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ORIGINAL RESEARCH

The Association Between Types of Social Media Use and Non-Suicidal Self-Injury (NSSI) Behavior Among High School Students in Yogyakarta City

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ABSTRACT

Introduction: Non-suicidal self-injury (NSSI) is a maladaptive behavior exhibited when facing intense distress, with the highest prevalence during adolescence. Social media use is suspected to be one of the risk factors for NSSI, from both active use (involving interaction with other users) and passive use (without interacting with other users). It is still unclear whether each type of use – active and passive – is associated with NSSI behavior. **Methods:** This study is an observational analytic study with a cross-sectional design. The study included 296 high school students in Yogyakarta City selected using cluster random sampling techniques. Social media use was measured using a study-specific questionnaire developed for this study, while NSSI behavior was assessed using the Indonesian version of the Self-Harm Inventory. The statistical tests used were Spearman's rank correlation and linear regression, with significance level defined at $p<0.05$. **Results:** Active social media use was positively correlated with NSSI behavior, with a coefficient of $r = 0.119$ ($p=0.040$). The linear regression analysis showed that depressive symptoms played a significant role in NSSI behavior ($p=0.000$). The analyses yielded an R^2 value of 0.20 for the proposed model. **Conclusion:** In this study, we found a significant correlation between active social media use and NSSI behavior among high school students in Yogyakarta City. **Active social media use** was positively correlated with **indirect self-harm** subscale and **cognitive behavior subscale.** The significant factor influencing NSSI behavior among high school students in Yogyakarta City was depressive symptoms.

Keywords: Active Passive Use, Adolescents, NSSI, Social Media, Type of Social Media Use

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INTRODUCTION

Non-suicidal self-injury (NSSI) is the act of deliberately harming or injuring oneself without the intent to end one's life; it is a maladaptive coping mechanism in response to emotional distress. Common examples of NSSI include cutting, head banging, and preventing wounds from healing[1]. The highest prevalence of NSSI is during adolescence[2]. Research conducted on high school students in Yogyakarta found a high lifetime prevalence of NSSI at 34.1%[3].

One of the risk factors for NSSI is behavioral problems, including unhealthy social media usage. Social media use is associated with an increased risk of NSSI in both clinical and non-clinical populations[4]. It is suggested that the risk of social media usage leading to NSSI is not only about the quantity of time spent but also how social media is used and the qualitative experiences conveyed to and received by its users[5]. Recent studies have begun to examine social media use by type—that is, active use (interacting with other users), such as posting photos or commenting; and passive use (without interaction with other users), such as checking friends' profiles or watching videos[5].

One aspect of both active and passive use that impacts NSSI behaviors is exposure to NSSI-related content[6]. Such content can convey depressive mood and self-injurious thoughts and behaviors to users who view it[7], triggering urges to self-harm or imitate the displayed behaviors[8].

Exposure to NSSI content leads to an increase in NSSI behaviors when measured over a period of time[9]. The transmission of self-harm thoughts and behaviors through online content can occur both when producing (active) and when consuming (passive) content[10]. In another study[11], active use was associated with NSSI, whereas passive use was not. Self-harming thoughts can be reinforced by feedback from other users, such as similar experiences or comments supporting NSSI[12]. Sharing self-injury methods also leads adolescents to engage in more severe NSSI, resulting in more severe injuries[13]. Repeated exposure to NSSI-related posts can also lead to normalization, making NSSI seem like a reasonable reaction to distress[8,13].

To date, no articles found that specifically discussed NSSI on social media usage in Indonesia or in Yogyakarta City. The adolescent's high usage of social media may further increase the intensity of NSSI. Therefore, research on social media use and NSSI behavior is important, considering the impact of NSSI which, despite not being intended to end one's life, can become a risk factor for suicidal behaviors. This study aims to analyze the relationship between types of social media use, that is active and passive, and NSSI behavior among high school students in Yogyakarta City.

METHODS

This is a cross-sectional study conducted in two public high schools in Yogyakarta City. Inclusion criteria were 1) currently enrolled in Grade X, XI, or XII, 2) aged 15–18 years. Whereas exclusion criteria were 1) no access whatsoever to any online social media, 2) having suicidal ideation, suicidal plans, and/or suicide attempts, 3) history of medical, cognitive, or organic psychiatric disorders that hinder understanding and/or completion of the questionnaire, 4) incomplete questionnaire responses. Sampling was conducted using a cluster random sampling method. Instruments used in this study were study-specific social media usage questionnaire related to NSSI content, Self-Harm Inventory (SHI), and Patient Health Questionnaire – 9 (PHQ-9).

The social media usage questionnaire related to NSSI content was specifically developed for this study (study-specific measure). It consisted of 3 questions on active usage and 3 on passive usage. The content validity and internal reliability testing were conducted on 102 high school students, with calculated r-values ranging from 0.352 to

0.735, all exceeding the r-table value, and a Cronbach's alpha of 0.583. Thus, the questionnaire was considered valid and reliable.

The SHI has been translated into Indonesian[14]. Its validity and reliability were tested in high school adolescent population[3], with r-values ranging from 0.183 to 0.726 all exceeding the critical r-table value and a Cronbach's alpha of 0.811. Questionnaires with item 18 (‘attempted suicide’) marked 'Yes' were excluded from the dataset. The Indonesian version of PHQ-9 has been validated and found reliable, with an Eta correlation r = 0.527 and a Cronbach’s alpha of 0.873[15].

RESULTS

Data collected in this study were analyzed using Statistical Package for Social Science (SPSS). From the total dataset (n=296), there were 192 subjects (64.9%) who had a history of social media usage related to NSSI content. Among these 192 subjects, 33.3% had a history of active use, while 66.7% had a history of passive use.

A total of 94 out of 296 subjects (31.8%) had a history of NSSI. Based on subscale categorization, the highest percentage of behavior among NSSI subjects (n=94) was mild direct self-harm (74.7%), followed by indirect self-harm (54.7%), severe direct self-harm (40%), cognitive behaviors (33.7%), and the least reported risky behaviors (26.3%). The mean SHI score among NSSI subjects (n=94) was 3.13 (±1.821) and median value was 3, indicating that each subject engaged in at least three types of self-injurious behavior.

Table 2 shows that only the correlation between active social media usage and NSSI behavior was statistically significant ($p<0.05$), while the passive usage did not result in significant correlation with NSSI behavior. Active social media use was positively correlated with indirect self-harm subscale and cognitive behavior subscale.

Table 1. Subject characteristics (n=296)

Variables		n	%
Age	15 years old	42	14.2
	16 years old	114	38.5
	17 years old	113	38.2
	18 years old	27	9.1
Sex	Female	197	66.6
	Male	99	33.4
Having sibling(s)	Not having sibling	35	11.8
	Having sibling(s)	261	88.2
With single parent	Both parent	273	92.2
	Single parent	23	7.8
Parent educational level	Lower education	9	3.0
	Higher education	287	97.0
Parent income level	Below minimum wage	64	21.6
	Above minimum wage	232	78.4
Depressive symptoms	No symptom	103	34.8
	Mild	121	40.9
	Moderate	50	16.9
	Severe	22	7.4

Table 2. Correlation between active and passive social media use and NSSI behavior (n=296)

		r [a]	p
Scores of active social media use	Total SHI score	0.119*	0.040*
	mild direct behavior score	0.089	0.125
	severe direct behavior score	0.101	0.083
	indirect behavior score	0.126*	0.031*
	risky behavior score	0.053	0.362
	cognitive behavior score	0.176*	0.002*
Scores of passive social media use	Total SHI score	0.092	0.116
	mild direct behavior score	0.078	0.183
	severe direct behavior score	0.047	0.420
	indirect behavior score	0.077	0.185
	risky behavior score	-0.022	0.710
	cognitive behavior score	0.076	0.194

[a]data was analyzed with *Spearman's Rank correlation*

Below is Table 3, which presents the strength of the relationship between each confounding variable and NSSI behavior (SHI score) among the subjects. The confounding variables that showed a significant relationship (p<0.25) with NSSI behavior were sex (male) and having sibling(s), both with negative correlations; and depressive symptoms with a positive correlation.

In Table 4, results from linear regression analysis indicate that the only variable with significant influence (p<0.05) on NSSI behavior was depressive symptoms. The model has an R^2 value of 0.20, meaning that 20% of the variance in NSSI behavior in this study is explained by the proposed model, with a significant contribution from depressive symptoms.

Table 3. Relationship between confounding variables and NSSI behavior (n=296)

	r [a]	p
Age	0.033	0.573
Sex (male)	-0.069*	0.239*
Having sibling(s)	-0.093*	0.111*
With single parent	-0.053	0.365
Parent educational level	0.032	0.585
Parent income level	-0.035	0.544
Depressive symptoms	0.391*	0.000*

[a]data was analyzed with *Spearman's Rank correlation*

Table 4. Analysis of variables influencing NSSI behavior (n=296)

	B	SE	t	p
Age	0.083	0.111	0.747	0.456
Sex	0.032	0.203	0.158	0.875
Having sibling(s)	-0.443	0.292	-1.518	0.130
With single parent	-0.514	0.349	-1.474	0.142
Parent educational level	1.008	0.566	1.781	0.076
Parent income level	-0.208	0.236	-0.883	0.378
Passive social media use	0.072	0.103	0.699	0.485
Active social media use	0.131	0.119	1.094	0.275
Depressive symptoms	0.163	0.021	7.803	0.000**
R^2		0.201		

DISCUSSION

This study found an association between active social media use and NSSI. Most of the subjects were grade X and XI students, predominantly aged 16–17 years. It is consistent with previous research on NSSI among high school students in Yogyakarta[3,16]. Female students made up the majority of the subjects (66.6%), aligns with previous studies reporting 59.3%[3] and 65.5%[16] female subjects; also consistent with demographic data from both schools which have 59.9% and 62.2% female students.

Nearly two-thirds (65.2%) of the study subjects exhibited depressive symptoms at mild, moderate, or severe levels. This is higher than the prevalence of mild, moderate, and severe depressive symptoms among adolescents in Banyuwangi, which was reported at 49%[17]. The level of academic stress, with 70% of high school students in Yogyakarta experiencing high academic stress[18], may contribute to the higher prevalence of depressive symptoms among students in Yogyakarta City.

In this study, the prevalence of social media use related to NSSI content was nearly two-thirds of the total subjects (64.9%). Compared to previous research[9], 43% subjects had been exposed to NSSI content, 45% had never been exposed, and 12% did not respond. That study was conducted on young adult subjects, whereas NSSI behavior, which is the main theme of the content examined in this study, has the highest prevalence among adolescents[2]. Additionally, it only studied activities of NSSI-related content on one social media platform, whereas this study did not restrict the type of social media used.

The percentage of passive social media use (without interaction with other users) among subjects was found to be higher than the percentage of active use. According to a social media usage survey in Indonesia[19], the most common reasons for using social media were to pass the time (58.9%) and to communicate with friends and family (57.1%). There was no specific indication of whether these activities were performed actively or passively, but spending time on social media is mostly passive, while communication involves active interactions with others.

The prevalence of NSSI among high school students from this study was 31.8%, slightly different from previous research conducted on high school students in the same city, which reported 34.1% prevalence[3]. During data collection, it was emphasized to subjects that NSSI is intentional and aimed to harming one's self. Thus, it was expected that the data entered by the subjects and the resulting prevalence calculated would reflect the intended behavior and represent the actual condition.

Another possible explanation for the prevalence difference was that one of the high schools in this study had a *Sekolah Sehat Jiwa* (Mental Health-Friendly School) program in collaboration with the Provincial Psychiatric Hospital. This program includes peer counseling training for students to support their peers in need, and the school can refer students requiring further assistance to the hospital. This may contribute to the lower prevalence of NSSI observed in this study.

Although previous research[3] did not calculate each NSSI subscale, the patterns observed were similar to those in this study. If NSSI behavior in that research were grouped into five subscales, the highest percentage was also the mild direct self-harm (87%, compared to 74.7% in this study), while the lowest percentage was also the risky behavior (19.5%, compared to 26.3% in this study).

Individuals with NSSI were found to have lower amygdala activities. When using social media, they did not experience discomfort (aversion) toward NSSI-related stimuli, such as photos of wound or sharp objects, therefore increasing the risk of re-engaging in NSSI[20]. The amygdala can also undergo a hijack, which is an excessive fight- or flight response, so the affective stimuli

cannot be processed rationally and leads to impulsive behavior[21].

Viewing NSSI-related photos from peers reduces cognitive control activation and response inhibition in the dorsal anterior cingulate cortex, bilateral prefrontal cortex, and lateral parietal cortex, which can increase the likelihood of engaging in similar risky behaviors[22]. Emotional dysregulation added with lack of cognitive control made individuals shift to maladaptive behavior such as NSSI.

Those neurobiological processes applied to both active and passive social media use. However, based on analysis in this study, only active social media use showed a significant positive correlation with adolescent NSSI behaviors. These findings align with previous studies[10,11]. The presence of interaction in active use, which is absent in passive use, along with high psychological distress, are believed to play a role in this significant correlation through the following mechanisms.

Compared to individuals who do not share their NSSI or related activities online, those who upload their NSSI were found to have more severe NSSI (especially intrapersonal functions of NSSI), higher clinical symptoms and suicidal ideation, and lower resilience and self-esteem[23]. These findings suggest that the individuals who post NSSI contents seem to have higher psychological distress, and tend to use NSSI to alleviate their distress.

When adolescents post NSSI-related content and receive attention, such as likes or comments, there is increased activity in the reward and motivation system of the brain. This positive experience is encoded in the hippocampus, encouraging them to share again to receive the same reward as before[22,24]. Other forms of interaction, such as supportive comments on NSSI posts or shared personal stories about NSSI from other users, act as a positive reinforcement that can strengthen NSSI-related thoughts and behaviors[12]. Similarly, if adolescents share self-harm methods on social media, they may attempt techniques that they have never tried before, leading to more severe NSSI behaviors[13].

When examining the subscales of NSSI behavior, active social media use showed a significant correlation with the indirect behavior subscale and the cognitive subscale. This may be because social media use influenced emotions and thoughts in the subjects, but did not yet affect their behavior. This assumption is supported by findings showing that 30.1% of subjects in this study reported that NSSI content influenced their emotions, 6.1% said it influenced their thoughts, and only 1.7% felt that it affected their behavior to engage in similar actions.

Among confounding factors, the variables that resulted in negative correlation with NSSI behavior were sex (male) and having sibling(s), whereas the variable positively correlated with NSSI behavior was depressive symptoms. According to literature, NSSI behavior is more commonly found among females compared to males[25,26]. Although neurobiological studies have not yet confirmed differences in neuronal circuits between males and females engaging in NSSI, puberty that happens earlier in females increases the risk of internalizing disorders such as depression and anxiety, and raises the likelihood of NSSI[27]. Females also tend to experience higher levels of psychological distress[28].

According to a meta-analysis[29], having sibling(s) is considered a risk factor for NSSI. Sibling relationships can provide positive aspects such as warmth and empathy, but can also have negative effects such as conflict and rivalry[30]. However, in this study, having sibling(s) was found to reduce NSSI behavior. It is likely that the presence of siblings acted as a positive influence and a source of social support for the subjects.

The confounding factor that showed a positive correlation with NSSI behavior was depressive symptoms. This supports the univariate analysis result which indicated that more than 70% of study subjects exhibited

mild, moderate, or severe depressive symptoms. The multivariate analysis also showed that the factor in the proposed model that gave a significant contribution influencing NSSI behavior was depressive symptoms. It aligns with the previous studies[26,31] which stated that depressive disorder is a risk factor for NSSI in adolescents. Imbalance of monoamine neurotransmitters, amygdala hyperactivity, prefrontal cortex hypoactivity in depression can reduce individual's ability to manage stress and heighten the likelihood of NSSI[32,33].

However, according to existing research, not all adolescents exposed to NSSI-related content will experience emotional, cognitive, and behavioral effects. Some adolescents are more vulnerable; one of the reasons is having depressive symptoms. They show stronger responses to NSSI-related stimuli and are more easily triggered, increasing their likelihood of engaging in NSSI due to the emotional, cognitive, and behavioral influences conveyed through social media content[34].

Generally, the initial trigger for adolescents engaging in NSSI is psychological, that is depressive feelings which often resulted from problems with family or friends. Adolescents with depression frequently struggle to manage negative emotions such as sadness, anger, or frustration, and NSSI may serve as a temporary coping mechanism to relieve these emotions[35,36]. On social aspect, when individuals find it difficult to verbally express emotional pain, NSSI can become a form of nonverbal communication to express distress and seek help[35,36]. Adolescents who lack someone to tell problems to are at greater risk of engaging in NSSI[25].

The limitations of this study include the collection of primary data by self-report which carries a high recall bias. Additionally, in the selected class clusters, only one grade XII class was obtained, meaning that while the results align with the hypothesis, they may not fully represent all age levels. The weakness of this study is not including several other potential factors that can influence NSSI, such as childhood trauma, history of bullying, personality traits, social support, and others as confounding variables. Furthermore, it is unclear whether NSSI behavior in the subjects was caused by pre-existing depressive symptoms or resulted from exposure to NSSI content on social media.

CONCLUSION

In this study we found that the type of social media use, particularly active use, was significantly and positively correlated with NSSI behavior among high school students. Specifically, NSSI subscales that active social media use was positively correlated with were indirect self-harm and cognitive behaviors. The factor that plays a significant role in NSSI behavior among high school students was depressive symptoms.

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