



Digital Stress and Mental Health Among College Students: The Mediating Role of Health Behavior

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ABSTRACT

The increasing use of digital technology in higher education has intensified students' exposure to online learning platforms, social media, and digital communication, potentially leading to digital stress and adverse health outcomes. Methods: A quantitative cross-sectional study was conducted among 210 students of Poltekkes Kemenkes Padang from January to March 2026. Respondents were selected using purposive sampling. Data were collected through an online questionnaire and analyzed using Structural Equation Modeling (SEM) with SmartPLS 4.0. Validity and reliability of the measurement model were assessed prior to structural model testing. Associations among variables were evaluated using path coefficients (β), 95% confidence intervals (95% CI), and p-values obtained through bootstrapping procedures. Results: Digital stress significantly reduced health behavior ($\beta = -0.48$; 95% CI: -0.59 to -0.36 ; $p < 0.001$) and increased mental health problems ($\beta = 0.52$; 95% CI: 0.40 – 0.63 ; $p < 0.001$). Health behavior was significantly associated with better mental health outcomes ($\beta = -0.37$; 95% CI: -0.49 to -0.24 ; $p < 0.001$) and partially mediated the relationship between digital stress and mental health ($\beta = 0.18$; 95% CI: 0.11 – 0.28 ; $p < 0.001$). Information overload was identified as the dominant dimension of digital stress, while sleep patterns and physical activity were the most affected health behavior indicators. Conclusion: Digital stress is a significant determinant of students' health behavior and mental health. Interventions focusing on digital literacy, healthy lifestyle promotion, and mental health support are needed to reduce the negative impacts of excessive digital exposure among college students.

Keywords: Digital Stress, Health Behavior, Mental Health, Students, Technostress



INTRODUCTION

The global digital transformation has significantly altered human lifestyles, including in the context of higher education. Students, as part of the digital generation, are experiencing increased use of technology such as smartphones, social media, and online learning platforms. This digitalization has created a new lifestyle known as the digital lifestyle, characterized by a high dependence on digital devices for academic and social activities. This increased use of technology has also led to increased screen time, potentially disrupting students' overall life balance.

The rapid advancement of digital technology has significantly transformed the learning environment of college students. The widespread use of online learning platforms, social media, and digital communication tools has created new opportunities for academic engagement. However, these developments have also contributed to increased exposure to digital stress, commonly referred to as technostress, which arises from the inability to cope effectively with constant connectivity, information overload, and technology-related demands (Tarafdar, Cooper and Stich, 2019).

College students are particularly vulnerable to digital stress due to their heavy reliance on digital devices for academic and social purposes. Prolonged screen time, academic pressure from online systems, and continuous notifications from multiple digital platforms may lead to psychological strain. This condition has been associated with anxiety, sleep disturbances, reduced concentration, and emotional exhaustion, all of which can negatively affect students' mental health (Fiorilli et al., 2020).

Mental health among college students has become a growing global concern. Research indicates that stress-related mental health problems are increasingly prevalent in higher education settings, especially in digitalized learning environments (World Health Organization, 2022). Digital stress may not only directly affect mental health outcomes but also indirectly influence students' well-being through their health behaviors. Health behaviors such as physical activity, sleep quality, and coping strategies play an important role in mediating the relationship between digital stress and mental health outcomes (Baker and de Moya, 2021).

Students who adopt positive health behaviors are more likely to manage stress effectively and maintain better psychological well-being, even in high digital exposure environments. Conversely, poor health behaviors may intensify the negative effects of digital stress, leading to higher risks of depression and anxiety symptoms. Therefore, understanding the mediating role of health behavior is essential to developing effective interventions aimed at improving student mental health in the digital era (American Psychological Association, 2023).

This development has been accompanied by the emergence of psychological distress due to excessive exposure to technology, known as digital stress. Digital stress is defined as psychological distress arising from the demands of connectivity, information overload, and social expectations in digital environments (Almakrob & Alduais, 2026). This concept evolved from technostress but has a broader scope because it includes the social and emotional dimensions of digital interactions.

Digital stress is a multidimensional construct encompassing various aspects such as information overload, communication overload, and social pressures such as fear of missing out (FoMO). Research shows that increased digital connectivity not only provides benefits but also



imposes significant cognitive and emotional burdens on individuals (Masluk et al., 2024). This reinforces the notion that intensive technology use can be a relevant source of stress in modern life.

In the context of university students, digital stress has increased with the implementation of technology-based learning systems, particularly since the COVID-19 pandemic. Hybrid learning models that integrate online and offline learning have been shown to increase the risk of technostress due to the demands of adapting to various digital platforms and the technology-based academic burden (Daud, 2025). This situation suggests that the digital transformation in education has significant psychological consequences.

Furthermore, the phenomenon of digital fatigue is increasingly being reported among university students. This fatigue is caused by prolonged digital exposure, multitasking, and the pressure to stay connected. Recent studies have shown that digital stress and digital fatigue contribute to the emergence of burnout in educational contexts (Honggang et al., 2026). This suggests a close relationship between digital stress and psychological exhaustion.

The impact of digital stress isn't limited to psychological aspects but also impacts students' health behaviors. Excessive screen exposure is known to correlate with sleep disturbances, such as insomnia and decreased sleep quality. Furthermore, intensive technology use also encourages sedentary behavior, characterized by low physical activity and increased sitting time.

Other health behavior changes include unhealthy eating patterns, such as a tendency toward emotional eating due to stress. This suggests that digital stress can trigger maladaptive behaviors that pose risks to an individual's physical health. Research shows that technology dependence can also impair self-control and increase the risk of poor health behaviors (Handayani & Purnasiwi, 2026).

On the other hand, the impact of digital stress on mental health has become a major concern in contemporary research. Digital stress has been shown to correlate with increased anxiety, depression, and burnout, particularly in younger generations with high levels of technology use (Masluk et al., 2024). This suggests that digital stress has serious implications for the psychological well-being of college students.

Furthermore, interactions on social media trigger social comparison mechanisms that can worsen mental health. Individuals tend to compare themselves to the idealized representations of others on social media, which can lead to feelings of low self-esteem and dissatisfaction. Furthermore, digital social pressure and cyberbullying also contribute to an increased risk of mental health disorders.

The relationship between health behaviors and mental health is complex and interconnected. Poor health behaviors, such as insufficient sleep and physical inactivity, can worsen an individual's mental health. Conversely, mental disorders can also trigger unhealthy behaviors as maladaptive coping. The biopsychosocial approach explains that the interaction between biological, psychological, and social factors is fundamental to understanding this relationship.

Although research on digital stress has advanced rapidly, most studies still focus on a single variable in isolation. Furthermore, many studies were conducted in developed countries, thus not



reflecting the social and cultural context in Indonesia. This indicates a research gap that needs to be filled through more comprehensive empirical studies.

Previous research has also been limited in examining the simultaneous relationship between digital stress, health behaviors, and mental health within a single integrated analytical model. However, quantitative approaches such as regression or Structural Equation Modeling (SEM) are essential for a deeper understanding of the relationships between variables.

The urgency of this research is heightened given that college students are in a developmental transition phase that is vulnerable to stress. The long-term impact of digital stress can impact the quality of human resources and academic productivity. Therefore, this research is crucial to empirically examine the influence of digital stress on students' health behaviors and mental health.

METHODS

This study employed a quantitative approach with an explanatory research design, aiming to examine the causal relationship between digital stress, health behaviors, and mental health in college students. This approach was chosen because it allows researchers to analyze both direct and indirect influences between variables through statistical hypothesis testing. The research design used was cross-sectional, meaning data collection was conducted at a specific point in time without any intervention, thus accurately depicting the actual condition of the research variables at the time of measurement.

This study was conducted at Poltekkes Kemenkes Padang between January and March 2026 using an explanatory cross-sectional design. The target population consisted of all active undergraduate students enrolled during the study period. Participants were selected using purposive sampling based on the following inclusion criteria: (1) registered as active students, (2) routinely using digital devices such as smartphones, tablets, or laptops for academic and social activities, (3) actively participating in technology-based learning, and (4) willing to provide informed consent.

The minimum sample size was determined according to recommendations for Structural Equation Modeling (SEM), which suggest a minimum of 5–10 observations per indicator variable. The research model contained 21 observed indicators representing digital stress, health behavior, and mental health constructs. Therefore, the required sample size ranged from 105 to 210 participants. To ensure adequate statistical power and stable parameter estimation, 210 respondents were recruited, fulfilling the upper threshold recommendation for SEM analysis.

The variables in this study consisted of digital stress as the independent variable, health behavior as the mediating variable, and mental health as the dependent variable. Digital stress is defined as psychological distress arising from excessive use of digital technology, with indicators including information overload, communication overload, technostress, and fear of missing out (FoMO). Health behavior is operationalized through indicators of sleep patterns, physical activity, diet, and clean and healthy living behaviors. Meanwhile, mental health is measured through indicators of anxiety, depression, psychological stress, and subjective well-being.



Data were collected using a structured self-administered questionnaire distributed electronically through institutional online platforms. The instrument consisted of three latent constructs: digital stress, health behavior, and mental health. Prior to the main survey, instrument validity and reliability were assessed through pilot testing. Construct reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR), while convergent validity was assessed using Average Variance Extracted (AVE). Threshold values of $\alpha > 0.70$, $CR > 0.70$, and $AVE > 0.50$ were considered acceptable.

Data analysis was performed using IBM SPSS Statistics version 26 for descriptive statistics and SmartPLS version 4.0 for Structural Equation Modeling (SEM-PLS). Descriptive analyses were conducted to summarize respondent characteristics and variable distributions. The SEM analysis consisted of two stages. First, the measurement model (outer model) was evaluated through indicator loadings, Cronbach's Alpha, Composite Reliability, and Average Variance Extracted. Second, the structural model (inner model) was examined using path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and bootstrapping procedures with 5,000 resamples. Results were reported as standardized path coefficients (β), 95% confidence intervals (95% CI), and p-values. Statistical significance was established at $p < 0.05$.

Based on the conceptual framework that has been prepared, this study proposes four main hypotheses, namely: (1) digital stress has a significant effect on students' health behavior, (2) digital stress has a significant effect on students' mental health, (3) health behavior has a significant effect on students' mental health, and (4) health behavior mediates the relationship between digital stress and mental health. This research model is expected to be able to provide an empirical picture of the dynamics of the relationship between these variables in the context of students in the digital era.

RESULTS

1. Respondent Characteristics

Table 1. Distribution of Respondent Characteristics (n = 210)

Characteristics	Category	Frequency (n)	Percentage (%)
Gender	Man	82	39.0
	Woman	128	61.0
Age	18–20 years	94	44.8
	21–23 years	98	46.7
	>23 years	18	8.5
Screen Time/Day	<5 hours	36	17.1
	5–8 hours	104	49.5
	>8 hours	70	33.4

Based on Table 1, the respondent profile shows that the study was dominated by students in the productive age group who actively use digital technology in their daily academic activities. The distribution of digital device usage duration indicates that the majority of respondents have a relatively high level of exposure to technology. These findings suggest that the study population



possesses characteristics relevant to the evaluation of the phenomenon of digital stress, given the high intensity of their interaction with digital devices and platforms.

2. Descriptive Analysis of Research Variables

Table 2. Descriptive Statistics of Main Variables

Variables	Mean	Elementary School	Min	Max	Category
Digital Stress	3.62	0.68	2.10	4.80	High
Health Behavior	2.89	0.74	1.80	4.40	Currently
Mental Health	3.45	0.72	2.00	4.90	Bad (indicates a problem)

According to Table 2, digital stress emerges as a significant issue amongst students, whilst health behaviours do not yet reflect an optimal state. At the same time, mental health conditions point to psychological vulnerabilities that require attention. These findings suggest a trend whereby increased stress in the digital environment goes hand in hand with a decline in the quality of students' health behaviours and psychological well-being.

3. Descriptive Analysis of Digital Stress Indicators

Table 3. Average Digital Stress Indicator

Indicator	Mean	Elementary School	Category
Information Overload	3.78	0.71	High
Communication Overload	3.65	0.69	High
Technostress	3.55	0.66	High
FoMO	3.50	0.72	High

Based on Table 3, the dimension of information overload is the most dominant factor in shaping students' digital stress. This finding suggests that students struggle to filter, manage and process the ever-increasing flow of digital information. Furthermore, high levels of communication overload and technostress indicate that the demands to remain constantly connected and responsive to digital communication are a source of additional pressure. Overall, all indicators are at relatively high levels, suggesting that digital stress is a multidimensional phenomenon experienced by students.

4. Descriptive Analysis of Health Behavior

Table 4. Average Health Behavior Indicators

Indicator	Mean	Elementary School	Category
Sleep Patterns	2.65	0.80	Bad
Physical Activity	2.70	0.75	Low
Dietary habit	3.00	0.70	Currently
PHBS	3.20	0.68	Currently

According to Table 4, the health behaviours most affected were sleep patterns and physical activity. These findings suggest that intensive engagement in digital activities has the potential to reduce rest time and encourage sedentary behaviour. Although the indicators for dietary habits and



healthy lifestyle practices still show a relatively better condition compared to other indicators, the results indicate that the adoption of a healthy lifestyle in its entirety has not yet been optimally achieved within the study population.

5. Descriptive Analysis of Mental Health

Table 5. Average Mental Health Indicators

Indicator	Mean	Elementary School	Category
Anxiety	3.60	0.70	High
Depression	3.40	0.72	Medium–High
Psychological Stress	3.55	0.68	High
Subjective Well-being	2.85	0.75	Low

Based on Table 5, students’ mental health is characterised by high levels of anxiety and psychological stress, as well as low levels of subjective well-being. These findings suggest that pressure arising from the digital environment not only affects emotional well-being but also diminishes students’ perception of their quality of life and psychological well-being. This pattern indicates a vulnerability in mental health that could impact both academic and social functioning if not properly addressed.

6. Structural Model Analysis

Table 6. Structural Model Results

Relationship	β	95% CI	p-value	Interpretation
Digital Stress → Health Behavior	-0.48	-0.59 to -0.36	<0.001	Significant
Digital Stress → Mental Health	0.52	0.40 to 0.63	<0.001	Significant
Health Behavior → Mental Health	-0.37	-0.49 to -0.24	<0.001	Significant
Digital Stress → Health Behavior → Mental Health	0.18	0.11 to 0.28	<0.001	Significant Partial Mediation

The structural model analysis demonstrated that digital stress had a significant negative effect on health behavior ($\beta = -0.48$; 95% CI: -0.59 to -0.36 ; $p < 0.001$), indicating that higher levels of digital stress were associated with poorer health behaviors among students. Furthermore, digital stress showed a significant positive association with mental health problems ($\beta = 0.52$; 95% CI: 0.40 – 0.63 ; $p < 0.001$), suggesting that increased digital stress contributed to worsening psychological conditions.

Health behavior was significantly associated with mental health outcomes ($\beta = -0.37$; 95% CI: -0.49 to -0.24 ; $p < 0.001$), indicating that healthier behaviors were linked to better mental health status. Mediation analysis further revealed that health behavior partially mediated the relationship between digital stress and mental health ($\beta = 0.18$; 95% CI: 0.11 – 0.28 ; $p < 0.001$). Because both the



direct and indirect effects remained statistically significant, the mediation effect was classified as partial mediation.

These findings indicate that digital stress influences mental health both directly and indirectly through its impact on students' health behaviors. The confidence intervals for all structural paths did not cross zero, confirming the robustness and statistical significance of the estimated relationships.

DISCUSSION

1. Main Research Variables

The results showed that digital stress was high, while health behaviors were moderate, and mental health tended to be poor. These findings indicate a consistent relationship between high digital exposure and a decline in students' physical and mental health. From the perspective of the Transactional Theory of Stress, this condition suggests that students interpret digital demands as stressors that exceed their coping capacity, thus triggering a stress response that impacts behavioral and psychological aspects.

This finding is in line with research by Bruni et al (2021) which stated that excessive digital exposure is significantly correlated with decreased psychological well-being and increased unhealthy behaviors in the younger generation (Bruni et al., 2021).

Researchers assume that the high levels of digital stress found not only reflect the intensity of technology use but also indicate an imbalance between the demands of the digital environment and students' adaptive capacity. In this context, students may not yet have adequate coping strategies to effectively manage digital stress. This condition indicates that digital stress acts as a predisposing factor that simultaneously influences health behaviors and mental health. Furthermore, researchers also assume that the interaction between these three variables is systemic, where changes in one aspect (for example, increased digital stress) can trigger a chain effect on other aspects, thus reinforcing the importance of an integrative approach in understanding this phenomenon.

2. Digital Stress Indicator

The analysis showed that information overload was the most dominant dimension of digital stress, followed by communication overload, technostress, and FoMO. This suggests that students experience cognitive stress due to excessive exposure to information and the constant demands of digital communication.

Within the framework of Cognitive Load Theory, this condition can be explained as cognitive overload that inhibits an individual's ability to process information effectively. When working memory capacity is exceeded, individuals tend to experience mental fatigue and decreased cognitive performance.

Research by Qin (2022) shows that information overload is one of the main factors that triggers digital stress and has an impact on cognitive fatigue and decreased decision-making quality (Qin, 2021).



Researchers assume that the dominance of information overload as the primary source of digital stress reflects students' inability to effectively select and manage information amidst the massive digital flow. This relates not only to the quantity of information received, but also to the complexity and speed of information dissemination, which exceeds individuals' cognitive processing capacity. Furthermore, high levels of communication overload indicate the presence of implicit social pressure, where students feel compelled to be digitally responsive and available. Researchers also argue that this phenomenon is reinforced by evolving digital social norms, so individuals tend to experience internal pressure even when there are not always explicit external demands. Thus, digital stress in this context is not only technical but also a complex socio-psychological construct.

3. Health Behavior

The results showed that sleep patterns and physical activity were the most impacted aspects of health behavior. This indicates that high digital exposure contributes to students' sedentary lifestyles and disrupts their circadian rhythms.

From the perspective of Health Behavior Theory, health behavior is influenced by environmental factors and individual habits. High exposure to digital technology tends to displace physical activity and disrupt rest periods, thus impacting health quality.

These findings are supported by research by Willie et al. (2022), which showed that excessive smartphone use is associated with decreased physical activity and poor sleep quality (Willie et al., 2022). Furthermore, a study by Galina et al. (2021) also found that high screen time was significantly correlated with sleep disturbances in college students (Galina et al., 2021).

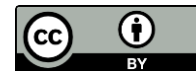
Researchers assume that poor sleep quality and physical activity patterns are a manifestation of a shift in student behavioral priorities due to the dominance of digital activities in daily life. Students tend to allocate more time to screen-based activities than to activities that support physical health, resulting in disruption to healthy lifestyles. Furthermore, researchers also assume that suboptimal health behaviors are not solely caused by a lack of knowledge, but are more influenced by habitual factors and the digital environment that encourage sedentary behavior. In this case, technology acts as a double-edged sword, which on the one hand provides convenience, but on the other hand contributes to a decline in the quality of health behaviors if not used wisely.

4. Mental Health

The results of the study showed that students' levels of anxiety and psychological stress were high, while subjective well-being was relatively low. This suggests that digital stress contributes significantly to the decline in students' psychological well-being.

Within the framework of Uses and Gratifications Theory, excessive use of digital media is initially intended to fulfill psychological needs, but in the long term it can actually cause negative effects such as anxiety and dependency.

Research by Runkle et al. (2022) showed that intense social media use correlated with increased anxiety and depression in college students (Runkle et al., 2022). Furthermore, a study by



Yi-Ming Kao & Ruan (2022) also found that high duration of digital use was associated with lower subjective well-being (Yi-Ming Kao & Ruan, 2022).

Researchers assume that the high levels of anxiety and psychological stress found are the result of chronic, poorly managed accumulation of digital stress. This condition indicates that students are not only exposed to intense digital stress but also experience limitations in emotional regulation and psychological adaptation. Furthermore, low subjective well-being indicates a mismatch between expectations and the reality experienced by students in the digital environment, particularly related to social comparison and existential pressures on social media. Researchers also argue that contextual factors, such as digital-based academic demands and limited mental health literacy, contribute to these negative impacts. Therefore, the mental health conditions of students in this study cannot be understood in isolation but must be seen as the result of a complex interaction between individual, social, and technological factors.

5. Limitation of the Study

This study has several limitations that should be considered when interpreting the findings. First, the use of a purposive sampling technique may limit the representativeness of the study population, as participants were selected based on predefined criteria rather than through probability-based sampling. Consequently, the findings may not be fully generalizable to all college students in Indonesia or other educational settings. Second, the cross-sectional design does not allow causal inferences regarding the relationships among digital stress, health behavior, and mental health. Third, all variables were measured using self-reported questionnaires, which may introduce recall bias and social desirability bias. Future studies are recommended to employ probability sampling methods, longitudinal designs, and multi-institutional samples to strengthen external validity and provide a more comprehensive understanding of the long-term effects of digital stress on student well-being.

CONCLUSIONS

This study concludes that digital stress plays a significant role in influencing students' health behaviors and mental health. The high levels of digital stress experienced by students indicate that their intense use of digital technology has become a significant source of psychological distress in their academic and social lives. This situation indicates that students are not yet fully able to manage digital demands adaptively, impacting various aspects of their well-being.

Research findings indicate that digital stress contributes to a decline in health behaviors, particularly sleep patterns and physical activity. This indicates that excessive digital exposure tends to encourage a sedentary lifestyle and disrupt the balance of students' biological rhythms. Thus, digital stress not only impacts psychological aspects but also has implications for health behaviors, potentially increasing the risk of long-term health problems.

Furthermore, digital stress has also been shown to be associated with a decline in students' mental health, characterized by increased anxiety and psychological stress, as well as decreased subjective well-being. These findings confirm that pressures in the digital environment, including



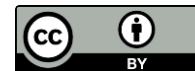
information overload and communication demands, can significantly worsen students' psychological well-being. Thus, digital stress can be understood as a significant determinant of mental health in the digital age.

Furthermore, this study demonstrates that health behaviors play a crucial role in bridging the relationship between digital stress and mental health. Suboptimal health behaviors have the potential to amplify the negative impact of digital stress on students' mental health. Conversely, good health behaviors can serve as a protective factor in mitigating these impacts. This underscores the importance of a holistic approach that considers the interaction between physical and psychological aspects in understanding student well-being.

Overall, this study provides an empirical contribution in explaining the relationship between digital stress, health behaviors, and mental health within a unified framework. The results confirm that managing digital stress is a crucial aspect in improving the quality of life for college students. Therefore, comprehensive interventions are needed, including improving digital literacy, promoting healthy lifestyles, and strengthening mental health support within the university environment.

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