

## The effect of intensity of social media use and physical activity on adolescent mental health El efecto de la intensidad del uso de los medios sociales y la actividad física en la salud mental de los adolescentes

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**Abstract.** Mental health disorders are an emerging challenge with the increasing use of social media platforms. The high use of social media and reduced physical activity of adolescents can affect mental health. The aim of the study was to predict the effect of intensity of social media use and physical activity on adolescents' mental health. This study is quantitative, with an ex post facto design. Subjects were adolescents aged 16-19 years totalling 138. Mental health instruments used GHQ-12, intensity of social media use was SONTUS, and physical activity was PAQ-A. The analysis technique used regression with Statistical Package for Social Science (SPSS) version 21 software. Results: (1) there is a negative influence between the intensity of social media use and adolescent mental health (Beta -0.353, p-value <0.05). (2) there is a positive influence between physical activity and adolescent mental health (Beta 0.460, p-value < 0.05). (3) the intensity of social media use and physical activity together provide 53.40% influence on adolescent mental health, the remaining 46.60% is influenced by other factors. For future researchers to test more variables so that they can find out the extent of the level of mental health, especially in this increasingly advanced era. The use of qualitative approaches such as phenomenological analysis and grounded theory is recommended for future research to further explain the dynamics of the relationship between variables. Teachers and parents are expected to conduct regular evaluations regarding the use of social media during school hours and at home, and evaluate knowledge about the benefits and harms of excessive social media use.

**Keywords:** social media use intensity, physical activity, mental health

**Resumen.** Los trastornos mentales son un reto emergente con el creciente uso de las plataformas de medios sociales. El elevado uso de los medios sociales y la reducida actividad física de los adolescentes pueden afectar a la salud mental. El objetivo del estudio era predecir el efecto de la intensidad del uso de los medios sociales y la actividad física en la salud mental de los adolescentes. Este estudio es cuantitativo, con un diseño ex post facto. Los sujetos fueron adolescentes de entre 16 y 19 años, en total 138. Se utilizaron los instrumentos de salud mental GHQ-12, intensidad de uso de medios sociales SONTUS y actividad física PAQ-A. La técnica de análisis utilizada fue la regresión con el programa Statistical Package for Social Science (SPSS) versión 21. Resultados: (1) existe una influencia negativa entre la intensidad de uso de los medios sociales y la salud mental de los adolescentes (Beta -0,353, p-valor <0,05). (2) existe una influencia positiva entre la actividad física y la salud mental de los adolescentes (Beta 0,460, p-valor < 0,05). (3) La intensidad del uso de los medios sociales y la actividad física juntas influyen en un 53,40% en la salud mental de los adolescentes, el 46,60% restante está influido por otros factores. Los futuros investigadores deberán probar más variables para poder averiguar el alcance del nivel de salud mental, especialmente en esta era cada vez más avanzada. Se recomienda el uso de enfoques cualitativos como el análisis fenomenológico y la teoría fundamentada en futuras investigaciones para explicar mejor la dinámica de la relación entre variables. Se espera que los profesores y los padres realicen evaluaciones periódicas sobre el uso de los medios sociales durante el horario escolar y en casa, y que evalúen los conocimientos sobre los beneficios y los perjuicios del uso excesivo de los medios sociales.

**Palabras clave:** intensidad de uso de los medios sociales, actividad física, salud mental.

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### Introduction

Technological advances in the field of communication media on social, or commonly referred to as social media, information shared to the public can be easily received, practical, and much more efficient. The function of social media is basically to expand social interaction and create dialogic communication between many individuals and build personal branding on oneself (Wang and Yang 2020). Indonesia is no exception, its large population makes it one of the targets of several social media application makers to be able to market new applications. Everyone, from children to adults, can have their own social media accounts, especially teenagers. Adolescence is a sensitive period for children due to socio-emotional development, this is because adolescents begin to develop a sense of self and seek pleasure (Riveros and Immordino-Yang 2021). The high use of social media in adolescents can affect their behaviour. Adolescents with high intensity

of social media use cause their social interactions to be indirect, namely their sociability and social sensitivity tend to be low. This can have an adverse effect on mental health indirectly such as the emergence of anti-social attitudes or commonly referred to as apathy. There are advantages and disadvantages to social media. With its use, people who are separated by distance can interact in real time. But unfortunately, social media is also used to commit crimes and embarrassments and can lead to addiction, insecurity, and many other things (Cabrera et al. 2019).

However, spending too much time in front of a screen reduces the time spent exercising and socializing (Viner et al. 2019). It is reported that approximately 32% of adolescents show a high frequency of internet connection (more than five hours per day) (Villanueva Blasco and Serrano Bernal 2019); therefore, these technology-induced lifestyle changes have led to an increase in sedentary lifestyles (Torres et al. 2020). This situation has turned sedentary lifestyles into a risk factor with major implications for

public health policy (García et al. 2019). The negative impact received on individuals with the influence of social media is the disruption of mental health such as depression caused by cyber bullying (Hoge, Bickham, and Cantor 2017). The most common disorders in children and adolescents are generalised anxiety disorder and depression (Keles, McCrae, and Grealish 2020). The research results in the use of social media having harmful effects on the younger generation as mental health related issues that develop during youth can act as an epidemic for each individual throughout life (Bashir and Bhat 2017).

Mental health disorders are an emerging challenge with the increasing use of social media platforms. Social media use is the second leading cause of disability among psychiatric disorders (Zubair, Khan, and Albashari 2023). Mental health is a serious phenomenon that needs attention, the World Health Organisation predicts that mental health, neurological and substance use account for 10% of the global burden of disease. It generally occurs in individuals of productive age, 15-29 years old. A major subset of adolescent depression is mental health. Good mental health is essential for learners' well-being, both in and out of school. Poor learner mental health can affect the ability to learn, remember information, and concentrate on learning (Houghton and Anderson 2017). In addition, poor mental health can also affect learners' social relationships, both with peers, family, and the school environment (García-Carrión, Villarejo-Carballido, and Villardón-Gallego 2019).

A study showed that screen time for educational purposes was negatively associated with children's physical activity levels and time spent outdoors was positively associated with children's age and number of somatic symptoms. Longer time in front of screens for leisure activities was also associated with reduced physical activity (Braidokienė et al. 2021). Giving children access to internet-connected electronic devices and introducing them at an early age can result in reduced movement or physical activity (Kobak et al. 2018). Physical activity is an important prerequisite of human health. This applies to all age categories, including pubertal children, it is generally assumed that the more active people are, the fitter the condition of the human body. In relation to the physical-sport aspect, physical activity performance can influence the development of personal potential, which in turn supports the growth of all aspects of human personality (Gentil Adarve et al. 2019). In particular, physical self-concept has a special weight highlighted and valued from a social point of view, especially in adolescence (Jesús De la Torre Cruz et al. 2018).

Physical activity can induce physiological changes, namely in the neurobiological system, physical activity can prevent symptoms arising from depression by increasing serum serotonin levels. The results showed that higher serum serotonin and lower cortisol levels were found in children who were physically active and were considered to be associated with better performance at school. This is

because serotonin has an important role in neuronal plasticity and development, so serotonin is also potentially associated with memory, attention, achievement and high intelligence quotient (IQ) (Alghadir, Gabr, and Iqbal 2020).

Fitness and mental health are two important interrelated components of human well-being. Mental health disorders are one of the leading causes of disability in the world, with a prevalence of more than 10%, while fitness is the ability to perform activities without experiencing significant fatigue (Nugraha et al. n.d.). The results showed that there was a small significant relationship between overall physical health and mental health. Learners with low mental health reported low physical health (Eisele 2019). Some of the predictive factors of declining mental health include younger age group ( $\leq 40$  years), education, poor self-rated health, high loneliness, quarantine status, fear of viral infection, presence of chronic illnesses (Ahmed et al. 2019). A study shows that there is a relationship between social media use and physical health indicators. There is a correlation with higher levels of CRP (a biomarker of chronic inflammation) which is associated with chronic diseases such as cardiovascular disease and cancer. Social media use can also lead to more frequent somatic symptoms such as headaches, chest pain, or back pain (Lee et al. 2022).

There is a relationship between the use of social media and health perceptions, this is indicated by the results of the study, namely the use of social media such as Facebook shows that positive upward social comparisons when using social media can be associated positively and negatively. In positive results social media users feel hopeful and motivated but at the same time some users feel that physical health will get worse (Dibb 2019). While many studies have shown that social media use triggers anxiety, another researcher found a unique link between pre-existing anxiety and online social interactions. He said people with anxiety tend to seek online interactions through social media, even though their social connections are still weak. One possible reason for this is the fact that weak virtual connections help people receive emotional support, but they are less concerned about how they look and feel. This highly unusual finding suggests that, contrary to popular belief, anxiety may lead to increased use of social media (Dutta, Ma, and De Choudhury 2018).

This raises interesting research discussions among researchers and can be an interesting angle for further research. Based on the high use of social media by adolescents around the world, as well as the existence of research gaps, it creates an opening for researchers to conduct further research on the influence of the intensity of social media use and physical activity on adolescent mental health.

## Materials and Methods

### Participants

The subjects in this study were high school students

aged 16-19 years. The sampling technique was carried out through random sampling. The research subjects totalled 138 students, with the provisions of respondents who had one or more active social media accounts, were willing to become respondents and agreed to sign informed consent.

### Research Design

This type of research is descriptive quantitative with an ex post facto approach. Ex post facto which means after the fact, with survey data collection. Questionnaires were distributed via google forms to high school students.

### Instrument Procedure

Mental health was measured using the General Health Questionnaire-12 (GHQ-12). The scale asks whether the respondent has experienced certain symptoms or behaviours recently. Each item is rated on a four-point scale (less than usual, not more than usual, more than usual, or more than usual); and for example when using the GHQ-12 gives a total score of 36 or 12 based on the chosen scoring method. The most common scoring methods are bi-modal (0-0-1-1) and Likert (0-1-2-3) scoring styles (El-Metwally et al. 2018). The advantage of the GHQ-12 is that it is short, can be easily assessed "clinically" (presence or absence of symptoms) as well as the degree of symptoms present (Likert-type score). The scale was originally designed as a risk measure for common mental disorders (Böhnke and Croudace 2016), but has also been used as a measure of general symptom burden, positive mental health and mild psychological problems (Hystad and Johnsen 2020).

The instrument for the intensity of social media use is Social Networking Time Use Scale (SONTUS). Olufadi developed the scale to measure the time spent by people on SNS. This 29-item self-report questionnaire is consist of 5 components: (1) relaxation and free periods; (2) academic related periods; (3) public-places-related use; (4) stress related periods; and (5) motives for use. SONTUS was designed in an 11- point Likert scale format with 1 as —not applicable to me during the past week up to 11 as —I used it more than 3 times during the past week but spend more than 30 min each. SONTUS has an internal consistency of .92 Cronbach's alpha value (Olufadi 2016).

Measurement of physical activity using questionnaire obtained from the results of adaptation from the physical activity questionnaire for older children and physical activity questionnaire for adolescents (PAQ-A) manual with some modifications because it was adapted to the conditions and habits of doing physical activity in Indonesia. The physical activity questionnaire was an instrument carried out by remembering the activities carried out on the previous 7 days. The form of questions in the PAQ-A questionnaire is included in the scaled response questions, namely, the form of questions that used a scale to measure and know the summary of general physical activity of the respondent to the questions

provided in the questionnaire. In this questionnaire, the statement of the response scale is eight questions and one question is to identify students who have had an unusual activity done the previous week, but this is not used in the score measurement section on the summary activity. The measuring scale used as an assessment of answers in the questionnaire is a Likert scale. PAQ-A has been translated into Indonesian, then this questionnaire has been tested for the validity of three experts for children, then the CVI value = 1 was obtained, and the questionnaire was declared valid. The reliability test results obtained Cronbach's alpha value of 0.88, then the instrument was declared reliable (Suza, Miristia, and Hariati 2020).

### Statistical Analysis

The statistical analysis technique used the Statistical Package for Social Science (SPSS) version 21 software. The statistical p-value level was set at p-value < 0.05.

### Results

The descriptive statistical results of the variables of intensity of social media use, physical activity, and adolescent mental health can be seen in Table 1.

Table 1.  
Descriptive statistics

Variable	Mean ± Standard Deviation (SD)
Intensity of social media use	35.50 ± 1.47
Physical activity	2.83 ± 2.41
Mental health	30.24 ± 3.82

Based on Table 1, it shows that the data on the variable Intensity of social media use obtained mean 35.50, SD 1.47, physical activity mean 2.83, SD 2.41), and mental health mean 30.24, SD 3.82).

### Normality Test

The normality test uses the Kolmogorov-Smirnov Test, namely by looking at the significance value of the residual variable if the p-value > 0.05, it can be said that the data is normally distributed. The results are presented in Table 2.

Table 2.  
Normality test results

Variable	p-value	Description
Intensity of social media use	0.327	Normal
Physical activity	0.436	Normal
Mental health	0.239	Normal

The normality test results in Table 2 above, shows that data intensity of social media use (p-value 0.327 > 0.05), physical activity (p-value 0.436 > 0.05), mental health (p-value 0.239 > 0.05), the data obtained from the results of the normality test data p-value ≥ 0.05, which means the data is normally distributed.

### Linearity Test

The linearity test is used to determine whether the

independent variable and the dependent variable in this study have a linear relationship if the increase in the independent variable score is followed by an increase in the dependent variable score. The results of the Linearity test of this study can be seen in Table 3.

Table 3.

Linearity test results			
Variable	p-value	Description	
Intensity of social media use	0.402	Linear	
Physical activity	0.273	Linear	

The homogeneity test results in Table 3 above, shows that the data intensity of social media use (p-value 0.402 > 0.05), physical activity (p-value 0.273 > 0.05), data obtained from the results of the linear data p-value  $\geq 0.05$ .

### Hypothesis Test Results

To determine the influence between the influence between variables, namely the intensity of social media use and physical activity on mental health, it is done by analysing the t test (partial) and F test (simultaneous), the results are as follows:

Table 4.

Partial test analysis results (t test)					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	6.638	0.490		13.540	0.000
1 Intensity of social media use	-0.353	0.118	-0.134	-2.996	0.013
Physical activity	0.460	0.173	0.655	3.254	0.022

Based on the analysis results in Table 4, it can be explained as follows:

The variable intensity of social media use obtained a t value of -2.996 and a p-value of 0.013 < 0.05, meaning that there is a significant influence between the intensity of social media use and adolescent mental health. The value is negative, meaning that if the score of intensity of social media use is higher, the mental health score will decrease.

The physical activity variable obtained a t-value of 3.254 and a p-value of 0.022 < 0.05, meaning that there is a significant influence between physical activity and adolescent mental health. The value is positive, meaning that if the physical activity score is higher, the mental health score will also be higher. The F test is needed to determine the effect of the independent variables on the dependent variable simultaneously and to determine the accuracy of the regression model used. The model accuracy test aims to determine whether the formulation of the model is appropriate or fit, the results are in Table 5.

Table 5.

F test analysis results (Simultan)					
ANOVA <sup>b</sup>					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	452.257	2	150.752	36.432	0.000 <sup>a</sup>
Residual	385.321	136	1.560		
Total	837.578	138			

a. Predictors: (Constant), Physical activity, Intensity of social media use  
b. Dependent Variable: Mental health

Based on Table 5, the F-value is 36,432 and the p-value is 0.000 < 0.05. It can be concluded that the regression model chosen is feasible to test the data and the regression model can be used to predict that the intensity of social media use and physical activity together have an effect on adolescent mental health. The results also found an Adjusted R Square value of 0.534, which means that the intensity of social media use and physical activity together have an influence of 53.40% on adolescent mental health, the remaining 46.60% is influenced by other factors.

### Discussion

The results showed that there is a negative influence between the intensity of social media use and adolescents' mental health. While social media can encourage identity formation and the development of virtual connections regardless of physical distance, at the same time, it also has the tendency to negatively impact self-esteem and self-image through unwanted feedback, not receiving adequate social validation, or unhealthy competition and comparison. Uncontrolled use of social media can lead to the development of many psychosocial problems, such as sleep disturbances, anxiety and depression (Garett, Liu, and Young 2018), poor academic performance (Sobaih et al. 2016), in addition to anxiety and depression (Seabrook, Kern, and Rickard 2016). Social networks can make people more aware and sensitive to their appearance by creating an atmosphere of social comparison. The appearance-related preoccupation engendered by social media is directly proportional to its use, as shown by the association of social media with depression, social anxiety, appearance-related anxiety, and sensitivity to appearance rejection (Hawes, Zimmer-Gembeck, and Campbell 2020).

The mental health of young people is severely affected. Self-harm is an important consequence of psychiatric problems in young populations, which lies on a continuum between non-suicidal self-harm and suicidal ideation (Jacob, Evans, and Scourfield 2017). Social media use may increase the likelihood of self-harm by conveying methods of self-harm, competitiveness, and contagion, but these sites are also an important source of online emotional support (Marchant et al. 2017). Heavy and prolonged use of social media among young people can result in not only an increased risk of mental health symptoms, but also a decline in physical health (Naslund et al. 2020). In addition, prolonged excessive use of social media may also lead to more frequent somatic symptoms such as headaches, chest or back pain (Lee et al. 2022).

Social media websites provide users with a wide spectrum of features, and it is often seen that people adapt to certain usage patterns. The most common set of actions, such as photo-stalking other users or scrolling through the latest news, is defined as passive social media use. It is evident from recent research that these patterns of behaviour and depression are intertwined. Passive social media use can lead to mood disorders and depressive

symptoms such as loss of interest or self-harm (Hussain and Griffiths 2018). Excessive social media use is a sign of depression and poor social relationships with friends and family (Vannucci and McCauley Ohannessian 2019). It can also occur indirectly through mediators such as decreased emotional connection with others, thus increasing levels of loneliness which in turn leads to depression (van Rooij et al. 2017).

Social media that contains content which acts as an emotional stimulus is obtained by individuals with high intensity, then there are mood swings that cause changes in individual emotions or called unstable emotions (Sampasa-Kanyinga and Lewis 2015). In addition, the content displayed on social media will increasingly centre on the mental health crisis itself. This has led to new considerations for adolescents' emotional well-being. It has also been mentioned in research that pre-pandemic social media use often mentions potential negative implications for adolescents' mental health (Odgers and Jensen 2020). There is a high prevalence of mental health problems with frequent social media exposure during the Covid-19 outbreak (Gao et al. 2020).

The results showed that there is a positive influence between physical activity and adolescent mental health. Physical activity plays an important role in keeping adolescents mentally well and even improving students' mental health. A good school physical activity programme will have an effect on students' mental health because more than half of the day students are in that environment. This finding is in line with others. School-related physical activity interventions can reduce anxiety, increase resilience, improve well-being and promote positive mental health in children and adolescents (Andermo et al. 2020). The study results show that there is a small significant relationship between overall physical health and mental health (Eisele 2019). Some of the predictive factors of declining mental health include younger age group ( $\leq 40$  years), education, poor self-rated health, high loneliness, quarantine status, fear of viral infection, presence of chronic illnesses (Ahmed et al. 2019).

Research in the United States suggests that respondents who reported spending more time at home and accessing social media with their smartphones had a higher risk of depression and even suicide, compared to teens who reported spending more time without screens and engaging in outdoor activities such as in-person social interactions, sports, and recreational activities (Naslund et al. 2020). This is in line with research conducted by (Ohrnberger, Fichera, and Sutton 2017) which explains that there is a relationship between mental and physical health which has an impact on the lifestyle and social interactions of an individual. If you have good mental health in the past, you will have good physical health too. Outdoor physical activities, such as walking, running and cycling, not only improve physical fitness, but also provide additional mental health benefits (Samodra et al. 2024; Suratmin et al. 2024). Studies show that people who exercise outdoors more frequently tend to have lower levels of depression

and better overall mental health (Beyer et al. 2014; Song, Ikei, and Miyazaki 2016).

## Conclusions

The results of the study can be concluded that (1) there is a negative influence between the intensity of social media use and adolescent mental health (p-value  $<0.05$ ). (2) there is a positive influence between physical activity and adolescent mental health (p-value  $<0.05$ ). (3) the intensity of social media use and physical activity together provide an influence of 53.40% on adolescent mental health, the remaining 46.60% is influenced by other factors. For future researchers to test more variables so that they can find out the extent of the level of mental health, especially in this increasingly advanced era. The use of qualitative approaches such as phenomenological analysis and grounded theory is recommended for future research to further explain the dynamics of the relationship between variables. Teachers and parents are expected to conduct regular evaluations regarding the use of social media during school hours and at home, and evaluate knowledge about the benefits and harms of excessive social media use.

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## Conflict of interest

We do not have any conflicts of interest related to this publication. In addition, no financial-related elements were included in this study that could influence the results. I consent to the manuscript being read and submitted by all authors listed under the corresponding author's name.

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