
Meta-Analysis: Effect of Social Media on Anxiety Disorders in Adolescents

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ABSTRACT : As technology develops, technology also has an impact on every aspect of life, including the psychology of every human being. The imbalance created by excessive social media use is of great concern to parents, researchers, and society regarding the mental health of individuals experiencing anxiety. Social media is ubiquitous among teens, who are also at high risk for anxiety disorders. This research aims to conclude that social media has an effect on anxiety disorders. This research uses a systematic review and meta-analysis using PICO. Population: teenagers. Intervention: social media. Comparison: not social media. Outcome: anxiety. The articles used in this research come from 1 database, namely Google Scholar. The keywords of the article are “teenager” AND “social media” AND “anxiety” AND “multivariate”. The articles included in this research are full paper articles, cross-sectional study design, publication year range 2017-2024 and the magnitude of the Adjusted Odds Ratio relationship. Articles were analyzed using the Review Manager 5.4 application. Five cross-sectional studies showed that social media can increase the risk of anxiety disorders by 1 times greater than not using social media, and the results were statistically ($aOR=1.00$; 95% CI= 0.63 to 1.57; $p= 0.01$). Teenagers who use social media increase anxiety disorders

Keywords: Social Media, Anxiety, Teens.

1. INTRODUCTION

As technology develops, it also impacts all aspects of people's lives, including their mental health. A person's psychological state can be seen from their family, school and society (F. Thursina, 2023). Individuals' lives are influenced by social media. It impacts our personal lives and causes significant damage to our culture, finances and well-being. A platform where people can exchange ideas, connect, interact, seek recommendations and provide guidance (S. Budury, A. Fitriyasi, and K. 2019).

Social media is a large-scale communication tool that reaches and involves almost everyone in society. To a lesser or greater extent, technology and social media have become very important. The era of globalization cannot be avoided; advances in social media technology also cause psychological problems for humans (PT Diva, RS Anggari, and H. Haswita, 2023).

Adolescents perceive social media as a danger to their mental health with three themes: social media use is thought to cause mood disorders and anxiety, social media is seen as a platform for cyberbullying, and social media use is often addictive (NZ Septiana, 2021). When traveling without a smartphone, this habit always causes panic and anxiety. Teenagers have an addiction to social media, which causes this panic. The use of social media has a big impact on the social environment (NK Dewi, I. Hambali, and F. Wahyuni, 2022). Generalized anxiety is

the most common disorder in children and adolescents (R. Al Yasin, RRKA Anjani, S. Salsabil, T. Rahmayanti, and R. Amalia, 2022).

The anxiety in question is anxiety that begins with an unrealistic desire to express oneself and the desire to be a perfect person, which the individual is unable to do, thus causing anxiety for the user (A. Rosmalina and T. Khaerunnisa, 2021). With the background that has been described, researchers are interested in conducting research on social media on anxiety disorders in adolescents.

2. MATERIALS AND METHODS

Research Design

This research uses articles published from 2017 to 2024. The selection of articles uses a flow diagram, namely the PRISMA Flow Diagram. The keywords used in the article search are "The article keywords are "teenager" AND "social media" AND "anxiety" AND "multivariate".

Meta-Analysis Steps

In this study, meta-analysis steps were used, including:

- 1) Formulating PICO includes P= Adolescents, I= Social media, C= No social media, O= Anxiety disorders.
- 2) Search for main study articles from a variety of electronic and non-electronic journals.
- 3) Conduct screening and critical appraisal of primary research study articles
- 4) Performed output forecast data extraction and synthesis into RevMan 5.4.
- 5) Present the results and draw conclusions.

Inclusion criteria

This study used inclusion criteria, namely full text articles with a cross-sectional research design. This article was published in English from 2017 to 2024. Analyzes and social media estimates of anxiety disorders until the end of the study were reported using adjusted odds ratios (aOR).

Exclusion Criteria

This study used exclusion criteria, namely articles that had been meta-analyzed, did not use a cross-sectional design, the final results of the study were not reported using the adjusted odds ratio (aOR) and the sample was <100 participants.

Instrument

The instrument in this research is the PRISMA Flow Diagram using primary study quality assessment for a cross-sectional design for Meta-analysis research.

Data analysis

From the articles that have been collected, data processing was carried out using the Review Manager application (RevMan 5.4) to determine the magnitude of the influence of social media on anxiety disorders. Data processing is presented in the form of forest plots and funnel plots.

3. RESULTS

The process of searching for articles to be synthesized then the process of reviewing and selecting articles using the PRISMA Flow Diagram shown in Figure 1. The initial search process produced 1,110 articles from 2017 to 2024, after eliminating duplicate articles, 850 articles were produced, then after the process of eliminating duplicate articles, the next step was to check the relevance of the titles and study design used to produce the 190 articles.

After that, we checked the articles according to the inclusion criteria and obtained exclusion criteria of 100 articles. From the filtered articles, research quality was assessed, 5 articles were found. Based on Figure 2, it can be seen that 5 research articles come from the Asian continent, namely the country (Turkey), the European continent, namely the country (Belgium), the American continent, namely the country (United States).

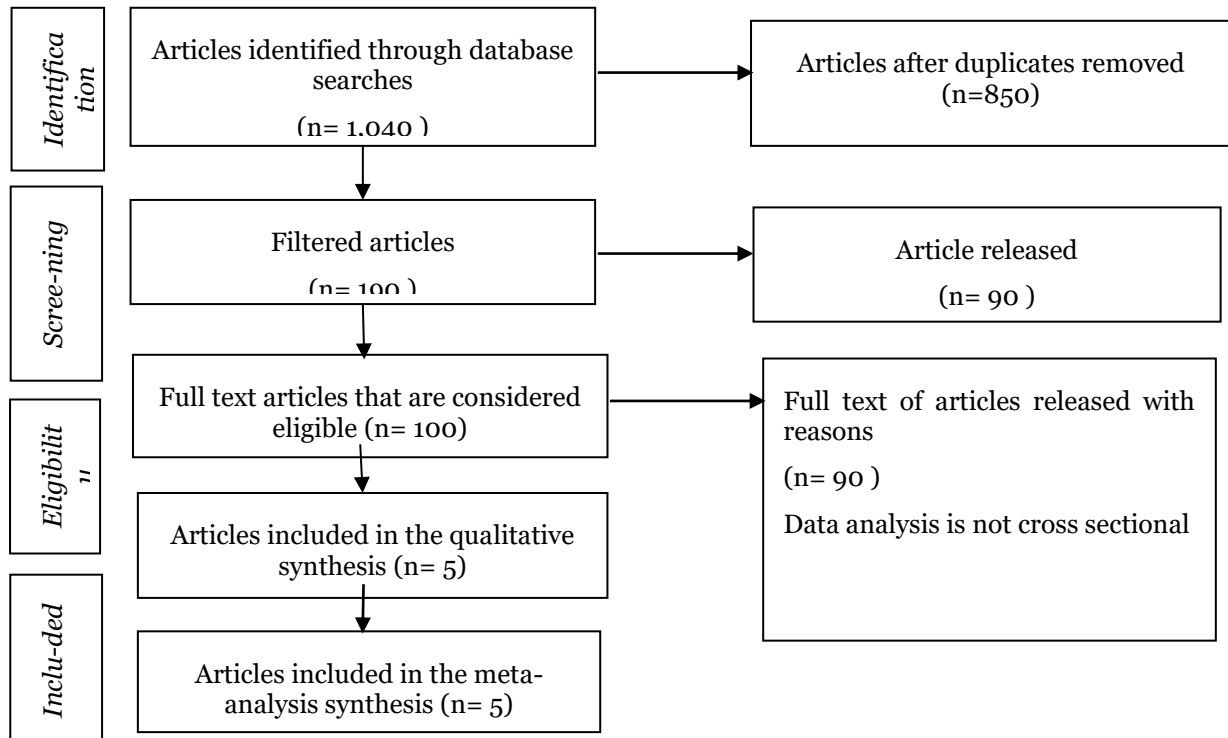


Figure 1. PRISMA flow diagram

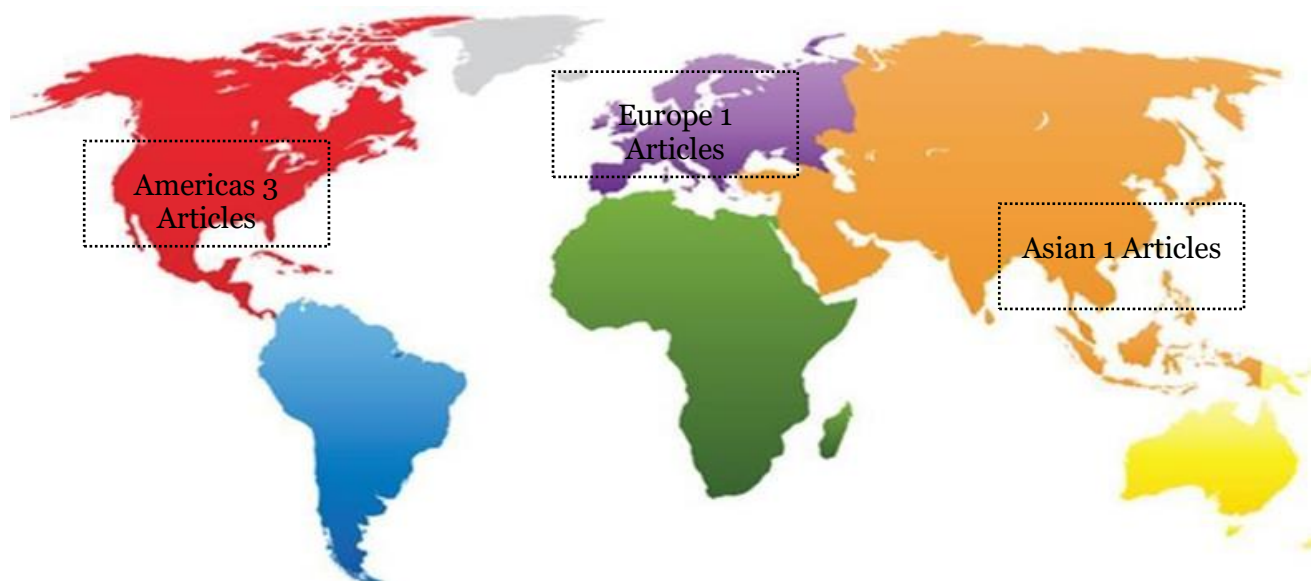


Figure 2. Research area of cross-sectional study The influence of social media on anxiety disorders

Table 1. Critical appraisal (critical appraisal) cross-sectional study of factors influencing social media with anxiety disorders

Author (Year)	Appraisal Criteria													Total
	1a	1b	1c	1d	2a	2b	3a	3b	4	5	6a	6b	7	
Vannuci et al 2017	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Zamora et al 2021	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Caner et al 2022	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Meshi et al 2021	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Primack et al 2017	2	2	2	2	2	2	2	2	2	2	2	2	2	26

Description of question criteria:

- **Formulation of research questions in the acronym PICO**
 - a. Is the population in the primary study the same as the population in the PICO meta-analysis?
 - b. Is the operational definition of intervention, namely exposed status in the primary study, the same as the definition intended in the meta-analysis?
 - c. Is the comparison, namely the unexposed status used by the primary study the same as the definition intended in the meta-analysis?
 - d. Are the outcome variables examined in the primary studies the same as the definitions intended in the meta-analysis?

- **Methods for selecting research subjects**

- a. In analytical cross-sectional studies, whether researchers choose samples from the population randomly (random sampling)?
- b. As an alternative, if in a cross-sectional analytical study the sample is not selected randomly, does the researcher select the sample based on outcome status or based on intervention status?

- **Methods for measuring exposure (intervention) and outcome variables (outcome)**

- a. Are the exposure and outcome variables measured with the same instruments (measuring tools) in all primary studies?
- b. If the variable is measured on a categorical scale, are the cutoffs or categories used the same across primary studies?

- **Design-related bias**

If the sample was not selected randomly, has the researcher made efforts to prevent bias in selecting research subjects? For example, selecting subjects based on outcome status is not affected by exposure status (intervention), or selecting subjects based on exposure status (intervention) is not affected by outcome status.

- **Methods for controlling confusion**

Whether the primary study investigators have made efforts to control the influence of confounding (for example, conducting a multivariate analysis to control for the influence of a number of confounding factors).

- **Statistical analysis methods**

- a. Did the researcher analyze the data in this primary study with a multivariate analysis model (for example, multiple linear regression analysis, multiple logistic regression analysis).
- b. Does the primary study report the effect size or association of the results of the multivariate analysis (adjusted OR).

- **Conflict of interest**

Is there no possibility of a conflict of interest with the research sponsor, which could cause bias in concluding the research results?

Scoring Instructions:

1. Total number of questions = 13 questions. Answer "Yes" to each question gives a score of "2". The answer "Undecided" gives a score of "1". The answer "No" gives a score of "0".
2. Maximum total score= 13 questions x 2= 26.
3. Minimum total score = 13 questions x 0 = 0. So the range of total scores for a primary study is between 0 and 26.

If the total score of a primary study is ≥ 22 , then the study can be included in the meta-analysis. If the total score of a primary study.

Table 2. Description of primary studies on the influence of social media on anxiety disorders with cross-sectional design (n=4,250)

Writer (Year)	Country	Sample	P (Population)	I (Intervention)	C (Comparison)	O (Results)
Vannuci et al 2017	United States of America	563	Age 18-22 years	Social media	Friend msocial media	Anxiety disorders
Zamora et al 2021	Belgium	153	Age 18-65 years	Social media	Friend msocial media	Anxiety disorders
Caner et al 2022	Türkiye	1,363	Teenager	Social media	Friend msocial media	Anxiety disorders
Meshi et al 2021	United States of America	403	Teenager	Social media	Friend msocial media	Anxiety disorders
Primack et al 2017	United States of America	1,768	Age 19-32 years	Social media	Friend msocial media	Anxiety disorders

Table 3. Adjusted Odd Ratio data on the influence of social media on anxiety disorders with a cross-sectional design (n=4,250)

Author (Year)	aOR	95%CI	
		Top	Low part
Vannuci et al 2017	0.06	0.01	0.12
Zamora et al 2021	1.49	0.86	2.60
Caner et al 2022	1.69	1.15	2.24
Meshi et al 2021	0.26	0.16	0.36
Primack et al 2017	1.36	0.92	1.01

Forest plots Figure 3 shows that social media can increase the risk of anxiety disorders by 1 time compared to teenagers who do not use social media, and this result is statistically significant (aOR=1.00; 95% CI= 0.63 to 1.57; p= 0.01). *Forest* it also shows high heterogeneity of effect estimates between primary studies $I^2 = 90\%$; $p < 0.001$. Calculation of the average effect estimate was carried out using a random effect model approach.

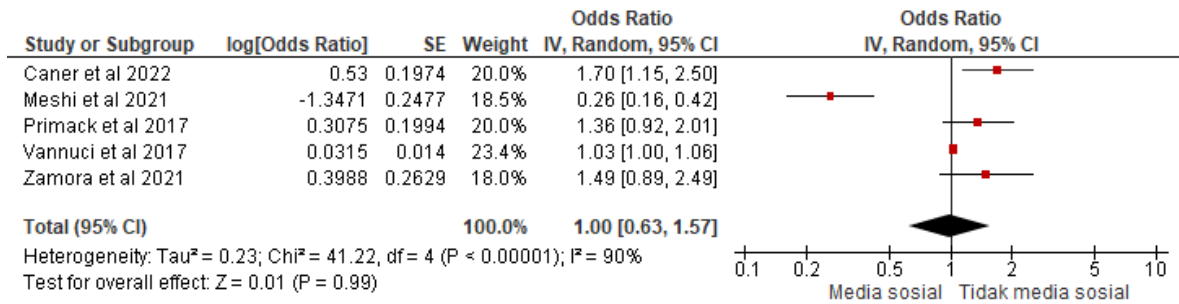


Figure 3. Forest plot ratio of the influence of social media on anxiety disorders

The funnel plot results in Figure 4 show that the distribution of effect estimates is uneven. The distribution of effect estimates shows that the distribution of effect estimates tends to lie more to the right of the vertical line of average effect estimates than to the left. Thus, this funnel plot image shows the existence of publication bias. Because the distribution of the estimated effect is located to the left of the average vertical line in the same direction as the diamond in the forest plot, publication bias tends to overestimate the true effect.

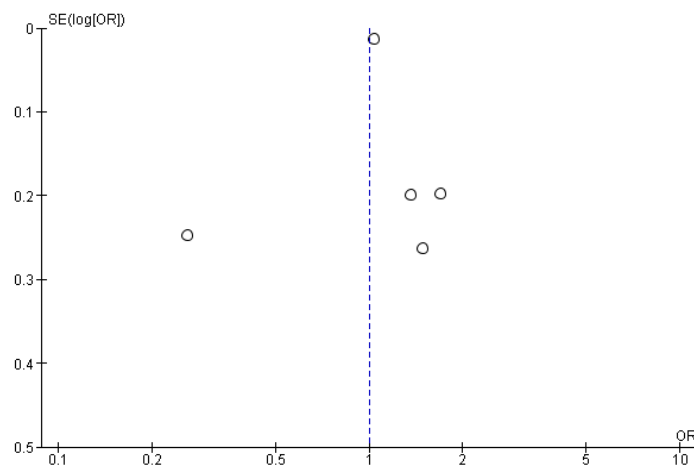


Figure 4. Funnel plot ratio of the influence of social media on anxiety disorders

4. DISCUSSION

The influence of social media on anxiety disorders in adolescents

This research shows that social media can increase the risk of anxiety disorders by 1 time compared to teenagers who do not use social media, and this result is statistically significant (aOR=1.00; 95% CI= 0.63 to 1.57; p= 0.01). The distribution of effect estimates shows that the distribution of effect estimates tends to lie more to the right of the vertical line of average effect estimates than to the left. Thus, this funnel plot image shows the existence of publication bias. Because the distribution of the estimated effect is located to the left of the average vertical line in the same direction as the diamond in the forest plot, publication bias tends to overestimate the true effect.

The longer teens spend on social media, the worse it is for their mental health because they focus on themselves and become addicted to social media, which can lead to anxiety disorders (A. Rosmalina and T. Khaerunnisa, 2021). The shift of interaction to technology is inevitable; Social media has both positive and negative effects, as this research shows. According to the research model, 53% of social media is related to students' mental health, but this is important because adolescence is a time of transition. Various preventive measures need to be taken to wisely use social media because anxiety, stress, depression and loneliness are dominant in adolescence (F. Thursina, 2023).

Higher social demands and pressure, including demands to have good grades and remain present on social media (N. Mardiana and Maryana, 2024). As a result, using social media allows users to compare themselves with others, even if only through uploaded photos (A. Trikandini and L. Kurniasari, 2021). Social and political problems also cause depression, stress and anxiety, one of which is reading news about sexual harassment and increasing cases of suicide (S. Budury, A. Fitriasaki, and K. 2019).

Uncontrolled or excessive use of social media in teenagers can disrupt mental health, because evidence shows that teenagers who are addicted to social media often experience depression, stress, anxiety and loneliness (M. Nur Cahya, W. Ningsih, and A. Lestari, 2023). Excessive or uncontrolled use of social media in teenagers can also have an impact on physical health, especially high blood pressure, which can cause hip fractures. Other physical health problems include eye problems and sleep disturbances, such as insomnia, which often occur among teenagers (R. Al Yasin, RRKA Anjani, S. Salsabil, T. Rahmayanti, and R. Amalia, 2022).

5. Conclusion

Teenagers who use social media increase anxiety disorders with uncontrolled or excessive use of social media in teenagers

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