EXPLORING AN ADVERSE EFFECT OF SOCIAL MEDIA ON ADOLESCENT'S MENTAL HEALTH

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ABSTRACT

Background: Previous studies have reported that adolescent use of social media can have a negative impact on their mental health. In 2021, the National Institutes of Health Malaysia emphasized the urgent need to address digital-related mental health issues, which pose a significant gap in our understanding. Nevertheless, there has been a lack of research on the effects of social media addiction on the mental well-being of local adolescents. This study aims to examine the effect of social media use on mental health issues among adolescents in Kelantan, Malaysia. **Methods:** A total of 384 respondents voluntarily participated in this cross-sectional study involving ten districts in Kelantan using the snowball sampling method. **Results:** Analysed data finds social media addiction correlates significantly with depression ($r = .390$, $p < .01$), suicide ideation ($r = .188$, $p < .01$) and self-esteem ($r = .156$, $p < .01$). Multiple regression analysis indicated that suicide ideation was predicted by social media addiction ($\beta = -.01$, $p < .05$) and depression ($\beta - .12$, $p < .01$) but not self-esteem ($\beta = -.002$, $p > .05$). Furthermore, social media moderates the relationship between depression and suicidal ideation ($\beta = .0016$, $p < .05$). **Conclusion:** Controlling social media use may prevent addiction and promote greater mental health among adolescents.

KEYWORDS: social media addiction, depression, self-esteem, suicidal ideation, adolescent, Malaysia

INTRODUCTION

Social media is now a fundamental part of modern life, offering a platform for social connections, promoting products and services, and providing quick and easy access to information. Its growing role in the lives of Malaysian adolescents necessitates an investigation into its potential impact on their mental well-being. Excessive social media usage can lead to issues such as addiction and exposure to negative content, both directly and indirectly. Extensive research has indicated that this overuse can have detrimental effects on both physical and mental health, as demonstrated by studies like those conducted by David et al. in 2021 and Memon et al. in 2018. Recent research, including work by Twenge et al. (2018) and Rosen et al. (2013), has associated excessive social media use with various mental health challenges, including sadness, anxiety, and low self-esteem.

Researchers in Malaysia have specifically identified a strong connection between social media addiction and stress, anxiety, and depression among undergraduate nursing students in Kuantan, proposing that this negative impact includes a secondary layer of stress and despair (Cho et al., 2021). Furthermore, factors like cyberbullying (Abaido, 2020), statutory rape, unsafe sex (Bazlin & Noor Azlan, 2011), teenage pregnancy, and exposure to pornography (Kimemia & Mugambi, 2016) are hypothesized to contribute to the depression, anxiety, and stress experienced by adolescents. Additional findings indicate that adolescents may encounter adverse experiences on social media, including anxiety stemming from the need for approval and exposure to distressing content, which can further contribute to declining mental health (Samantha & Zhooriyati, 2022).

While the influence of social media on the mental health of Malaysian adolescents has gained attention, a significant research gap exists concerning its impact in rural areas. Existing studies have primarily concentrated on urban adolescents, neglecting the distinct experiences and challenges faced by their rural counterparts in the context of social media and mental health (NIHM 2021 & Shamsuddin et al. 2013).

Addressing this gap is essential for developing more effective interventions and strategies tailored to the specific needs of rural Malaysian adolescents, potentially enhancing their mental health outcomes. This study aims to investigate the consequences of social media addiction, focusing on suicidal ideation, depressive symptoms, and self-esteem among adolescents in Kelantan. The results will offer valuable insights into how social media affects the mental health of Malaysian adolescents, informing the development of interventions and policies designed to promote healthier social media usage within this demographic.

METHODOLOGY

In a cross-sectional survey spanning ten districts in Kelantan, we sourced adolescent population data from the Department of Statistics Malaysia (DOSM) website. The data was categorized by ethnicity (Malay, Chinese, Indian, Bumiputras), gender (male and female), and age groups (10-14 years, 15-19 years, and 20-24 years). To accommodate our research needs, we adjusted the starting age from 12 to 10 years old, ensuring that the 10-14 years age range included 12-year-olds during data sorting. The total adolescent population encompassed all ethnicities, genders, and age groups, amounting to N = 59,878,000. To determine the sample size, we utilized an online calculator at https://www.calculator.net/sample-size-calculator.html. Our study employed a 95% confidence level, a 5% margin of error, a population proportion of 50%, and a population size of N = 59,878,000. This calculation yielded a required sample size of n = 385.

This study employed a simple random sampling method to gather 385 samples, ensuring an unbiased selection process and equal opportunity for all adolescents in Kelantan. Eligibility criteria were established for participants. Inclusion criteria: i) Malaysian nationality, ii) age between 12-24 years, iii) current internet and social media use, iv) proficiency in Malay and/or English, and v) willingness to complete the survey. Exclusion criteria: i) non-Malaysian citizenship, ii) age below 12 or above 24, iii) no internet access or social media usage, iv) inability to comprehend Malay and/or English, v) lack of willingness to participate in the survey, and vi) a diagnosis of mental illness.

This study utilized the Google Form platform for our survey, and it was distributed via WhatsApp, Telegram, Facebook, Instagram, and Twitter. The form incorporated an information sheet explaining the study, a consent form, and four standardized questionnaires. These questionnaires assessed depression (using the Patient Health Questionnaire-9; PHQ-9), suicidal ideation (a component of the PHQ-9), self-esteem (utilizing the Rosenberg Self Esteem Scale; RSES), and social media addiction (assessed through the Social Media Addiction Questionnaire; SMAQ). To promote participation and minimize response bias, all questionnaire items were available in both English and Malay languages. To ensure complete responses, each item was configured as 'required' within the Google Form settings.

All potential respondents received an information sheet, consent form, and questionnaire through the provided link. Individuals under 18 years of age were required to obtain parental or legal guardian consent before completing the questionnaire. Data collection took place from September 3, 2022, to November 7, 2022. The completed questionnaires were collected and recorded in a Google Sheet, resulting in 384 responses, which were cleaned and prepared for analysis.

The data analysis utilized the Statistical Package for Social Sciences (SPSS) version 27.0. We employed both descriptive and inferential statistics, including frequency and percentage analysis for demographic items. Additionally, we utilized Pearson's correlation, multiple regression, and the Baron and Kenny (1986) method for moderation analysis to examine the relationships, predictions, and moderation between social media addiction and depression, self-esteem, and suicidal ideation. Multiple regression was also employed to control for confounding variables such as age and sex.

Instrumentation
Depression
The Patient Health Questionnaire-9 (PHQ-9) was used to assess depression. This scale was created by Kroenke et al. (2001) and it complies with the Diagnostic and Statistical Manual, Fourth Edition (DSM-IV)'s (diagnostic criteria for clinical depression). With an 88% sensitivity and specificity, this measure can detect depression. The response options for the question, which asks about depression symptoms that appeared within two weeks, range from 0 (hardly ever) to 3 (almost daily). Scores under 5 were seen as not indicative of a depressive disorder, however scores of 10 and more are indicative of one. The mean score for patients with major depressive disorder was 17 (SD = 6.1), while the mean score for individuals with other types of depressive disorders was 10.4 (SD = 5.4). PHQ-9 had exceptional reliability characteristics, with internal reliability measuring at Cronbach's alpha =.89. While the mean score between the first test and the retest was recorded at 5.08 and 5.03, the test retest, which was also done between 48 hours, produced reliability, $r = 0.84$ (Kroenke et al. 2001). The Malay version of the PHQ-9, which was translated and validated by Sherina, Arroll, and Goodyear-Smith (2012), was used for this investigation. The Malay version of the PHQ-9 has convergent validity with the General Health Questionnaire (GHQ-12) at $r = 0.61$, p 0.001, strong internal reliability, and sensitivity and specificity of 87% and 82%, respectively.

Suicidal ideation
A single PHQ-9 item used to assess suicidal ideation was used. If the respondent "Thought that you would be better off dead or of hurting yourself in some way," they must answer the item. The PHQ-9 questionnaire lists this item as item no. 9 (Kroenke et al 2001).

Self-esteem
The 10-item Rosenberg Self Esteem Scale (RSE) was used to assess general self-esteem. On a four-point Likert scale, from 1 ("strongly disagree") to 4 ("strongly agree"), participants gave answers like "On the whole, I am satisfied with myself" a rating. The reliability of the RSE has been proved by Cronbach's alpha scores, which range from.72 to.90. Li et al. reported in 2019 that the Cronbach's alpha values for factor 1 and factor 2 for upper secondary school pupils in Malaysia were, respectively,.78 and.60. The Rosenberg Self-Esteem Scale-Malay, which Li et al. (2019) translated and validated, is the RSE's translated Malay version. It was used in this study. Strong internal consistency has been demonstrated by this version, with alpha values starting at $\alpha = 0.624$ to 0.776 (Li et al. 2019).

Social media addiction

The Social Media Addiction Questionnaire (SMAQ), created by Hawi and Samaha in 2016, is a modification of the Facebook Intrusion Questionnaire (FIQ) in which "Facebook" has been replaced with "social media." The FIQ was an 8-item Facebook addiction assessment tool that was based on The Mobile Phone Involvement Questionnaire and Brown's 10 Behavioural Addiction Components. The SMAQ questionnaire's instructions state at the outset, "The following questions are about your relationship with and use of online social media." Eight comments about social media addiction are included in it, including "I frequently think about social media when I am not using it." These items are rated by respondents on a 7-point Likert scale, with 1 representing "strongly disagree" and 7 representing "strongly agree." Total scores can vary from 8 to 50; higher values suggest more serious addiction. SMAQ's internal consistency is strong, as seen by its Cronbach's alpha of .87. The typical score on the SMAQ is 24.5 (SD: 9.4). In general, female participants do better than male participants, with a mean score of 26.2 (SD=9.4) versus 22.8 (SD=9.4) for the latter. For the purposes of this study, the SMAQ was back translated by two translators from English to Malay. With a of 0.809, the Malay version of the SMAQ shows good internal consistency. Additionally, there was a positive but small correlation (r = 0.384, p 0.001) between the predictive validity of the Malay-SMAQ and the PHQ-9.

RESULTS

About 400 Google form links were distributed and only 384 responded. There is no incomplete data since the form were set to require all respondent responses on all items asked. This translates to 96% response rate. Normality test was executed prior other parametric test to avoid the violation of assumption. The normality was assess using histogram and Normal Q-Q plot of SMAQ. The histogram visualized as having normal distribution with mean of 27.12 and standard deviation of 9.398. Meanwhile in the Normal Q-Q plot, we observed that the data plot was mostly on the straight line. There are two data was seen as outliers in the boxplot namely data 375 and 364. However, we remain this data as their SMAQ score are on the acceptable range. Other than that, the data has no multicollinearity and shown homogeneity.

Among 384 respondents, 31% were male and the rest were female. The majority of the respondents' ages ranged from 18 to 24 years old (81.5%). Malay races and Islam affiliation dominates the sample which contributed 99.2% and 99.5% respectively. About 41.4% of respondents holds higher education certificates ranging from STPM to Diploma. Most respondents reside in Kota Bharu district (36.7%) and majority (85.4%) lived with their parents. the highest education for respondents' both father and mother were mostly SPM. More detailed socio-demographic profiles are shown in Table 1.

Table 1 Demographic profiles.

Profiles	Frequency (n)	Percent (%)
Gender		
Male	119	31
Female	265	69
Age		
12 -18 years	71	18.5
18 -24 years	313	81.5
Race		
Malay	381	99.2
Chinese	1	.3
Indian	1	.3
Others	1	.3
Religion		
Islam	382	99.5
Buddha	2	.5
Education		
PMR	31	8.1

SPM	59	15.4
Diploma/STPM/STAM/Matriculation	159	41.4
Bachelor Degree	132	34.4
Master	2	.5
PhD	1	.3
District		
Kota Bharu	141	36.7
Pasir Mas	94	24.5
Machang	43	11.2
Tanah Merah	17	4.4
Jeli	6	1.6
Pasir Puteh	18	4.7
Bachok	25	6.5
Kuala Krai	11	2.9
Gua Musang	8	2.1
Tumpat	21	5.5
Stay with		
Parent	328	85.4
Mother Only	40	10.4
Father Only	4	1.0
Grandparent	8	2.1
Adopt Family	4	1.0
Father education level		
PMR	51	13.3
SPM	146	38.0
Diploma/STPM/STAM/ Matriculation	60	15.6
Bachelor Degree	99	25.8
Master	20	5.2
PhD	8	2.1
Mother education level		
PMR	47	12.2
SPM	144	37.5
Diploma/STPM/STAM/Matriculation	63	16.4
Bachelor Degree	110	28.6
Master	14	3.6
PhD	6	1.6

Notes: PMR = Penilaian Menengah Rendah; SPM = Sijil Pelajaran Malaysia; STPM = Sijil Tinggi Pelajaran Malaysia; STAM = Sijil Tinggi Agama Malaysia, PhD = Philosophy Doctor.

Table 2 shows the correlation between social media addiction, depression, self-esteem and suicidal ideation. Social media addiction was found significantly associated with depression ($r = .39$, $p < .001$) as well as self-esteem ($r = .16$, $p < .001$) and suicidal ideation ($r = .19$, $p < .01$). Meanwhile, depression significantly correlated with self-esteem ($r = .26$, $p < .001$) and suicidal ideation ($r = .68$, $p < 0.001$). A weak significant relationship was found between self-esteem and suicidal ideation ($r = .16$, $p < .001$).

Table 2   Inter variable correlation coefficient

	1	2	3	4
1 Social Media Addiction	1	.390**	.156**	.188**
2 Depression		1	.256**	.681**
3 Self-Esteem			1	.155**
4 Suicidal Ideation				1

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

Table 3 shows the standard multiple regression used to assess depression, social media addiction and self-esteem to predict suicidal ideation after controlling the influence of gender, age, race, religion, level of education, socio-economic status and districts. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. The total variance explained by the model as a whole was 47.1%, $F_{(3, 380)}$ = 112.86, $p < .001$. In the final model as shown in Table 4, only depression and social media addiction were statistically significant, with depression recording a higher beta value (β = .12, $p < .001$) than the social media addiction (β = - .01, $p < .05$), which means only depression and social media addiction predicts suicidal ideation. Meanwhile, poor self-esteem did not predict suicidal ideation among adolescents in Kelantan (β = -.002, $p > .05$).

Table 3   Model summary of predictors on suicidal ideation

Model Summary								
Model	R	R^2	Std. Error of the Estimate	Change Statistic				
				R^2 Change	F Change	df1	df2	Sig. F Change
1	.686ᵃ	0.471	.72540	.471	112.864	3	380	0.000

a. Predictors: (Constant), Depression, Social Media Addiction, Self esteem

e. Dependent Variable: Suicidal Ideation

Table 4   Multiple regression on suicidal ideation

Model		Unstandardized Coefficients		Standardized Coefficients	t	P-value	95.0% CI of β	
		β	SE	Beta			Lower	Upper
1	Constant	-.396ᵃ	.159		-2.484	.013	-.710	-.083
	Depression	.120	.007	.720	17.366	.000	.106	.133
	Social Media Addiction	-.010	.004	-.090	-2.219	.027	-.018	-.001
	Self esteem	-.002	.005	-.016	-.415	.679	.013	.008

a.   Dependent Variable: Suicidal Ideation

Note: SE = standard error, CI = confidence interval

In the table 5 the model contributes 48.0% of the variance changes in suicidal ideation, R^2 = .4800, p < 0.001. The analysis also shown a significant interaction effect where the effect of depression on suicidal ideation was moderated by social media addiction, β = .0016, 95% CI (.004, .0027), t = 2.5768, p < 0.05. The simple slope graph below (Figure 1) shows that all the β value effect of social media addiction is positive, which means social media addiction increased in proportion with the depression on suicidal ideation.

Table 5   Regression coefficient of moderation analysis

Model		Unstandardized Coefficient		t	*P*-value	95.0% CI of β	
		β	SE			Lower	Upper
1	Constant	.0731	.2309	.3165	.7518	-.3809	.5271
	Depression (X)	.0757	.0181	4.1863	.0000	.0401	.1113
	Social Media Addiction (W)	-.0294	.0088	-3.3536	.0009	-.0466	-.0122
	Interaction (XW)	.0016	.0006	2.5768	.0103	.0004	.0027

a. Dependent Variable: Suicidal Ideation
Note. R^2 = 0.4800
Note: CI = confidence interval; SE = standard error

As shown in the Table 6, at the lowest point of social media addiction, there is a significant positive relationship between depression and suicidal ideation, β = .1022, 95% CI (.0838, .1205), t = 10.9336, p < 0.001 and it can also be seen at the highest point of social media addiction, there is also a significant positive relationship between depression and suicidal ideation, β = 0.1333, 95% CI (.1162, .1503), t = 15.3741, k < 0.001. In other words, depression could affect on suicidal ideation are depend on how addicted the individuals are to social media. On the other hand, social media addiction could serve as a triple risk factor as depressed people nowadays rely on social media to cope with stress, killing time during self-isolation or being a victim from social media.

Table 6   Regression coefficient of depression on suicidal ideation according to the level of social media addiction

SMA	Effect (β)	t	*P*-value	LLCI	ULCI
17 (Low)	.1022	10.9336	0.000	.0838	.1205
26 (Mean)	.1162	17.1779	0.000	.1029	.1295
37 (High)	.1333	15.3741	0.000	.1162	.1503

Note: SMA= Social Media Addiction; LLCI = lower limit confidence interval; ULCI = upper limit confidence interval

The simple slope graph was plotted to visualize the moderation interaction of the social media addiction on the relationship between depression and suicidal ideation as shown in Figure 1.
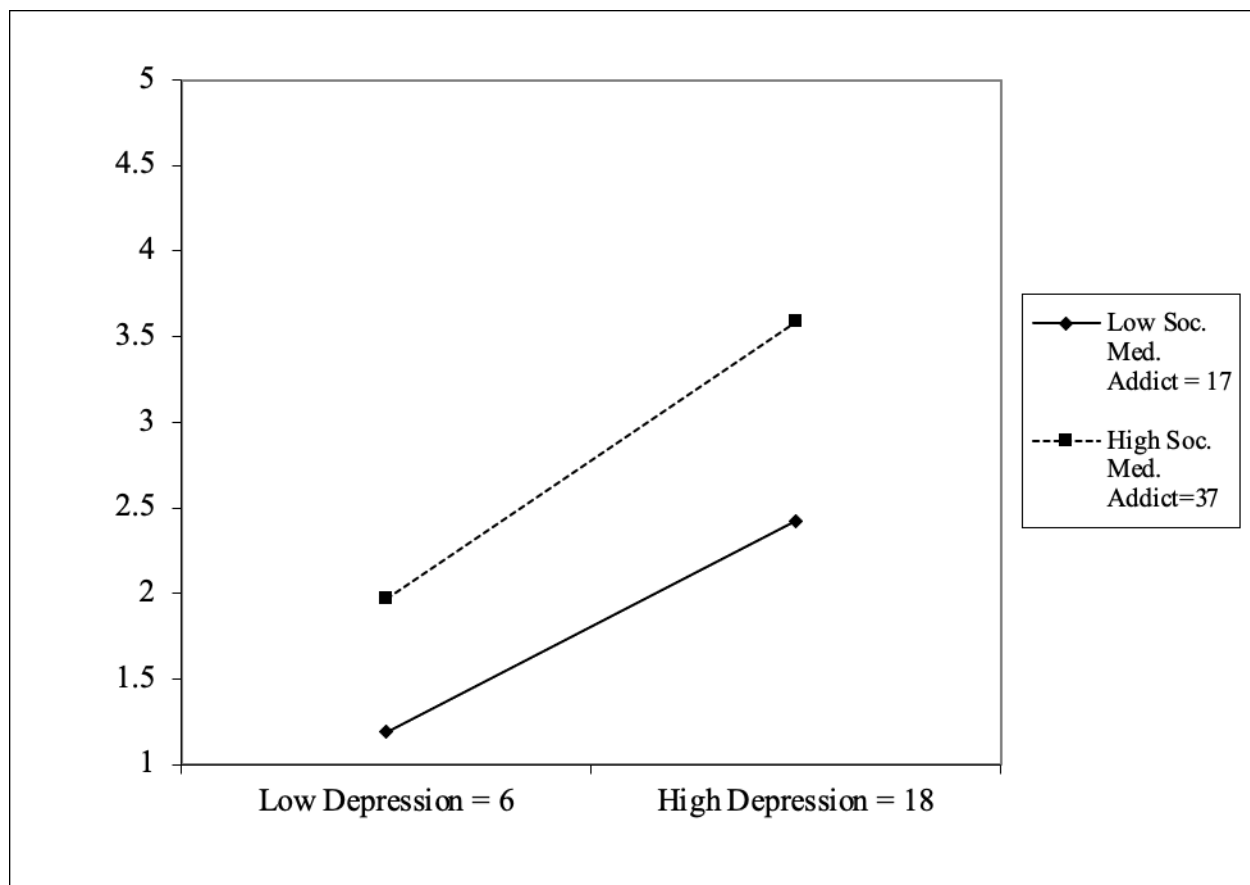
Figure 1. Simple slope interaction effect of social media addiction as moderator

DISCUSSION

Our research indicates that teenage social media addiction is highly associated with depression and suicidal ideation, and further investigation implies that depression and social media use may even be able to predict suicidal thoughts. This finding was further reinforced by research by Brunborg and Andreas (2019), who discovered a connection between adolescent depression symptoms and social media usage. Brunborg and Andreas (2019) clarified that the connection is merely fleeting. A systematic review reported that time spent, activity, investment and addiction on social media influences depression, anxiety, and psychological distress in adolescents (Keles et al. 2020). In addition, Keles et al. (2020) claim that specific attitudes or behaviours, such as social comparison, active or passive use of social media, and reasons for using social media, likely have a greater impact on mental health issues than how frequently someone uses social media or how many friends they have there. Our results, however, run counter to Keles et al. (2020) assertion that self-esteem did not predict suicidal ideation. Instead, the current study found a strong link between depression and suicide. In this regard, we concur with Ivie et al. (2020) that additional research is required to establish the link between social media use and depression. The link may be moderated or mediated by other factors.

It was believed that there were many types of additional factors. like murderous cyberbullying. According to Hinduja & Patchin (2015), "cyberbullicide" is a term used to describe suicide that has a link to cyberbullying. According to a study, social media users, particularly teenagers, are more likely to experience cyberbullying, which makes the victim feel unhappy and, in the worst cases, suicidal (Hinduja & Patchin 2019). Hinduja and Patchin (2015) explained that the victims of cyberbullying are two times likely to attempt suicide by amplifying the feeling of isolation, instability, and hopelessness especially those with pre-existing mental health issues. There is growing concern that social media may be a significant risk factor for suicide and urgently calls for attention as scrolling through social media has become a coping mechanism for depressed adolescents' social withdrawal.

Furthermore, pro-suicide influence groups, information on lethal means and forums discussing suicide methods are easily accessible at any time (Dunlop, More & Romer, 2011, Johnstone, 2011, Rajagopal, 2009, Rajagopal 2004; Brown & Barraclough 1997). Biddle (2008) examined 240 websites and

found that half of them were pro-suicide websites while Recupero et al. (2008) found 11% of 373 websites to be pro-suicide websites. Online chatrooms and forums provide a platform for suicidal ideators to connect and share common thoughts and feelings. Additionally, by participating in such group discussions, suicide ideators push others to commit suicide by providing them with instructions on where, what, and how to do it (Dunlop, More & Romer, 2011, Johnstone, 2011, Rajagopal, 2009, Rajagopal 2004; Brown & Barraclough 1997). When this happens, scholars refer to it as a suicide pact (Rajagopal 2004; Brown & Barraclough 1997). In other cases, suicide ideators may cooperate and agree with other suicide ideators to commit suicide at specific times and frequently using the same lethal means. with the past, people who knew one other well—such as family members, partners, or friends—would make suicide pacts. However, with cybersuicide pacts, most suicides are carried out by strangers (Rajagopal 2004; Brown & Barraclough 1997). Such occurrences have sadly occurred multiple times and have been reported in the media or propagated on social media among Malaysian teenagers and young adults (The Guardian, 2019). Nearby, residents also worry that suicide news may spread quickly. Users of social media and the internet, particularly young people, can pick up dangerous suicide techniques by imitating other suiciders, especially when the suicide was carried out by a well-known person (Williams 2011). Insist that proactive prevention measures must be taken immediately and at a higher level. Social media technology is advancing quickly, and as more people utilise social media, it should already be possible to create advanced artificial intelligence that can assist those who suffer from mental illness. Such technologies will aid those who are considering suicide by preventing them from seeing websites with information on suicide, directing them to helplines instead, and preventing them from conducting additional searches on suicide or self-harm. Utilising current technology, search engines now offer helplines when users enter the keywords "suicide" or "self-harm." That implementation, though, is passive. In the future, we envision artificial intelligence recognising patterns and behaviours that are associated with suicidal or self-harm activity and actively alerting loved ones or emergency personnel to the situation.

CONCLUSION

Modern technology makes it simple for kids to access and learn new information via the internet, which causes parents great worry and concern. Teenagers who rely on social media for social interaction are more likely to engage in cyberbullying, have a propensity for comparison, may discover explicit information, and engage in other high-risk behaviours. Teenagers who are depressed frequently post about how they are feeling on social media rather than discussing their difficulties. Some teens post pictures of their wounds on their arms as a way to communicate their tremendous sorrow, and other teenagers later discover that slashing their hands would help them feel better mentally.

Thus, this study argues the use of social media as a coping skill among adolescents during their depressive episode. Some parents may see their adolescent spending their free time by scrolling on social media is just a common thing and risk-free. It is suggested that behaviour activation strategies as a part of the therapy given to adolescents with depression to avoid them relying too much on social media when they have free time.

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