. These occurrences can disrupt the natural progression into deep sleep, resulting in adolescents feeling unrefreshed (24). Furthermore, the literature indicates that various psychosocial and environmental factors are frequently associated with sleep disturbances in adolescents, including academic pressure, lifestyle habits, social activities, sports participation, excessive use of the internet and mobile phones, peer influence, socioeconomic status, and a lack of knowledge and awareness about sleep hygiene (7,9,25,26).

Mental health problems represent a potential consequence of sleep disturbances**.** This study identified a significant relationship between sleep disturbances and mental health, with a p-value of 0.007 and a correlation coefficient (r) of 0.145. These results indicate that greater severity of sleep disturbances in adolescents is associated with higher total difficulty scores in mental health, encompassing emotional problems, behavioral issues, hyperactivity, and peer relationship problems. Although the correlation is weak, the statistical significance suggests that sleep disturbances are an important correlate of mental health problems in adolescents. These findings are consistent with previous studies that have also demonstrated a link between sleep disturbances and mental health issues among adolescents (17,19). The weak correlation observed in this study suggests that additional variables likely influence adolescents' mental health, which were not examined in this research. Potential unmeasured factors include individual personality traits, family status and practices, peer relationships, and school climate (27,28).

The majority of adolescents in this study were found to experience mental health problems across several domains, including emotional problems, behavioral issues, and peer relationship difficulties, with the highest proportion classified as abnormal.

Emotional problems may include symptoms of depression and anxiety, which are among the most common mental disorders in adolescents experiencing sleep disturbances (2,26). Beyond sleep disturbances, emotional issues in adolescents are also associated with excessive use of social media, parenting styles, and academic stress (29-31). Similarly, behavioral problems, such as antisocial behavior, aggression, defiance, or rule-breaking, are correlated with academic pressure, self-control, and family dynamics, including parent–child conflicts (32,27). Difficulties in peer relationships reflect challenges in forming healthy social interactions, such as feelings of rejection, lack of close friendships, or experiences of bullying. Factors such as school environment, parental attachment, and sociocultural differences are also linked to the quality of peer relationships (33,34). Additionally, sleep disturbances are correlated with lower motivation and a reduced ability to engage in positive social activities (35). Existing literature indicates that, from a physiological and biochemical perspective, sleep deprivation disrupts the hormonal balance involved in mood and emotional regulation. This disruption includes elevated cortisol levels associated with anxiety and depression, reduced levels of serotonin and dopamine that help maintain a positive mood, and impaired functioning of the prefrontal cortex, which is essential for decision-making and emotional control (36–38). These biochemical changes may increase adolescents' vulnerability to stress and are theoretically linked to the exacerbation of emotional difficulties.

## Conclusion

A correlation exists between sleep disturbances and mental health among adolescents. Consequently, maintaining adequate sleep is crucial for achieving optimal mental well-being. Implementing sleep hygiene education within the school environment, in conjunction with strategies involving families and communities, represents a viable intervention. This integrated approach is anticipated to prevent and mitigate the negative effects of sleep disturbances on adolescent mental health.

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**Declaration of Conflict of Interest**

No conflict of interest declare

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**Author Contributions**

Writing – original draft : KN, Methodology: KN, Investigation: SRS, Data Curation: SU, Visualization: KN, Writing-review & editing: KN, Validation: SU, Resource: SRS, Supervision: KN, Formal analysis: SU

**Data Availability Statement**

The dataset generated and analysed during the current study is available from the corresponding author upon reasonable request.

**Declaration of the Use of AI in Scientific Writing**

No AI tools to make in research

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