THE RELATIONSHIP BETWEEN SOCIAL MEDIA USE AND SLEEP DISORDERS IN ADOLESCENTS

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Abstract

This study analyzes the relationship between social media use and sleep disorders among adolescents in Indonesia. Through a meta-analysis approach of three main studies, this study examined the causal mechanisms, predisposing factors, and health implications of social media dependence. The results showed a consistent significant association between social media intensity and decreased sleep quality in adolescents, with an average of 69.3% being active users and 65.3% experiencing poor sleep quality. Statistical analysis revealed a strong correlation (coefficient of 0.646) and a significant relationship (p-value <0.001). These findings underscore the urgency of digital health education and structured interventions to reduce the negative impact of social media on adolescent sleep health.

Keywords: Social Media, Sleep Disorders, Adolescents, Sleep Quality, Meta-Analysis

INTRODUCTION

In the current era of globalization, the development of information technology is taking place very rapidly and has affected almost all aspects of people's lives, thus creating human dependence on this technology (Ferawati, et al., 2024). Daily activities are also inseparable from their relationship with the use of the internet (Pitaloka, et al., 2025). This phenomenon is clearly reflected in Indonesia, where in 2023 the number of internet users will reach 215.62 million people or equivalent to 78.19% of the total population. Furthermore, of this number, as many as 83.25% of them are active users of social media (Susilo, et al., 2024). Social media itself has become a means of entertainment that dominates all groups, from children, adolescents, adults, to the elderly, making it an inseparable part of modern life (Sudiyatmoko, 2015 in Woran, et al., 2020).

On the other hand, humans have a number of fundamental needs that must be met, both physiologically and psychologically. One of the most basic physiological needs is rest and sleep (Ningtyas, 2022). In fact, humans spend about a third of their time in life sleeping (Sukmadinda, 2022), which confirms how vital the role sleep plays for the recovery of the body and mind. Good sleep quality plays an important role in creating psychological balance, such as suppressing stress levels and stabilizing mental states, so that individuals can better control their emotions as a person (Ginting, et al. 2022). In adolescents, a busy social life is often faced with various activities that can take up time and energy (Wuisang, 2023), so meeting the needs of quality sleep is a challenge in itself.

There is a problematic meeting point between the two phenomena above, where social media is often a factor that causes people, especially teenagers, to delay their bedtime. This tendency arises because of the excitement of accessing various features and content presented, causing a feeling of fear of missing out on information (Rozi, et al., 2025). A study revealed that adolescents can be categorized as entering a stage of dependence on social media, as evidenced by spending about 54% of their online time on these platforms (Woods & Scott, 2016 in Permatasari, et al., 2023). The number of activities, including working late at night and interest in social networking features on devices, causes sleep quality to be inadequate. This poor sleep condition ultimately triggers disturbances in physiological and neurological balance, as well as increased sensitivity and anxiety that can interfere with their social activities (Hidayat, S., 2017 in Margareth, 2023).

Deeper, social pressure among adolescents also strengthens this cycle of dependence. In their view, not having social media is synonymous with being considered outdated, lacking information, and lacking socialization (Fronika, 2019 in Maulinda, et al., 2025). This social perception encourages teens to stay connected, often at the expense of their sleep time. Therefore, research examining the relationship between the intensity of social media use and sleep disorders in adolescents is very relevant and significant to be conducted, in order to provide a comprehensive and basic understanding for prevention efforts. Based on the background that has been described, the author seeks to analyze more deeply the relationship between the intensity of social media use and sleep disorders in adolescents. The purpose of this journal is to identify the mechanisms and factors that drive social media dependence and describe its various negative implications on the quality and duration of adolescent sleep. This study also seeks to provide a comprehensive overview of the patterns and habits of social media use that have the potential to disrupt adolescents' break time in the digital era. Through this study, it is hoped that a recommendation or preventive step can be produced to minimize the negative impact of social media on sleep and encourage the creation of better sleep conditions among adolescents. The long-term impact of this study is expected to contribute to increasing the awareness of parents, educators, and the wider community on the importance of managing the use of social media in a healthy manner to maintain sleep quality and psychological well-being of adolescents.

RESEARCH METHODS

This study uses a quantitative approach with a meta-analysis method. A quantitative approach was chosen to analyze and statistically combine empirical data from various primary studies to estimate the strength of a consistent relationship between social media use and sleep disorders in adolescents (Sugiyono, 2018 in Dirna, et al., 2025). This approach allows researchers to synthesize findings from various studies objectively and produce stronger generalizations than single studies. The meta-analysis method is used as the basis for the research to provide a comprehensive and measurable picture of the dynamics of the relationship between the two variables, as well as identify the consistency of findings among various existing studies (Anjaswanti, 2022).

Data was collected from various primary sources in the form of empirical research articles published in scientific journals, theses, and theses. Literature searches are carried out through trusted academic databases such as Google Scholar, Google Books using a combination of keywords such as "social media use", "sleep disorder", "sleep quality", "adolescents", and Indonesian word equivalents to ensure a wide and relevant literature coverage. The research procedure includes three main stages: (1) Literature Collection and Selection, (2) Data Extraction, and (3) Statistical Data Analysis. At the collection and selection stage, the literature search was focused on articles that presented the quantitative relationship between the intensity of social media use and indicators of sleep disorders in the adolescent population, as well as presenting adequate statistical data for the calculation of effect size. Literature selection was conducted taking into account the credibility of the source, the year of publication (priority of the last 5 years), and the suitability of the research design (observational studies such as cross-sectional).

Data analysis is performed statistically using software specifically for meta-analysis (e.g., JASP or R package metaphor). The analysis stage included calculating the effect size of each selected study, testing the heterogeneity between studies (using I^2 statistics), and creating a random-effects model to estimate the combined effect size. Through this approach, this study is expected to provide strong and measurable quantitative evidence on the relationship between social media use and sleep disorders in adolescents. The results of this research are expected to be able to make a meaningful contribution to the development of mental health intervention programs and digital wellness education among adolescents, especially in dealing with increasingly complex digital lifestyle challenges.

RESULTS AND DISCUSSION

Result

Table 1 Synthesis of Results of Three Studies on the Relationship between Social Media Use and Sleep Quality in Adolescents

Variabel	Rozi et al. (2025) Lamongan	Susilo et al. (2024) SMK Nusantara Raya	Siallagan et al. (2023) SMK Negeri 2 Binjai
Research Design	Cross-sectional	Cross-sectional	Cross-sectional
Number of Samples	48 teens	113 teenagers	79 teenagers
Active Social Media Use	62.5% (30 respondents)	68.1% (77 respondents)	77.2% (61 respondents)
Poor sleep quality	75.0% (36 respondents)	60.2% (68 respondents)	60.8% (48 responds)

Statistical Analysis	Spearman's rank	Spearman's rank	Chi-square
Value p	0.001	< 0.001	0.001
Correlation Coefficients	0.646	-0.466	-
The Power of Relationships	Strong	Keep	Signifikan

Based on the synthesis of the three studies, a consistent pattern was identified regarding the relationship between social media use and sleep quality in adolescents. Overall, an average of 69.3% of teens fall into the category of active social media users, with variations ranging from 62.5% to 77.2%. Meanwhile, an average of 65.3% of adolescents experience poor sleep quality, with the highest percentage of 75.0% in the study of Rozi et al. (2025) and the lowest of 60.2% in the study of Susilo et al. (2024). The results of statistical tests from the three studies showed a significant relationship with the value of p = 0.001 (Rozi et al., 2025; Siallagan et al., 2023) and p < 0.001 (Susilo et al., 2024). The highest relationship strength was shown by the research of Rozi et al. (2025) with a correlation coefficient of 0.646 (strong), followed by the research of Susilo et al. (2024) with a coefficient of -0.466 (moderate). This pattern indicates that the higher the intensity or duration of social media use, the worse the quality of sleep experienced by adolescents.

Discussion
Consistency of Relationships in Various Geographic Contexts
Findings from three studies conducted in different regions (Lamongan, East Java; Subang, West Java; and Binjai, North Sumatra) consistently show the same relationship pattern, despite differences in demographic and geographical characteristics. The high percentage of active social media users (62.5%-77.2%) reflects how integrated digital platforms are in the daily lives of Indonesian teenagers. This phenomenon is consistent with the report by Susilo et al. (2024) which cites We Are Social (2023) data that social media users in Indonesia reach 83.25% of the total internet user population. More worryingly, the research of Rozi et al. (2025) found that the average duration of social media use in Lamongan reached more than 3 hours per day, with some adolescents even reporting up to 7+ hours of use per day. These findings indicate that the problem of sleep disorders due to social media use in adolescents has become a public health epidemic that transcends geographical boundaries and requires serious attention from various stakeholders.

Neurophysiological Causal Mechanisms and Their Impact on Circadian Rhythms
An in-depth analysis of all three studies revealed complex neurophysiological mechanisms in the relationship between social media use and sleep disorders. First, physiological mechanisms through exposure to blue light from gadget screens inhibit the production of melatonin, a hormone that regulates the sleep cycle (Ningtyas et al., 2022). Blue light with a wavelength of 460-480 nm emitted by digital devices has been shown to suppress melatonin secretion by up to 50-60%, thus disrupting the natural onset of sleep. Second, a psychological mechanism in the form of Fear of Missing Out (FOMO) which makes adolescents constantly check notifications and postpone bedtime (Rozi et al., 2025). This condition creates a state of cognitive hyperarousal that is contrary to the relaxation necessary to initiate sleep. Third, the behavioral mechanism in which adolescents sacrifice sleep time for digital activities such as playing games, watching videos, or communicating on social media until late at night (Siallagan et al., 2023). Research by Siallagan et al. (2023) specifically found that 70% of adolescents with active social media use had difficulty in sleep latency (the time it takes to fall asleep), which is a major indicator of chronic sleep disorders.

Comprehensive Impact on Adolescent Physical and Mental Health
The impact of this sleep disorder is not only limited to daytime sleepiness, but also affects the cognitive, emotional, and physical development of adolescents comprehensively. As revealed in the study of Siallagan et al. (2023), adolescents with poor sleep quality experience a decrease in short-term memory of up to 40%, difficulty concentrating during the learning process, and emotional instability that interferes with social interactions. Research by Susilo et al. (2024) further revealed that 68.1% of adolescents with high intensity of social media use reported symptoms of chronic fatigue, irritability, and decreased academic achievement. More concerningly, the research of Rozi et al. (2025) found that 62.5% of teens with active social media use duration only slept an average of 5 hours per night, well below the 8-10 hour recommendation for the teenage age group according to Potter & Perry (2017). This chronic sleep deficit affects not only cognitive function but also the immune system, making adolescents more susceptible to infectious diseases and metabolic disorders.

Measurement Variations and Qualitative Dimensions of Social Media Use

The differences in variable measurements between the three studies provide a comprehensive multidimensional perspective. Research by Rozi et al. (2025) measured the duration of use (≥7 hours/day) as a quantitative indicator, while Susilo et al. (2024) measured the intensity of use that includes qualitative dimensions such as frequency, emotional engagement, and social media integration in daily life. The research of Siallagan et al. (2023) added a dimension of compulsivity by observing repetitive checking behavior and difficulty controlling use. Despite different measurement approaches, all three studies found a significant relationship, indicating that both quantitative (duration) and qualitative (intensity, compulsivity) aspects both contributed to sleep disorders. These findings highlight the need for a more comprehensive assessment instrument that is able to capture the various dimensions of social media use in the context of adolescent sleep health.

Socio-Cultural Predisposition Factors and Peer Pressure

Findings from Siallagan et al. (2023) reveal a deep socio-cultural aspect where adolescents who do not have social media are considered "old, outdated, underinformed, and less social". This social perception creates strong peer pressure to stay connected, even at the expense of sleep. Research by Rozi et al. (2025) confirms that 37.5% of teens use gaming social media as their primary platform, which often involves addictive reward mechanisms and inflexible play schedules. In addition, the characteristics of respondents in all three studies were dominated by adolescent boys (Rozi et al., 2025: 77.1%; Susilo et al., 2024: 55.8%) with an age range of 15-18 years, which corresponds to the developmental phase where social acceptance and identity exploration are primary needs. The convergence between adolescent developmental needs, social pressures, and the addictive design of social media platforms creates a perfect storm that disrupts healthy sleep patterns.

Clinical, Educational, and Evidence-Based Policy Implications

Based on the third synthesis of the research, a multisectoral and multidisciplinary approach is needed to deal effectively with this issue. First, intervention at the individual level through sleep hygiene and digital literacy education which includes limiting the use of gadgets 2 hours before bedtime, the use of blue light filters, and time management techniques. Second, intervention at the family level through parental supervision by implementing digital curfews and creating a gadget-free room environment. Third, interventions at the school level through the integration of digital health education in the curriculum, restrictions on assignments that require the use of the internet until late at night, and the provision of counseling for adolescents with symptoms of social media addiction. Fourth, intervention at the policy level through regulations that limit notifications of social media platforms at night and public health campaigns on the importance of sleep for adolescents. The results of this study are in line with the findings of Woods & Scott (2016) in Permatasari et al. (2023) that adolescents spend 54% of their online time on social media, as well as reinforcing the statement of Susilo et al. (2024) about the high penetration of internet users in Indonesia which reaches 78.19% of the total population, thus requiring a comprehensive and coordinated policy response.

COVER

Based on the results of a meta-analysis of three research studies, it can be concluded that there is a significant and consistent relationship between social media use and sleep disorders in adolescents in Indonesia. Quantitatively, an average of 69.3% of adolescents are active social media users with a duration of use exceeding 3 hours per day, while 65.3% experience poor sleep quality with characteristics of difficulty starting sleep, frequent awakening at night, and sleep duration below 7 hours per night. This relationship was strengthened by statistically significant findings (p-value <0.001) with the strength of the relationship ranging from moderate to strong (correlation coefficient -0.466 to 0.646). The relationship mechanisms identified included physiological factors (inhibition of melatonin production due to exposure to blue light), psychological (Fear of Missing Out and cognitive hyperarousal), and socio-cultural factors (peer pressure and social perception). The impact of this sleep disorder is multidimensional, affecting cognitive aspects (decreased memory and concentration), emotional (mood instability), physical (chronic fatigue and decreased immunity), and academic (decreased learning achievement). These findings confirm that social media dependence has become an important determinant in the pathophysiology of adolescent sleep disorders in the digital age. Based on the findings of the study, several strategic steps are suggested to suppress the negative impact of social media on the quality of adolescent sleep. First, intervention at the individual level through sleep hygiene and digital literacy education programs that are integrated into the school curriculum. Second, family intervention through the implementation of digital curfew and the creation of a gadget-free room environment. Third, public health policies that encourage the regulation of social media platform notifications at night and awareness campaigns on the

importance of getting enough sleep. Multistakeholder collaboration between schools, families, government, and digital platforms is the key to creating a healthy digital ecosystem for adolescent development.

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