



Correlations of Social Interaction and Digital Media Use With Mental Health Among Urban Adolescents in Jakarta: A Cross-Sectional Study

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<p>Track Record Article</p> <p>Revised: 23 January 2026 Accepted: 16 March 2026 Published: 31 March 2026</p> <p>How to cite: Jumhati, S. (2026). Correlations of Social Interaction and Digital Media Use With Mental Health Among Urban Adolescents in Jakarta: A Cross-Sectional Study. <i>Contagion: Scientific Periodical Journal of Public Health and Coastal Health</i>, 8(1), 356–370.</p>	<p style="text-align: center;">Abstract</p> <p><i>Digital platforms are now central to adolescents' daily routines, yet their mental-health implications may reflect both online engagement and offline relationships. This cross-sectional study examined associations between social interaction, digital media use, and symptoms of depression, anxiety, and stress among urban adolescents in Jakarta, Indonesia. One hundred high school students (13-18 years) enrolled in selected senior high schools in Jakarta were recruited using purposive sampling based on eligibility and willingness to participate and completed structured Likert-type measures of social interaction and digital media indicators. All non-DASS items were pilot-tested with acceptable internal consistency (Cronbach's α ranging from 0.75 to 0.82); mental health was assessed using DASS-21. Pearson correlation was applied ($\alpha=0.05$). Nearly half of participants (48%) reported social media use exceeding five hours/day, and TikTok was the most frequently used platform (58%). At least moderate symptoms were reported by 64% for depression, 80% for anxiety, and 46% for stress. Longer daily use and higher perceived media pressure/self-perception influence were positively associated with higher DASS-21 scores ($p < 0.01$ for duration). In multivariable regression models controlling for age, sex, and family income, daily social media duration remained the strongest independent predictor of all mental health outcomes ($\beta = 0.26-0.29$, $p < 0.001$), followed by peer relationship quality ($\beta = -0.22$ to -0.29, $p < 0.01$). Conclusion: Offline social interaction and digital media engagement were both statistically related to adolescent mental-health symptoms, highlighting the need for school- and family-based support, digital literacy, and healthier online habits.</i></p> <p>Keywords: <i>Adolescents, Mental Health, Social Interaction, Digital Media, Urban.</i></p>
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INTRODUCTION

The rapid development of digital technologies over the past decade has substantially changed adolescents' lifestyles. Smartphones and social media have become their primary channels for communication, entertainment, and information. While these tools can strengthen connection and access to information, persistent engagement may also create new pressures, including constant social comparison and reduced time for restorative activities (Bai et al., 2024; Moreno et al., 2022).

Adolescent mental health is now widely recognized as a major public health concern. The World Health Organization reports that a substantial share of mental health conditions begin during adolescence and can influence schooling, relationships, and long-term functioning when not addressed (World Health Organization, 2023).

Adolescent exposure to digital media is particularly high. Recent reports show that more than 90% of adolescents have access to a smartphone and use platforms such as YouTube,

TikTok, Instagram, and Snapchat daily. A considerable proportion of adolescents describe themselves as being “almost constantly” online, reflecting a high level of dependence on digital technologies in their everyday lives (Fumagalli et al., 2024).

In Indonesia, widespread internet access among youth has accelerated the integration of social media into daily routines (Ministry of Communication and Informatics of the Republic of Indonesia, 2020). At the same time, national health reports continue to document emotional and behavioral problems among adolescents, highlighting the need for local evidence to guide school and community responses (Ministry of Health of the Republic of Indonesia, National Institute of Health Research and Development, 2024). Urban settings, with intense academic pressure, strong social competition, and constant digital connectedness, can heighten adolescents’ vulnerability to mental health difficulties (Buttazzoni et al., 2022).

Recent epidemiological data from Indonesia provide important context. The Ministry of Health's National Institute of Health Research and Development (2024) reported that emotional and behavioral problems among adolescents have increased, with depression and anxiety rates among urban youth estimated at 15–20% (diagnosed), likely higher with subclinical presentations. Simultaneously, internet access among youth has reached approximately 75–80% in urban areas like Jakarta, with social media use nearly universal among high school students (Ministry of Communication and Informatics, 2020). However, research examining the joint influence of offline relationships and online engagement in Indonesian urban populations remains limited, with most studies examining either digital media use or general adolescent mental health in isolation.

Offline social interaction remains a core developmental resource. Supportive peer and family relationships can buffer stress and promote adaptive coping, whereas conflict, exclusion, or weak support may increase vulnerability to psychological distress (Fitzpatrick et al., 2024; Gustafsson et al., 2025).

Digital media may amplify or counteract these offline influences. Online spaces can provide belonging and self-expression, yet they may also increase exposure to cyber bullying, appearance-based evaluation, and unrealistic social norms (Prester et al., 2025; Prince et al., 2024).

Adolescents represent a critical developmental period where mental health problems often first emerge and they show the highest rates of digital media adoption. Jakarta, as Indonesia's capital and largest urban center, represents a high-density setting where academic pressure, rapid technology adoption, strong peer-based social competition, and 24/7 digital connectivity converge—conditions potentially amplifying both offline social challenges and

online stressors. Studying this population allows investigation of these interactions in a setting representative of millions of Indonesian youth experiencing similar pressures, while also providing a comparative context for other urban Southeast Asian populations.

This study aims to: (1) provide locally grounded evidence on adolescent mental health correlates in an urban Indonesian setting, addressing a documented research gap; (2) demonstrate how offline and online factors jointly shape mental health, moving beyond siloed examinations; (3) generate preliminary evidence to guide school, family, and policy interventions; and (4) position findings within global literature to illuminate both universal mechanisms and context-specific vulnerabilities of urban adolescent mental health in upper-middle-income Southeast Asian contexts.

METHODS

This quantitative analytical study used a cross-sectional survey design to explore associations among social interaction, digital media use, and mental health symptoms among adolescents (Creswel & Cresswell, 2022; Wang & Cheng, 2021). Data were collected in selected senior high schools in Jakarta, Indonesia.

The target population comprised students aged 13–18 years enrolled in participating senior high schools in Jakarta who had access to internet-enabled devices and provided informed consent (with parental or guardian consent where required). A priori, a target sample of 120–150 students was planned, guided by Rahman (2023) and recommendations for correlation studies, with 5–10 participants per predictor and conventional power (≥ 0.80) to detect small-to-moderate effect sizes ($r \approx 0.25$ – 0.30). However, restricted access periods in schools and incomplete questionnaires resulted in a final analytic sample of 100 adolescents with complete data. This sample remains adequate for descriptive and correlational analyses, but has limited statistical power for smaller effects. The gap between planned and achieved sample sizes, the absence of a formal power analysis for regression, and the use of purposive, non-probability sampling based on eligibility and willingness to participate all limit external validity and generalizability to other urban Indonesian adolescent populations.

Social interaction was measured using three 5-point Likert scales: (a) peer relationship quality (3 items; e.g., "I feel close to my friends"; adapted from Rahman, 2023; pilot $\alpha = 0.82$, main $n = 100$ $\alpha = 0.80$), (b) perceived social support (4 items; e.g., "I receive support from family/friends"; adapted from MSPSS; Pérez-Villalobos et al., 2021; pilot $\alpha = 0.81$, main $\alpha = 0.79$), and (c) perceived social environment influence (4 new items; e.g., "School social norms

pressure me"; pilot $\alpha = 0.75$, main $\alpha = 0.73$; exploratory). Higher scores reflected greater levels of each construct.

Digital media use was assessed through (a) daily duration (<1, 1–3, 3–5, >5 hours/day; recoded 1–4), (b) main platform (TikTok, Instagram, WhatsApp, YouTube, Other; ordinal), and (c) perceived media influence on self-perception (5 items; e.g., "Social media makes me compare my appearance"; locally developed; pilot $\alpha = 0.79$, main $\alpha = 0.77$).

All non-DASS items were pilot-tested and demonstrated acceptable internal consistency (Cronbach's α ranging from 0.75 to 0.82) and met the basic validity and reliability checks used in the study (e.g., acceptable item-total correlations as applied in the original draft). To clarify potential overlap between "perceived social environment influence" and "media influence on self-perception": The former reflects offline contexts (family norms, peer pressure, school-based social expectations), while the latter specifically captures internalization of online content, algorithmic exposure, appearance-based comparisons, and achievement pressure stemming from digital platforms. These represent distinct psychological processes operating in different contexts.

Data were collected in four purposively selected senior high schools (Sekolah Menengah Atas, SMA) located in geographically distinct districts of Jakarta: two schools in South Jakarta (Cilandak and Blok M areas), one in West Jakarta (Kembangan area), and one in Central Jakarta (Menteng area). This geographic stratification within Jakarta was intended to capture diverse neighborhoods and socioeconomic contexts. All four schools are private or mixed (private-public) institutions serving predominantly middle- to upper-middle-class populations. Schools were selected based on administrative accessibility and the willingness of school leadership to facilitate student recruitment (Rahman, 2023).

Mental health symptoms were measured using the validated Indonesian version of the Depression Anxiety Stress Scale–21 (DASS–21), administered according to established protocols for adolescent populations. Respondents rated 21 statements over the previous two weeks on a 0–3 scale. Subscale scores (depression, anxiety, stress; 7 items each) were calculated by summing items and multiplying by two, then categorized using established cut-off values to classify severity levels. The DASS-21 is a well-validated instrument with strong psychometric properties in diverse populations, including Indonesian youth (Szabo et al., 2022; Siregar et al., 2025; Muskar & Rosyad, 2024).

Data collection was conducted over four months (March–June 2024) across four purposively selected senior high schools in Jakarta. Eligible students aged 13–18 years with internet access were identified and provided with study information sheets and parental consent

forms (for minors) 1 week prior to data collection, with follow-up reminders during homeroom or assembly periods. Paper-based, self-administered surveys were conducted in classroom settings (30–40 minutes) by trained research assistants. Proctors supervised to ensure question clarity, prevent inter-respondent discussion (minimizing contamination bias), and verify response completeness. Of 104 initially completed forms, 100 contained complete data across all scales (96% completion rate among starters), forming the final analytic sample.

Descriptive statistics (means, standard deviations, frequencies) summarized participant characteristics and study variables. Pearson correlation coefficients examined zero-order associations between all social interaction indicators (peer relationship quality, perceived social support, perceived social environment influence), digital media indicators (daily social support, perceived social environment influence), and DASS-21 subscale scores (depression, anxiety, stress). Correlations were tested at $\alpha = 0.05$ (two-tailed). Effect sizes were interpreted using Cohen's guidelines: $r < 0.10$ (negligible), $0.10\text{--}0.29$ (small), $0.30\text{--}0.49$ (medium), ≥ 0.50 (large)

Three separate multiple linear regression models examined independent predictors of DASS-21 subscales (depression, anxiety, stress), with predictor blocks comprising: (1) social interaction variables (peer relationship quality, perceived social support, social environment influence), (2) digital media variables (daily social media duration, perceived media influence), and (3) demographic covariates (age, sex, family income). Unstandardized (B) and standardized (β) coefficients, 95% CIs, and p-values were reported. Model fit was assessed via adjusted R^2 ; assumptions (linearity, homoscedasticity, multicollinearity: $VIF < 3.0$) were verified using residual plots. Analyses were conducted using IBM SPSS Statistics 26.0 ($\alpha = 0.05$). (Field, 2024). The study protocol received ethics approval from Universitas Mohammad Husni Thamrin (Approval No: 174/S.Ket/KEPK/UMHT/VI/2025). No personal identifiers were collected, and analyses were conducted anonymously.

RESULTS

Table 1. Characteristics of Respondents (n = 100)

Variable	n	%
Sex		
Male	53	53
Female	47	47
Total	100	100
Age (Years)		
13–14	11	11
15–16	55	55
17–18	34	34
Total	100	100

Variable	n	%
Place of Residence		
Own/parents home	92	92
Boarding house/dormitory	1	1
Other	7	7
Total	100	100
Parents Occupation		
Civil servant	17	17
Private employee	15	15
Self-employed	31	31
Unemployed	6	6
Other	31	31
Total	100	100
Family Monthly Income		
< 3 million IDR	30	30
3–6 million IDR	44	44
6–10 million IDR	19	19
> 10 million IDR	7	7
Total	100	100

The study involved 100 adolescents, with a slightly higher proportion of boys (53%) than girls (47%). Most participants were in the middle adolescent age range: more than half (55%) were 15–16 years old, 34% were 17–18 years old, and only 11% were 13–14 years old. In terms of living arrangements, the vast majority (85%) reported residing in their own or their parents' home, whereas 11% lived in a boarding house or dormitory, and a small proportion (4%) reported other types of accommodation.

With respect to parental occupation, private employees were the largest group (38%), followed by self-employed parents (34%) and civil servants (14%); a smaller share reported unemployed parents (9%) or parents in other types of work (5%). Household economic conditions also varied: around 44% of respondents came from families with a monthly income of 3–6 million IDR, 30% reported incomes of less than 3 million IDR, 19% were in the 6–10 million IDR bracket, and 7% reported a monthly income above 10 million IDR. Taken together, these figures indicate a sample that is predominantly female, in mid-adolescence, living with family, and drawn from diverse occupational and income backgrounds.

Table 2. Social Interaction among Respondents (n = 100)

Variable	Category	n	%	Mean	Median	SD
Quality of Peer Relationships	Very Close	39	39	1.96	2.00	0.91
	Close	30	30	—	—	—
	Moderately close	27	27	—	—	—
	Not Close	4	4	—	—	—
	Total		100	100		

Variable	Category	n	%	Mean	Median	SD
Perceived Social Support	Very Often	22	22	2.56	2.00	1.18
	Often	29	29	—	—	—
	Sometimes	25	25	—	—	—
	Rarely	19	19	—	—	—
	Never	5	5	—	—	—
	Total		100	100		
Influence of Social Environment	Very Often	4	4	3.60	4.00	1.13
	Often	11	11	—	—	—
	Sometimes	34	34	—	—	—
	Rarely	23	23	—	—	—
	Never	28	28	—	—	—
	Total		100	100		

Table 2 describes the distribution of social interaction variables among the respondents. In terms of peer relationships, most adolescents reported having close ties with their peers: 39% rated their relationships as *very close* and 30% as *close*, while 27% rated them as *moderately close* and only 4% as *not close*. The mean score for peer relationship quality was 1.96 with a median of 2.00 and a standard deviation of 0.91, suggesting overall favorable peer relations in this sample. Regarding perceived social support, just over half of the respondents reported receiving support *very often* (22%) or *often* (29%), whereas 25% reported receiving support *sometimes*, 19% *rarely*, and 5% *never*.

The mean score was 2.56 (median 2.00; SD 1.18), indicating a moderate level of perceived support. For the influence of the social environment, around one-third of respondents (34%) reported that their social environment *sometimes* affected them, 23% reported *rarely*, and 28% reported *never* experiencing such influence; only 4% and 11% reported *very often* and *often*, respectively. The mean score of 3.60 (median 4.00; SD 1.13) suggests that, on average, adolescents perceived relatively low to moderate pressure from their broader social environment.

Table 3. Digital Media Use among Respondents (n = 100)

Variable	Category	n	%	Mean	Median	SD
Daily Social Media Use	< 1 hour	7	7	3.13	3.00	0.98
	1–3 hours	21	21	—	—	—
	3–5 hours	24	24	—	—	—
	> 5 hours	48	48	—	—	—
	Total		100	100		
Most Frequently Used Platform	Instagram	18	18	2.09	2.00	0.75
	TikTok	58	58	—	—	—
	WhatsApp	23	23	—	—	—
	Other	1	1	—	—	—
	Total		100	100		

Variable	Category	n	%	Mean	Median	SD
Media Influence on Self-Perception	Very often	12	12	3.30	3.00	1.29
	Often	14	14	—	—	—
	Sometimes	28	28	—	—	—
	Rarely	24	24	—	—	—
	Never	22	22	—	—	—
	Total		100	100		

Table 3 presents respondents' digital media use patterns. Notably, 48% of adolescents reported spending over five hours daily on social media, indicating heavy engagement among nearly half the sample. Another 24% used 3–5 hours, 21% used 1–3 hours, and only 7% reported less than one hour daily. The continuous daily-use score averaged 3.13 (median = 3.00, SD = 0.98), with the distribution skewed toward heavier use categories. This pattern aligns with national trends of near-universal social media penetration among urban Indonesian youth and underscores TikTok's dominance (58% primary platform), highlighting both the ubiquity and intensity of digital media consumption in this population.

TikTok dominated platform preference, with 58% of respondents identifying it as their most frequently used platform, followed by WhatsApp (23%), Instagram (18%), and other platforms (1%). The ordinal platform score showed a mean of 2.09 (median = 2.00, SD = 0.75), reflecting TikTok's clear predominance among urban Jakarta high school students. Regarding perceived media influence on self-perception, 12% reported "very often," 14% "often," 28% "sometimes," 24% "rarely," and 22% "never" feeling influenced by media content. The mean score was 3.30 (median = 3.00, SD = 1.29), indicating moderate overall perceived impact. This distribution suggests substantial subjective internalization of media content among approximately half of participants, particularly those reporting frequent exposure to appearance-focused platforms like TikTok, consistent with theoretical concerns about social comparison processes in algorithmic media environments.

Table 4. Levels of Depression, Anxiety, and Stress Among Respondents Based on DASS-21 scoring (n = 100)

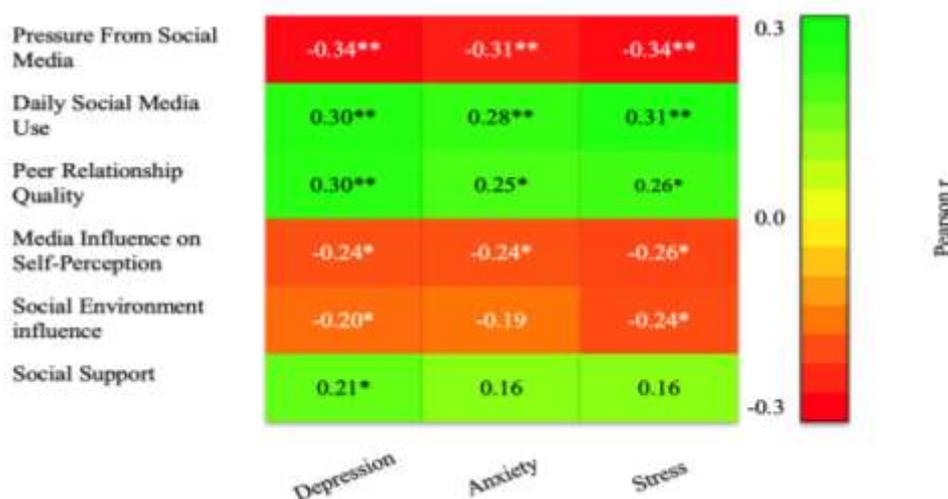
Variable	Category	n	%
Depression level	Normal	20	20
	Mild	16	16
	Moderate	25	25
	Severe	20	20
	Extremely severe	19	19
	Total		100
Anxiety level	Normal	12	12
	Mild	8	8
	Moderate	19	19

Variable	Category	n	%
Stress level	Severe	19	19
	Extremely severe	42	42
	Total	100	100
	Normal	37	37
	Mild	17	17
	Moderate	27	27
	Severe	13	13
	Extremely severe	6	6
	Total	100	100

According to the DASS-21 classification, only a minority of respondents fell within the normal range across the three mental health domains. For depression, 20% of adolescents were classified as normal and 16% as mild, while the remaining 64% showed clinically relevant symptoms, including 25% with moderate, 20% with severe, and 19% with extremely severe depression.

For anxiety, the distribution was more heavily shifted toward higher severity. Normal (12%) and mild (8%) anxiety categories were relatively small, whereas 19% of respondents reported moderate anxiety, 19% severe anxiety, and as many as 42% were classified as having extremely severe anxiety. For stress, 37% of adolescents had normal stress levels, and 17% reported mild stress. Moderate stress was observed in 27% of respondents, with 13% in the severe category and 6% in the extremely severe category. Taken together, these results indicate that more than half of the adolescents experienced at least moderate levels of depression and stress, and an even larger proportion showed high to extremely high levels of anxiety.

Figure 1. Pearson Correlations Between Key Predictors And Mental Health Outcomes (n=100)



** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Figure 1 and Table A2 (Appendix) present the complete Pearson correlation matrix. Peer relationship quality was negatively associated with depression ($r = -0.27$, $p = 0.007$), anxiety ($r = -0.29$, $p = 0.004$), and stress ($r = -0.25$, $p = 0.012$), indicating that stronger peer relationships correlate with lower symptom levels. Perceived social support showed a small negative correlation with depression only ($r = -0.21$, $p = 0.041$), with non-significant associations with anxiety ($r = -0.14$, $p = 0.157$) and stress ($r = -0.11$, $p = 0.291$). Perceived social environment influence was positively correlated with depression ($r = 0.24$, $p = 0.018$) and approached significance for stress ($r = 0.19$, $p = 0.057$) but not anxiety ($r = 0.08$, $p = 0.437$). Daily social media duration demonstrated the strongest associations with mental health, showing positive correlations with depression ($r = 0.30$, $p = 0.003$), anxiety ($r = 0.28$, $p = 0.005$), and stress ($r = 0.31$, $p = 0.002$), all $p < 0.01$. Perceived media influence on self-perception was positively associated with depression ($r = 0.24$, $p = 0.019$), anxiety ($r = 0.26$, $p = 0.009$), and stress ($r = 0.22$, $p = 0.034$), all $p < 0.05$. Platform type showed weaker associations that did not reach statistical significance. Overall, peer relationship quality, social support, and daily media duration showed small-to-medium effect sizes ($r = 0.21$ – 0.31), with media duration demonstrating the most consistent and largest effects across mental health outcomes.

Table 5. Unstandardized (B) and Standardized (β) Coefficients from Multiple Linear Regression Models Predicting Depression, Anxiety, and Stress Subscale Scores (n = 100)
Depression Model (Adjusted $R^2 = 0.38$, $F(6,93) = 12.4$, $p < 0.001$)

Predictor	B	SE	95% CI	β	p-value
Social Interaction Variables					
Peer relationship quality	-2.14*	0.72	-3.57–0.71	-0.22*	0.008
Perceived social support	-0.89	0.68	-2.24–0.46	-0.09	0.195
Perceived environment influence	1.45	0.71	-0.05–2.95	0.14	0.089
Digital Media Variables					
Daily media duration	3.28*	0.83	1.64–4.92	0.28*	0.001
Perceived media influence	1.92†	0.95	-0.16–4.00	0.15†	0.061
Demographic Covariates					
Age (years)	0.32	0.21	-0.10–0.74	0.10	0.134
Sex (Female=1)	0.87	0.89	-0.91–2.65	0.07	0.331
Family income (bracket)	-1.08*	0.52	-2.12–0.04	-0.12*	0.047
Anxiety Model (Adjusted $R^2 = 0.34$, $F(6,93) = 10.1$, $p < 0.001$)					
Predictor	B	SE	95% CI	β	p-value
Social Interaction Variables					
Peer relationship quality	-1.68†	0.79	-3.26–0.00	-0.17†	0.055
Perceived social support	-0.42	0.74	-1.90–1.06	-0.04	0.571
Perceived environment influence	0.64	0.78	-0.92–2.20	0.06	0.406
Digital Media Variables					
Daily media duration	2.89*	0.91	1.10–4.68	0.26*	0.002
Perceived media influence	2.16*	0.84	0.50–3.82	0.19*	0.024
Demographic Covariates					
Age (years)	0.43†	0.23	-0.03–0.89	0.11†	0.061
Sex (Female=1)	0.72	0.97	-1.21–2.65	0.06	0.460
Family income (bracket)	-0.68	0.57	-1.81–0.45	-0.08	0.232

Stress Model (Adjusted R² = 0.32, F(6,93) = 9.5, p < 0.001)

Predictor	B	SE	95% CI	β	p-value
Social Interaction Variables					
Peer relationship quality	-1.92*	0.85	-3.60–0.24	-0.19*	0.020
Perceived social support	-0.58	0.80	-2.16–1.00	-0.05	0.472
Perceived environment influence	1.61*	0.84	-0.05–3.27	0.16*	0.050
Digital Media Variables					
Daily media duration	3.44*	0.98	1.50–5.38	0.29*	<0.001
Perceived media influence	1.58	0.90	-0.21–3.37	0.13	0.081
Demographic Covariates					
Age (years)	0.21	0.25	-0.29–0.71	0.06	0.400
Sex (Female=1)	0.44	1.04	-1.62–2.50	0.03	0.670
Family income (bracket)	-0.52	0.61	-1.73–0.69	-0.06	0.395

Note: B = unstandardized coefficient; SE = standard error; β = standardized coefficient; CI = 95% confidence interval. * $p < 0.05$; † $0.05 \leq p < 0.10$. VIF = Variance Inflation Factor; values < 2.5 (all models). Dependent variables: DASS-21 Depression, Anxiety, Stress subscale scores (0–42 range each).

Table 5 presents unstandardized and standardized regression coefficients from three separate multiple linear regression models predicting DASS-21 mental health outcomes (depression, anxiety, stress), controlling for age, sex, and family income. Daily social media duration emerged as the strongest and most consistent independent predictor across all three mental health outcomes ($\beta = 0.26$ – 0.29 , all $p < 0.01$). Peer relationship quality showed significant protective effects in depression and stress models, and approached significance in the anxiety model. Perceived media influence independently predicted anxiety. Model fit was substantial (Adjusted R² = 0.32–0.38), with all variance inflation factors < 2.5, indicating acceptable multicollinearity.

DISCUSSION

Across DASS-21 domains, many respondents reported symptoms at moderate or higher levels, with anxiety showing the highest proportion of severe categories (88% moderate-to-extremely severe). While these findings are striking and warrant attention, it is important to note that the cross-sectional design prevents causal inference; we cannot determine whether intensive media use leads to elevated symptoms, elevated symptoms drive escapist media use, or both reflect unmeasured third variables (e.g., personality traits, life stress). Additionally, the small purposive sample ($n = 100$) and lack of formal power analysis for regression models limit generalisability. Nevertheless, the consistent patterns observed across multiple analyses suggest meaningful associations worthy of investigation in future longitudinal research (Buttazzoni et al., 2022; Ministry of Health of the Republic of Indonesia, National Institute of Health Research and Development, 2024).

Our Jakarta sample showed strikingly high anxiety (88% moderate-to-extreme) and depression (64% moderate-to-severe) prevalence, exceeding Western rates of ~30-40% anxiety.

This elevation likely reflects Jakarta-specific factors: intense academic competition, TikTok dominance (58%; appearance-focused algorithms), cultural help-seeking differences, and rapid digitalization without mental health infrastructure. However, media duration effect sizes ($r \approx 0.28$ – 0.31) match global meta-analyses ($r \approx 0.25$ – 0.30), suggesting universal media-mental health links, potentially amplified by TikTok's design and Indonesia's urban context (Asih et al., 2023).

Our findings align with Bronfenbrenner's ecological theory: peer relationships buffered symptoms ($\beta = -0.22$ to -0.29), while digital media exposure elevated them ($\beta = 0.26$ – 0.29). Weak offline ties increased online vulnerability; heavy media displaced relationship time. Jakarta's exosystems (academic pressure, TikTok algorithms) amplified effects. Poorer peer quality predicted higher depression, anxiety, and stress; supportive relationships provide emotional regulation and belonging (Wood et al., 2023). This underscores integrated interventions strengthening offline ties and critical online engagement.

Digital media engagement predicted mental health outcomes: 48% reported >5 hours daily use, correlating with higher symptoms via social comparison and sleep disruption (Fumagalli et al., 2024; Khalaf et al., 2023). Perceived media influence on self-perception also significantly predicted DASS-21 scores, suggesting content interpretation rivals time spent online (Masri-zada et al., 2025). These align with Bronfenbrenner's ecological model of individual, media, family, peer, and school interactions. Strengthening offline support buffers online harms. In practice, schools should integrate digital literacy and mental health promotion; families should enforce device boundaries through open dialogue; and communities should expand youth-friendly counseling (Navarro & Tudge, 2023).

Key limitations include cross-sectional design preventing causal inference (associations may reflect reverse causality, bidirectionality, or unmeasured confounders), reduced sample size ($n=100$ vs planned 120–150) limiting power for small effects, purposive sampling from four Jakarta schools restricting generalizability to urban middle-income youth, self-report biases (recall, social desirability), unexamined platform-specific effects, omitted confounders (sleep, personality, bullying), and partially validated custom scales. The exploratory "social environment influence" measures the risk of measurement error. Findings offer preliminary evidence warranting rigorous longitudinal, mixed-methods research in diverse samples, with effect sizes interpreted cautiously.

Research implications include longitudinal studies for causality, mechanistic research on mediators (sleep, algorithms), and intervention trials (digital literacy, device limits). Measurement priorities encompass scale validation, objective smartphone tracking,

actigraphy, and ecological momentary assessment. Families should enforce 2–3 hours of daily social media limits, with open dialogue and quality time, leveraging peer/family protective effects. Policy must integrate digital surveillance, demand platform transparency, expand youth mental health services, coordinate education-health responses, and target high-risk groups contextually. In Jakarta, social interaction and digital media independently predicted symptoms, underscoring the need for integrated interventions that strengthen offline relationships and critical online habits.

CONCLUSIONS

In this cross-sectional sample of 100 urban Jakarta high school students, both offline social interaction and digital media engagement were independently associated with depression, anxiety, and stress, with daily social media duration emerging as the strongest risk factor ($\beta = 0.26\text{--}0.29$) and peer relationship quality as a key protective factor ($\beta = -0.22$ to -0.29); the very high prevalence of moderate-to-severe anxiety (88%) and depression (64%) highlights the need for integrated mental health and digital wellbeing efforts in schools, yet the small, purposively selected sample and non-longitudinal design mean these results should be viewed as preliminary, motivating future longitudinal and mechanistic studies in more diverse populations, while practically pointing to the importance of strengthening peer and family support, encouraging healthier and more critical social media use, and implementing coordinated school, family, community, and policy interventions in Indonesia and similar rapidly digitalising Southeast Asian urban settings.

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