

A COMPARATIVE STUDY OF THE RELATIONSHIP BETWEEN TIKTOK USE AND SOCIAL ANXIETY AMONG FEMALE STUDENTS AT SMAN 9 MAKASSAR AND SMA IT AR-RAHMAH MAKASSAR

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ABSTRACT

Introduction: Adolescent social anxiety, particularly among females, is reported at 28.2% versus 25.4% among males. Globally, it affects about 7% of the population annually and contributes to higher risks of non-communicable and mental disorders. Social media, especially TikTok, is suspected to play a crucial role in this issue. **Aims:** This study compared the relationship between TikTok use intensity and social anxiety among female students from two educational settings: SMAN 9 Makassar (public) and SMA IT Ar-Rahmah (Islamic-based private). **Methods:** A quantitative cross-sectional design was used with 86 respondents selected through multistage and total sampling. Instruments included the Social Anxiety Scale for Adolescents (SAS-A), four questionnaires on social media use, and Welltory for physiological data. **Results:** Social anxiety was reported by 55.8% and 46.4% of SMAN 9 Makassar and SMA IT Ar-Rahmah students, respectively. The Mann-Whitney U test showed no significant difference between schools ($p=0.163$). The Chi-Square test revealed a significant relationship between TikTok use intensity and social anxiety ($p=0.000$). Duration of use also differed significantly ($p=0.019$), with SMAN 9 and SMA IT Ar-Rahmah students averaging 112.7 and 73.8 minutes/day. TikTok content type was significantly related to social anxiety at SMAN 9 Makassar ($p=0.000$) but not at SMA IT Ar-Rahmah ($p=0.960$). User activity and general social media intensity showed no significant link. **Conclusion:** Social anxiety levels did not differ significantly between schools, but TikTok use intensity and content type were strongly associated. Multilevel interventions involving screening, digital literacy, and policy collaboration are recommended.

Keywords: Adolescent, Digital Literacy, Social Anxiety, Social Media, TikTok

INTRODUCTION

Social anxiety is a global mental disorder, affecting approximately 7% of the world's population each year (World Health Organization, 2018). In Indonesia, the 2023 Health Survey (SKI) recorded 2% of the population aged ≥ 15 years with mental health problems. The highest prevalence (2.8%) was observed in the 15-24 age group (BKPK Kemenkes RI, 2023). Based on the

data, social anxiety is most dominant in adolescent girls (28.2%) compared to boys (25.4%) (Center for Reproductive Health, 2022). Specifically in South Sulawesi, the prevalence reached 2.7% in the population aged ≥ 15 years, with 2.6% in females, exceeding the national rate (BKPK Kemenkes RI, 2023). A study suggests that excessive social media use may be associated with increased social anxiety and depression in adolescents (Primack et al.,

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2017). In January 2024, social media users in Indonesia are reported to be 167 million, which is equivalent to 49.9% of the total population (Kemp, 2024).

TikTok is among the fastest-growing social media platforms in Indonesia. In July 2024, Indonesia became the country with the largest number of TikTok users at 157.6 million users (Statista, 2024), with the proportion of 13-17 year olds at 28%, and the average time spent in a month is 34 hours and 15 minutes (Kemp, 2024). In Makassar, the use of this platform has also increased rapidly among teenagers. Based on initial observations, the majority of students, specifically schoolgirls, often access the application either to watch or even make videos. Unlike other platforms, TikTok focuses on encouraging users to interact with personalized algorithms, which display videos according to individual preferences, as well as generate content and self-representations (Bhandari and Bimo, 2020). Its unique approach in influencing behavior through content personalization and more individualized interactions makes the platform exceptional to be discussed in this study.

High social media use is often associated with various negative impacts, including an increased risk of mental health problems such as anxiety, depression, and social isolation (Gao, 2023). (Satici et al., 2022) discovered that a longer duration of TikTok viewing may increase the risk of social anxiety. According to (Kurniasari, Kurniasih, and Krisdiyanto, 2023), approximately 60-70% of adolescents who frequently use the platform are observed to experience stress and anxiety disorders. The type of activity of the users is also related to social anxiety, categorized into active and passive. Those who tend to be passive are more prone to social anxiety because the activities often involve negative social comparisons, which can trigger insecurity and concerns about others' judgment (Thorisdottir et al., 2019). The type of content or what users watch can also affect

the mood. (Virós-Martín, Montaña-Blasco and Jiménez-Morales, 2024) shows that the type of TikTok content has a mixed impact on dimensions of digital well-being.

The data in this study presents that women are more vulnerable to social anxiety than men. SMAN 9 Makassar and SMA IT Ar-Rahmah schools were selected based on scientific criteria relevant to the study objectives. SMAN 9 Makassar was selected because it has a non-strict *mobile phone* use policy, allowing students to freely access their devices. In contrast, SMA IT Ar-Rahmah has stricter rules on *mobile phone* use and social media access. This study focused on high school individuals who are in a developmental phase where self-identity and social interaction are very important. Based on observation, social anxiety has a significant impact on public health. This study was designed to address the lack of information about the effects of certain aspects of TikTok use on social anxiety among adolescents. The purpose was to analyze the relationship between TikTok with social anxiety among female students of SMAN 9 Makassar and SMA IT Ar-Rahmah Makassar City.

METHODS

This study adopted an observational analytic design with a cross-sectional approach and was conducted at two senior high schools, namely SMAN 9 Makassar and SMA IT Ar-Rahmah. The population consisted of all female students from both schools (624 and 76, respectively). The generalization area of this study was limited to female students from the two institutions, representing public and Islamic-based educational environments in Makassar. A total of 86 respondents participated, comprising 43 students from each school. The number was adjusted to ensure comparability between the institutions, as Grade XII students at SMA IT Ar-Rahmah were excluded due to examination schedules. Sampling at SMAN 9 Makassar

was conducted using a quota sampling method followed by simple random sampling, while SMA IT Ar-Rahmah adopted a total sampling method.

This study comprised independent variables such as TikTok Use Intensity, User Activity Type, and Content Type, as well as *confounding* variables, namely Intensity of Use of Other Social Media. TikTok use intensity was measured using *Social Media Use Intensity Scale* and classified into low (≤ 33 rd percentile), moderate (34th–66th percentile), and high (≥ 67 th percentile) based on total scores. User activity (active or passive) was assessed using *Social Media Activity Questionnaire*, and content type was identified through a 17-item content diversity scale developed and validated by the study team. Intensity of other social media use was measured using a five-item scale covering frequency and duration. Social anxiety was assessed using *Social Anxiety Scale for Adolescents* (SAS-A) and supported by *Heart Rate Variability (HRV)* measurements from Welltory application. Respondents who scored above the mean SAS-A score with low HRV (SDNN < 50 ms) were classified as anxious, while others were not anxious. All data were subjected to editing, coding, entry, and cleaning before statistical analysis. In this study, the dependent variable was identified as Social Anxiety. Secondary data was obtained from each school, including the number of students, class distribution, and basic demographic information such as age. Primary data was collected directly and comprised the independent variables of the study and the level of social anxiety of female students.

The instruments used include several questionnaires with tested reliability. Social anxiety was measured using Indonesian version of SAS-A, developed by La Greca and Lopez (1998), with 33 items and a Cronbach's Alpha

reliability of 0.931. Intensity of social media use was measured by Social Media Use Intensity Scale, comprising 2 items, designed by Sukmadinda (2022) with a reliability of 0.876. The type of user activity uses *Social Media Activity Questionnaire* (SMAQ), which has been applied by Ozimek, Brailovskaia and Bierhoff (2023), with a reliability of 0.85. TikTok content type was measured through a 17-item questionnaire developed and validated, based on the studies by Schneuing (2023) and Virós-Martín, Montaña-Blasco and Jiménez-Morales (2024) with a reliability of 0.73. Meanwhile, intensity of using other social media was measured through a 5-item questionnaire prepared and validated by the team, with a reliability of 0.802. All instruments used a Likert scale and followed a validation process and reliability testing to ensure consistency in measuring study variables. Furthermore, the physiological measurement of social anxiety uses Welltory to measure *Heart Rate Variability (HRV)* through a PPG sensor. The indicator adopted was *Standard Deviation of NN Intervals* (SDNN). Welltory has been tested for validity ($p < 0.05$) and reliability ($r = 0.77$ to 0.94).

Data were processed through a pre-analysis process of editing, coding, entry, and cleaning. Univariate analysis was presented in frequency and percentage tables, while bivariate analysis used the Chi-Square test for categorical data. Social anxiety scores between the two schools were compared using Mann-Whitney U test because the data were not normally distributed. Multivariate analysis was not conducted as the *confounding* variable did not show a significant relationship with the dependent variable. This study obtained ethical approval from the Health Research Ethics Commission of the Faculty of Medicine and Health Sciences, UIN Alauddin Makassar, with ethical number B.167/KEPK/FKIK/II/2025.

RESULT**Univariate Analysis****Table 1.** Characteristics of Respondents at SMAN 9 Makassar and SMA IT Ar-Rahmah Makassar City in 2025

Characteristics of Respondents	SMAN 9 Makassar (N=43)		SMA IT Ar-Rahmah (N=43)	
	n	%	n	%
Gender:				
Female	43	100	43	100
Place of Residence:				
Boarding	4	9.3	1	2.3
House				
Dormitory	-	-	2	4.7
Home	39	90.7	40	93.0
Age:				
15 Years	17	39.5	11	25.6
16 Years	16	37.2	22	51.2
17 Years	9	20.9	9	20.9
18 Years	1	2.3	1	2.3

Based on Table 1, all respondents in both schools were female students (100%), with the majority residing at home (SMAN 9: 90.7%; SMA IT: 93%). Most of the students at SMAN 9 Makassar were in

grade X (55.8%), while SMA IT Ar-Rahmah was in grade XI (51.2%). The dominant age at SMAN 9 was 15-16, and at SMA IT Ar-Rahmah was 16.

Table 2. Frequency Distribution of TikTok and Other Social Media Use Variables

Variable	Category	SMAN 9 Makassar		SMA IT Ar-Rahmah	
		n	%	n	%
Intensity of TikTok Use	Low	12	27.9	12	27.9
	Medium	19	44.2	15	34.9
	High	12	27.9	16	37.2
Total		43	100	43	100
Activity Type of TikTok Users	Passive	21	48.8	30	69.8
	Active	22	51.2	13	30.2
Total		43	100	43	100
TikTok Content Type	Not Diverse	13	30.2	11	25.6
	Diverse	18	41.9	20	46.5
	Very Diverse	12	27.9	12	27.9
Total		43	100	43	100
Intensity of Use of Other Social Media	Low	13	30.2	11	25.6
	Medium	16	37.2	21	48.8
	High	14	32.6	11	25.6
Total		43	100	43	100

Table 2 shows different patterns of social media use between institutions. Students of SMAN 9 Makassar are dominated by moderate intensity of TikTok use (44.2%) and active activities (51.2%). In contrast, SMA IT Ar-Rahmah students were more at high intensity (37.2%) and the

majority of passive activities (69.8%). The results showed that both schools had diverse TikTok content preferences. For other social media, SMAN 9 Makassar had moderate to high intensity of use (37.2% and 32.6%), while SMA IT Ar-Rahmah had the majority at moderate intensity (48.8%).

Bivariate Analysis

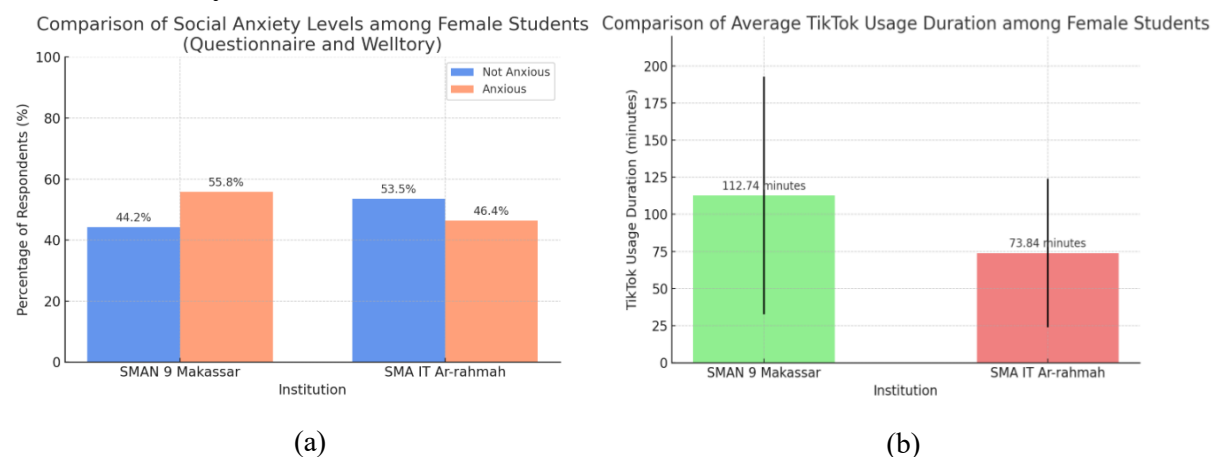


Figure 1. Distribution of Social Anxiety Level among Female Students (a); Distribution of Duration of TikTok Use among Female Students (b)

Figure 1(a) shows that the majority of students of SMAN 9 Makassar experienced social anxiety (55.8%), while the majority of students of SMA IT Ar-Rahmah had no experience (53.5%), consistent with SAS-A and Welltory measurements. Following Shapiro-Wilk normality test ($p=0.283$ in SMAN 9 and $p=0.001$ in SMA IT Ar-Rahmah), Mann-Whitney U test discovered no significant difference in mean social anxiety between schools ($p=0.163$), but the *mean rank* of SMAN 9 Makassar (47.24) was higher.

Figure 1(b) shows the mean duration of TikTok use, with SMAN 9 Makassar and SMA IT Ar-Rahmah recording 112.74 minutes $\pm$ 79.91 and 73.84 minutes $\pm$ 51.38, respectively. Following the Shapiro-Wilk normality test in each school ($p=0.005$ in SMAN 9 and $p=0.000$ in SMA IT Ar-Rahmah), the Mann-Whitney U test showed a significant difference in the duration of TikTok use ($p=0.019$), clearly signifying that female students of SMAN 9 Makassar generally spent a longer time daily on TikTok.

Table 3. Results of Analysis of the Relationship between TikTok Social Media and Social Anxiety of Students

Institution	Variable	Category	Social Anxiety				Total		P-Value
			n	%	n	%	N	%	
SMAN 9 Makassar	Intensity of TikTok Use	Low	12	100	0	0	12	100	0.000
		Medium	7	36.8	12	63.2	19	100	
		High	0	0	12	100	12	100	
SMA IT Ar-Rahmah		Low	10	83.3	2	16.7	12	100	0.000
		Medium	12	80.0	3	20.0	15	100	
		High	1	6.3	15	93.8	16	100	

Institution	Variable	Category	Social Anxiety				Total		P-Value	
			n	%	n	%	N	%		
SMAN 9 Makassar	User Activity Type	Passive	9	42.9	12	57.1	21	100	0.864	
		Active	10	45.5	12	54.5	22	100		
SMA IT Ar-Rahmah		Passive	17	56.7	13	43.3	30	100	0.526	
		Active	6	46.2	7	53.8	13	100		
SMAN 9 Makassar	Content Type	Not Diverse	13	100	0	0	13	100	0.000	
		Diverse	6	33.3	12	66.7	18	100		
		Very Diverse	0	0	12	100	12	100		
SMA IT Ar-Rahmah		Not Diverse	6	54.5	5	45.5	11	100	0.960	
		Diverse	11	55.0	9	45.0	20	100		
		Very Diverse	6	50.0	6	50.0	12	100		
SMAN 9 Makassar		Intensity of Use of Other Social Media	Low	7	53.8	6	46.2	13	100	0.413
			Medium	5	31.3	11	68.7	16	100	
High	7		50.0	7	50.0	14	100			
SMA IT Ar-Rahmah	Low		5	45.5	6	54.5	11	100	0.817	
	Medium		12	57.1	9	42.9	21	100		
	High		6	54.5	5	45.5	11	100		

Chi-Square test results in Table 3 showed a significant relationship between intensity of TikTok use and social anxiety in both schools ($p=0.000$). At SMAN 9 Makassar, high intensity use caused anxiety (100%). A similar pattern was observed at SMA IT Ar-Rahmah, with 93.8% of high-intensity students experiencing anxiety.

Type of TikTok user activity was not significantly associated with social anxiety in either institution ($p=0.864$ for SMAN 9 Makassar; $p=0.526$ for SMA IT Ar-Rahmah). The type of content was significantly associated with social anxiety at SMAN 9 Makassar ($p=0.000$), but not at SMA IT Ar-Rahmah ($p=0.960$). Intensity of use of other social media also did not show a significant relationship in both schools ($p>0.05$).

DISCUSSION

Comparison of Social Anxiety in Students

This study showed no significant

difference in the level of social anxiety between female students of SMAN 9 Makassar and SMA IT Ar-Rahmah. The result challenges initial assumptions regarding the direct impact of school environment differences on social anxiety, suggesting that school regulation of mobile phone use is not a major determinant. This non-significant difference suggests that genetic predisposition (Baba, Kloiber, and Zai, 2022), difficult childhood experiences (Keles, McCrae, and Grealish, 2020), as well as broader psychosocial influences such as family and peer support, possibly play a more dominant role than school policies. Adolescence (16-18 years) is a crucial period of identity formation (Erikson, 1968) and increased sensitivity to social evaluation, where peer group (Asyia et al., 2022) and family support (Halidu and Kotera, 2024) become key protective factors that can balance social anxiety, independent of the formal school environment (Kholifah, 2021). This evidence is consistent with a study

challenging the assumption that faith-based schools inherently provide greater protection against mental health problems such as social anxiety (Rizqi Animah, Mardiyah Hayati, and Rochman Basuki, 2024). As a result, the mechanisms influencing adolescents' mental health are more complex and not solely determined by a school's religious affiliation or its specific policies on technology use. Internal and external protective factors, such as strong social support and coping skills, can significantly moderate the impact of environmental stressors, including social media exposure, on adolescent mental health (Singh et al., 2020).

An important public health implication of this study is the potential relationship between social anxiety and increased risk of Non-Communicable Diseases (NCDs) in adolescents (Payasi and Jain, 2025). The presence of social anxiety in a substantial proportion of students (55.8% at SMAN 9, 46.5% at SMA IT Ar-Rahmah) is concerning. This relationship may manifest through behavioral pathways, such as emotional eating (Erdem, Efe and Özbey, 2023) and poor sleep patterns (Kajastus et al., 2024), leading to increased body mass index (BMI) and insulin resistance, which are risk factors for diabetes and cardiovascular disease (Damayati et al., 2024). Physiological pathways, such as chronic activation of the sympathetic nervous system, increased cortisol levels, and interleukin-6, may contribute to early atherosclerosis in adolescents (de Baumont et al., 2021). Therefore, the evidences demand a paradigm shift in public health strategies, advocating the integration of mental health screening and interventions as an integral component of NCDs prevention programs (Cantika et al., 2024).

The Relationship between Intensity of TikTok Use with Social Anxiety of Students

This study discovered a highly

significant positive relationship between the intensity of TikTok use and social anxiety in female students of SMAN 9 Makassar and SMA IT Ar-Rahmah. A clear pattern was observed where female students with low intensity of TikTok use did not show social anxiety, while those with high intensity mostly experienced the disorder. This is a robust and consistent result across the two different school environments. The high intensity of TikTok use, characterized by "infinite scrolling" and rapid content switching, can cause sensory and cognitive overload, overstimulate the nervous system, and significantly worsen anxiety (Schneuing, 2023). Excessive time on the platform can also replace meaningful face-to-face social interactions, causing feelings of loneliness and isolation (Payasi and Jain, 2025). TikTok's highly personalized "For You Page" (FYP) algorithm contributes to *Fear of Missing Out* (FOMO) (Gopal et al., 2024) and triggers upward social comparison (Schneuing, 2023), leading to persistent feelings of inadequacy and low self-esteem, direct precursors of social anxiety (Putri, Virilia and Stefani, 2023). The immersive design of the platform may lead to compulsive use, which is strongly associated with increased levels of anxiety and depression.

These results are consistent with many studies showing a positive correlation between high social media intensity as well as increased anxiety and depression in adolescents (Wu, Huang and Yang, 2024). Studies show that adolescents who spend more than three hours a day on social media have double the risk of experiencing symptoms of anxiety and depression (Malenge, Mohamed and Abdinor, 2024). Some studies suggest that TikTok use does not *necessarily* contribute negatively to social anxiety, and may even offer relief in certain contexts (Gu et al., 2021). The results of this study suggest a dose-response relationship between the intensity of TikTok use and social anxiety. This provides a clear target for public health interventions, as managing the intensity and

duration of TikTok use is essential. Rather than broad bans, strategies should focus on setting healthy screen time limits, promoting self-regulation, and educating teens and parents about the threshold at which TikTok use becomes detrimental to mental health.

Differences in Duration of TikTok Use among Students

The analysis showed a significant difference in the duration of TikTok use between female students of SMAN 9 Makassar and SMA IT Ar-Rahmah. SMAN 9 Makassar students spent significantly more time on the platform. This difference is an important contextual piece for understanding the differential impact of TikTok in both school settings. The most direct explanation for this significant difference lies in the contrasting school policies regarding cell phone use and social media access. SMAN 9 Makassar, as a public school, implements a lax policy that allows students more freedom in carrying and accessing their mobile devices, including TikTok. Meanwhile, SMA IT Ar-Rahmah, as an integrated Islamic school, imposes strict regulations on mobile phone use and social media access, limiting students' opportunities to engage in prolonged TikTok use during school hours. These policy differences directly affect daily habits and the duration of TikTok use.

Significant differences in duration of TikTok use were directly correlated with stated school policies, suggesting a clear cause-and-effect relationship of stricter policies leading to lower duration of use. When this is considered alongside the absence of significant differences in overall social anxiety between the two schools, it shows a deeper understanding. This suggests that policies can effectively control exposure to a potential stressor (TikTok), but do not necessarily eliminate underlying vulnerabilities to social anxiety (Rahmi, 2022). These results are in line with studies showing higher and less regulated TikTok use in mainstream

schools compared to faith-based schools, where patterns of use may be more influenced by religious behavior or academic pressure (Fadhilah, 2022). However, some studies suggest that the duration of TikTok use is not only related to the type of educational institution, with high use also observed in religious schools due to increased digital activity during online learning or as a coping mechanism for academic stress (Sun et al., 2024).

The Relationship of TikTok User Activity Type with Social Anxiety of Students

This study discovered no significant relationship between the type of TikTok user activity (passive or active) and social anxiety in female students of SMAN 9 Makassar and SMA IT Ar-Rahmah. The results suggest that classifying users as "active" or "passive" does not adequately explain TikTok's link to social anxiety. This simple division overlooks factors like interaction quality, content type, and individual vulnerability (Valkenburg, Koutamanis and Vossen, 2022) (Mahmudah, Purnamasari and Nuswantoro, 2023). Slightly higher anxiety among active users at SMAN 9 Makassar and passive users at SMA IT Ar-Rahmah points to contextual differences. Interventions should therefore focus on user motivation, content, and emotional regulation rather than activity type.

The Relationship between TikTok Content Type and Social Anxiety of Students

The study discovered a significant link between TikTok content type and social anxiety among female students of SMAN 9 Makassar, with greater content diversity associated with higher anxiety. No such relationship appeared among SMA IT Ar-Rahmah students. For SMAN 9 Makassar, the result supports Social Comparison Theory (Festinger, 1954), as exposure to idealized content on beauty,

lifestyle, or success can heighten self-dissatisfaction, conformity pressure, and FOMO (Schneuing, 2023).

The absence of this link at SMA IT Ar-Rahmah may reflect stricter phone and social media rules that limit exposure to anxiety-provoking content (Reinecke, Gilbert, and Eden, 2022). This controlled environment inherently limits overall exposure to a range of potentially anxiety-provoking content, thereby reducing opportunities for negative social comparisons. SMA IT Ar-Rahmah students predominantly accessed content that tended to be less directly comparative or aspirational in nature. This triggered social anxiety than the content favored by SMAN 9 students. The content served more as a means of relaxation and entertainment rather than a source of social distress. The differences between the two schools regarding the effects of content type on social anxiety emphasized that the impact of content diversity is not universal but moderated by the surrounding environment and its regulatory framework. In the less regulated environment (SMAN 9), unlimited exposure to diverse content, often idealized, directly triggered social comparison and anxiety. In a more controlled environment (SMA IT Ar-Rahmah), although diverse content is consumed, overall limited access or perhaps a different mindset instilled by school values may balance out the negative effects.

Relationship between Intensity of Use of Other Social Media with Social Anxiety of Students

There is no significant relationship between the intensity of using platforms such as Facebook, Instagram, and X and social anxiety among female students of SMAN 9 Makassar and SMA IT Ar-Rahmah. Based on the Use and Gratification Theory (Ruggiero, 2000), these platforms mainly support social connection and self-expression, which may help regulate anxiety.

TikTok's endless scrolling, personalized "For You Page," and rapid short videos foster stronger engagement and potential dependency (Payasi and Jain, 2025) (Yildirim et al., 2023). Its stream of viral trends and idealized content heightens FOMO and social comparison (Gopal et al., 2024) and can cause overstimulation (Schneuing, 2023). The results suggest that TikTok's design uniquely contributes to adolescent social anxiety, underscoring the need for platform-specific digital literacy and mental health interventions (Jain et al., 2025).

CONCLUSIONS

In conclusion, no significant difference was observed in social anxiety levels between students of SMAN 9 Makassar and SMA IT Ar-Rahmah. The disorder tended to be higher among students at SMAN 9 Makassar. Higher TikTok use intensity was associated with greater social anxiety, while content type showed a relationship with anxiety only at SMAN 9 Makassar. User activity type and intensity of other social media use were not related to anxiety levels. This study was limited to two schools with a small number of female respondents, restricting generalization. The cross-sectional design and the adoption of self-report and HRV application data may also have influenced accuracy. Future studies should engage a larger and more diverse sample, including male students, and apply longitudinal or mixed-method designs to clarify causal relationships.

Recommendations are directed to several stakeholders. Schools and teachers are advised to implement regular mental health screening and integrate digital literacy programs into the curriculum. Parents should supervise adolescents' social media habits and promote balanced screen time at home. Health professionals and psychologists are advised to provide preventive counseling related to social media-induced anxiety. Meanwhile, policymakers and digital platform

regulators are recommended to collaborate in promoting educational and prosocial digital content to strengthen mental resilience.

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