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Meta-analysis
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Psychological Factors and Social Support in Adolescents with Suicidal Ideation: A Meta-Analysis

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ABSTRACT

Background: According to World Health Organization (WHO) data, as of August 28, 2023, there are more than 700,000 deaths due to suicide every year and the fourth highest cause of death in 18-29 years old is suicide. Studies report that psychological conditions and social support are risk factors for the emergence of suicidal ideation in adolescents. This study aimed to analyze and estimate the effect of psychological determinants (anxiety, loneliness, and depression), gender, and social support on suicidal ideation in adolescents.
Subjects and Method: This was a meta-analysis with PICO model. Population: adolescents. Intervention: women, psychological determinants (anxiety, loneliness, and depression), and social support. Comparison: men, no anxiety, no loneliness, no depression, no social support. Outcome: suicidal ideation. The basic data used involves Google Scholar, PubMed, BMC, ScienceDirect, and Springer Link. The inclusion criteria are full-text articles with cross-sectional studies, published from 2018-2023, reported aOR. Data analysis using the Review Manager 5.3.
Results: Meta-analysis was carried out on 16 primary studies from various countries, namely Ethiopia, Nepal, the United States, India, Slovenia, South Korea, Nigeria, Jamaica, China, the Netherlands, and Greece. Suicidal ideation decreased in male adolescents (aOR= 0.95; 95% CI= 0.73 to 1.24; p= 0.700) and strong social support (aOR= 0.84; 95% CI = 0.76 to 0.93; p <0.001). Loneliness (aOR= 2.86; 95% CI= 1.38 to 5.96; p= 0.005), anxiety (aOR= 2.46; 95% CI= 1.58 to 3.84; p<0.001), and depression (aOR= 5.46; 95% CI= 3.43 to 8.70; p<0.001) increased the risk of suicidal ideation.
Conclusion: Suicidal ideation decreases in male adolescents and strong social support. It increases with loneliness, anxiety, and depression increase the risk of suicidal ideation.

Keywords: suicidal ideation, psychological determinants, social support, adolescents.

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BACKGROUND

In America, the suicide phenomenon according to the Centers for Disease Control and Prevention (CDC) increased in 2021 to 48,183 people, which is the highest number since 2018 (Sekarwati, 2023). WHO explained that suicide ranks second as the cause of death that occurs in the age group of 15-29 years in countries with middle to low income levels and Southeast Asia ranks second as the region with the most suicide cases compared to the other four continents (Enggarsari, 2021).

In Indonesia, suicide incidents are still found in the community. According to data written by the Village Potential Statistics of the Central Statistics Agency in 2021, there were 3,058 suicide cases in villages/sub-districts in Indonesia (Statistics, 2022). A survey conducted by the Global Health Observatory, stated that the age group of 20-29 occupies the second position as the age group with the most suicide deaths that occur at productive age in Indonesia.

Understanding the factors that influence suicidal ideation in adolescents is very important in prevention efforts. Among these factors are gender factors, psychological factors, and social support factors. Based on gender, women had a greater risk of having suicidal ideation (aOR= 0.78; 95% CI= 0.38 to 0.70) compared to adolescent boys (Quarshie and Odame, 2023)

Psychological determinants themselves include various internal aspects of individuals that can influence suicidal thoughts and behaviors. From a psychological perspective, feelings of loneliness, anxiety, and depression can be predisposing factors that can reinforce suicidal ideation in adolescents. Loneliness in general is related to negative heart tension that involves connections between individuals (Febriani, 2021). Adolescents with high levels of loneliness are at greater risk of having suicidal ideation (aOR= 9.91; 95% CI= 8.65 to 11.34) compared to adolescents who do not feel lonely (Baiden et al., 2019).

Anxiety, which is a painful and unpleasant feeling with several levels (mild, moderate, and severe anxiety) is also known to contribute to the emergence of suicidal ideation (Savitri and Swandi, 2023). Previous studies have shown that adolescents with high anxiety have a greater risk of having suicidal ideation (aOR= 2.07; 95% CI= 1.05 to 4.10) compared to adolescents who do not have anxiety (Orri et al., 2018).

Depression is also inseparable from the emergence of suicidal ideation in adolescents. Depression itself is a state of psychiatric disorder that involves emotional disorders that are not uncommon in adolescents (Rahmy and Muslimahayati, 2021). Previous studies have shown that adolescents with high levels of depression have a greater risk of developing suicidal ideation (aOR=5.8; 95% CI=3.5 to 9.8) (Guo et al., 2023).

In addition to the psychological condition of adolescents, external factors such as social support also have an influence on the emergence of suicidal ideation in adolescents. Social support, according to Sarafino (2014) in Muthmainah (2022), is a condition that refers to the sense of comfort, care, self-esteem, or assistance that individuals get from both parents and other groups (Muthmainah, 2022).

Adolescents with high social support have a greater risk of developing suicidal ideation (aOR=1.00; 95% CI= 0.99 to 1.01) compared to those without. This study aimed to estimate the magnitude of the influence of depression, anxiety, and loneliness and social support on suicidal ideation in adolescents.

SUBJECTS AND METHOD

1. Study Design

The study is a systematic review and meta-analysis using PRISMA's flowchart guide. The databases used involve Google Scholar, PubMed, BMC, ScienceDirect, and Springer Link. The keywords used are ("determinants") AND "gender" AND "anxiety" AND "loneliness" AND "depression" AND "social support for suicidal ideation in adolescents" AND ("multivariate" OR "odds ratio") consists of study design and study site (place and time).

2. Step of Meta-Analysis

The meta-analysis was carried out in five steps as follows:

1) Formulate research questions in the PICO, including: P= adolescents, I= drinking parents, drinking friends, smoking, C= non-drinking parents, non-drinking friends, non-smoking, O= Alcohol consumption.
2) Search for primary study articles from various electronic and non-electronic databases.
3) Conduct screening and critical assessment of primary research articles.
4) Perform data extraction and synthesize effect estimates into RevMan 5.3.
5) Interpret and conclude the results.

3. Inclusion Criteria

The author developed inclusion criteria, namely English-language articles with cross-sectional studies published between 2018-2023. The analysis used is a multivariate analysis using an adjusted odds ratio (aOR). The subjects of the study were adolescents aged 12-21 years, and the results analyzed were suicidal ideation.

4. Exclusion Criteria

The exclusion criteria in this study are RCT (randomized controlled trials) studies, quasi-experiments, research protocols, preliminary studies, non-full text articles (aOR) and the sample is <100 participants.

5. Operational Definition of Variables

Anxiety is a painful and unpleasant feeling that is divided into mild, moderate, and severe anxiety.

Loneliness is a condition of a person that refers to the subjective anxiety that is felt when a social relationship loses its important characteristics both qualitatively and quantitatively.

Depression is a condition in which a person feels sad, disappointed when experienceing a change, loss, failure and becomes pathological when unable to adapt.

Social support is a sense of comfort, care, self-esteem, or help that individuals get from both parents and other groups.

Suicidal ideation is a person's thoughts about killing themselves, making plans for when, where and how the suicide will be committed, and thoughts about the effects of suicide on others.

6. Instruments

Primary studies that have been screened will undergo a critical assessment or review of the study to determine eligibility. The assessment instrument used the Critical Appraisal Cross-Sectional Study for Meta-analysis Research published by the Master of Public Health, Sebelas Maret University of Surakarta (2023).

7. Data analysis

The search results of the articles were collected with the help of PRISMA diagrams. Lead articles that fit the inclusion criteria were analyzed using the RevMan 5.3 application to calculate the effect size and heterogeneity of the study. The results of data processing were represented (OR, 95% confidence interval, and p-value)using the Mantel-Haenszel method for meta-analysis and presented in the form of forest plots and funnel plots.

RESULTS

The process of searching for articles to be synthesized and the process of reviewing and selecting articles using the PRISMA Flow Diagram are presented in Figure 1. The initial search process resulted in 5,762 articles. After removing articles duplication, 3,575 articles were generated, subsequently, after the process of eliminating article duplication, the next step was to check the relevance of the title and the study design used to generate 462 articles. After checking articles according to inclusion criteria and exclusion criteria, 95 articles were obtained. In the end, as many as 16 full-text articles were included for meta-analysis with the study method on the article being cross-sectional.

Figure 2 showed the observed 16 study articles that come from the Africa, America, Europe, and Asia continents.

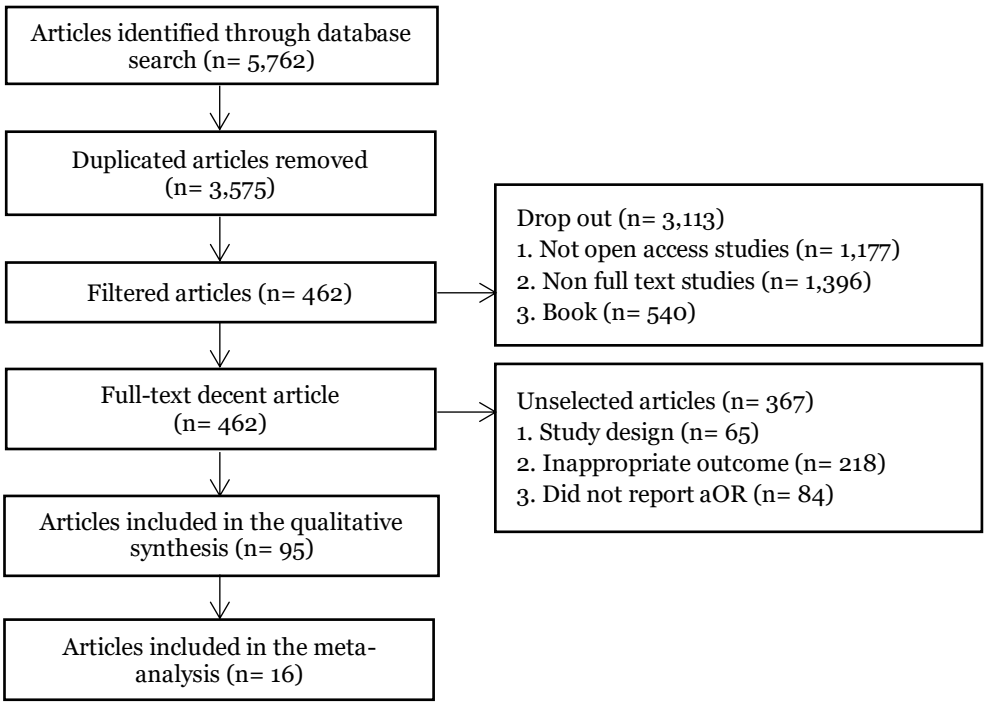

Figure 1. PRISMA Flow diagrams

Figure 2. Research distribution map of psychological factors and social support in adolescents with suicidal ideation

Table 1. The quality assessment result of correlations between knowledge, self-efficacy, and social support on HIV testing with a cross-sectional study.

Primary Study	Criteria													Total
	1				2		3		4	5	6		7	
	a	b	c	d	a	b	a	b			a	b		
Amare et al. (2018)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Pandey et al. (2019)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Bete et al. (2023)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Baiden et al. (2019)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Halli et al (2021)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Baiden et al. (2023)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Sarfo et al. (2022)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Banstola et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Gomboc et al. (2022)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Bračič et al. (2019)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Kim et al. (2021)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Adewuya et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Boduszek et al. (2021)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Zhou et al. (2021)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Weibenga et al. (2020)	2	2	2	2	2	2	0	2	2	2	2	2	2	24
Papadoupoulou et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	26

Table 1 showed quality assessment result of articles with a cross-sectional study included in meta-analysis.

Description of the question criteria:

1. Formulation of research questions in PICO acronym:
   a. What is the population in the study primary is the same as the population in PICO meta-analysis?
   b. What is the operational definition of intervention (intervention), namely the status of exposure (exposed) in primary studies is the same as that definition intended in meta-analysis?
   c. What is the comparison (comparison), namely status not exposed (unexposed) is used Primary studies are the same as that definition intended in meta-analysis?
   d. What is the outcome variable being studied? in primary studies is the same as that definition intended in meta-analysis?
2. Method for selecting research subjects:
   a. Descriptive cross-sectional study (prevalence): Is the sample randomly selected?
   b. Analytical cross-sectional study: Are samples randomly or purposively selected?
3. Methods for measuring comparisons (intervention) and outcome variables:
   a. Are both exposure or intervention and outcome variables measured with the same instruments in all primary studies?
   b. If variables are measured on a categorical scale, are the cut-offs used the same across primary studies?
4. Bias of the design:
   a. How much is the response rate?
   b. Is non-response related to outcomes?
5. Methods to control confounding:
   a. Is there any confusion in the results or conclusions of the primary study?
   b. Have primary study researchers used appropriate methods to control the effects of confusion?
6. Method of statistical analysis:

a. In the cross-sectional study, is multivariate analysis performed?
b. Multivariate analysis includes multiple linear regression analysis, multiple logistic regression analysis, Cox regression analysis.

7. Is there a conflict of interest with the research sponsor?

Description of scoring:

0= No; 1= Hesitate; 2= Yes.

Table 2 describes a summary of primary research of the effect of drinking friends on alcohol consumption with a cross-sectional design, a meta-analysis was carried out on 16 articles originating from the country of Ethiopia, Nepal, United States of America, India, China, North America, Slovenia, South Korea, Nigeria, Jamaica, China, Netherland, and Greece. The largest research population was found in a study conducted by Zhou et al. (2021) namely 11,372 students, and the study with the smallest population, namely the study conducted by Halli et al (2021) as many as 282 adult ages <30 years - 30 years or older.

Table 2. Description of the primary studies of psychological factors and social support in adolescents with suicidal ideation (cross-sectional study).

Author (years)	Country	Sample	P	I	C	O
Amare *et al.* (2018)	Ethiopia	603	Students age 15-19 years	1. Loneliness 2. Depression 3. Social Support	1. No Loneliness 2. No Depression 3. No Social Support	Suicide Ideation
Pandey et al. (2019)	Nepal	8,670	Students aged 11-18 years	1. Female 2. Loneliness 3. Anxiety 4. Social Support	1. Male 2. No Loneliness 3. No Anxiety 4. No Social Support	Suicide Ideation
Bete et al. (2023)	Ethiopia	1,615	Students age <14 until - 19 years	1. Female 2. Depression 3. Anxiety Social support	1. Male 2. No Depression 3. No Anxiety No Social support	Suicide Ideation
Baiden et al. (2019)	United States of America	10,745	Adolescents aged 14-18 years or older	1. Female 2. Loneliness	1. Male 2. No Loneliness	Suicide Ideation
Halli et al (2021)	India	282	Adult age <30 years - 30 years or older	Depression	No Depression	Suicide Ideation
Baiden et al. (2023)	United States	14,765	Adolescents age 12-18 years	1. Female 2. Depression	1. Male 2. No Depression	Suicide Ideation
Sarfo et al. (2022)	North America United States	1,877	Adolescents aged 13-17 years	1. Female 2. Loneliness 3. Anxiety	1. Male 2. No Loneliness 3. No Anxiety	Suicide Ideation
Banstola et al. (2020)	Nepal	1,070	Adolescents age 13-19 years	Social support	No Social support	Suicide Ideation
Gomboc et al. (2022)	Slovenia	991	Individuals aged 18-95 years	1. Female 2. Loneliness	1. Male 2. No Loneliness	Suicide Ideation
Bračič et al. (2019)	Slovenia	1,615	Adolescents age 15 years	1. Female 2. Depression 3. Loneliness 4. Social support	1. Male 2. No Depression 3. No Loneliness 4. No Social support	Suicide Ideation

Author (years)	Country	Sample	P	I	C	O
Kim et al. (2021)	South Korea	1,700	Adults aged 30-44 years and 60-74 years	Loneliness	No Loneliness	Suicide Ideation
Adewuya et al. (2020)	Nigeria	9,441	Individuals aged 11-21 years	1. Female 2. Depression 3. Anxiety	1. Male 2. No Depression 3. No Anxiety	Suicide Ideation
Boduszek et al. (2021)	Jamaica	7,182	Children and adolescents age 9-17 years	1. Female 2. Anxiety 3. Depression 4. Social support	1. Male 2. No Anxiety 3. No Depression 4. No Social support	Suicide Ideation
Zhou et al. (2021)	China	11,372	Students age ≥18 years	1. Female 2. Depression 3. Anxiety 4. Social support	1. Male 2. No Depression 3. No Anxiety No Social support	Suicide Ideation
Weibenga et al. (2020)	Netherland	1,576	Individuals aged 18-65 years	1. Female 2. Loneliness 3. Social support	1. Male 2. No Loneliness 3. No Social support	Suicide Ideation
Papadoupoulou et al. (2020)	Greece	5,748	Individuals aged 18-65 years or above	1. Female 2. Depression 3. Anxiety	1. Male 2. No Depression 3. No Anxiety	Suicide Ideation

a. Correlation of gender with suicidal ideation

Table 3. aOR and 95% CI data the correlation of gender with suicidal ideation.

(Author, year)	aOR	95% CI	
		Lower Limit	Upper Limit
Bracic et al. (2017)	1.38	0.94	2.03
Baiden et al. (2019)	1.07	0.93	1.23
Pandey et al. (2019)	1.39	1.03	1.88
Weibenga et al. (2020)	1.42	0.79	2.55
Adewuya et al. (2020)	1.94	1.57	2.40
Gomboc et al. (2020)	0.79	0.53	1.18
Papadoupoulou et al. (2020)	0.99	0.71	1.38
Zhou et al. (2021)	0.72	0.61	0.85
Boduszek et al. (2021)	0.59	0.48	0.73
Sarfo et al. (2022)	0.34	0.26	0.44
Baiden et al. (2023)	0.85	0.65	1.11
Bete et al. (2023)	1.11	0.80	1.54

Table 3 showed the effect sizes of the primary studies used in the meta-analysis about the correlation of gender with suicidal ideation, with largest adjusted odd ratio (aOR) conducted by Adewuya et al. (2020) is 1.94, and the lowest aOR conducted by Boduszek et al. (2021) is 0.59.

Figure 3 presents a forest plot about the influence of gender on suicidal ideation. The results of the study showed that gender influenced the risk of suicidal ideation, although the effect was not statistically significant. Adolescents with male sex were 0.95 times more likely to have suicidal idea-

tion than females (aOR= 0.95; 95% CI= 0.73 to 1.24; p= 0.700).

The forest plot also showed a large heterogeneity of estimates between studies (I^2= 93%). Thus, the average calculation of the effect estimate is carried out using the random effect mode approach.

Figure 4 shows a funnel plot about the influence of gender on the risk of having suicidal ideation. The funnel plot shows that the estimated effect is evenly distributed to the right and left of the average vertical line. Thus the plot funnel indicates the absence of publication bias.

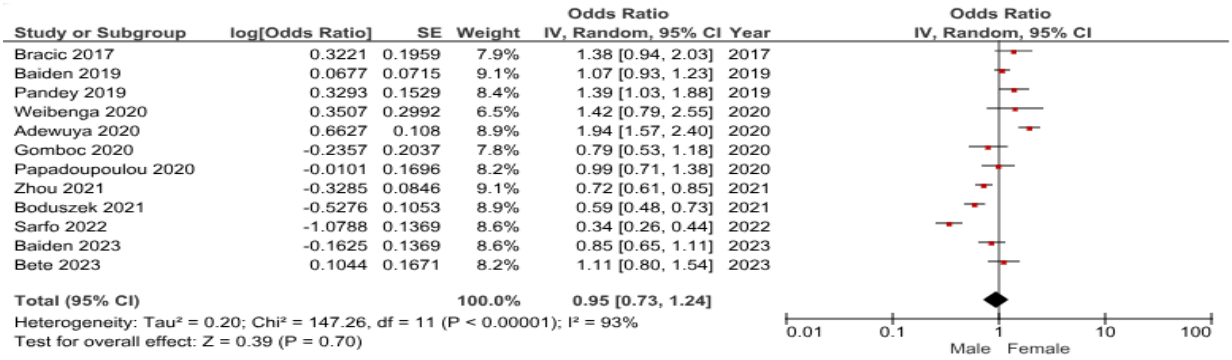

Figure 3. Forest plot the correlation of gender with suicidal ideation.

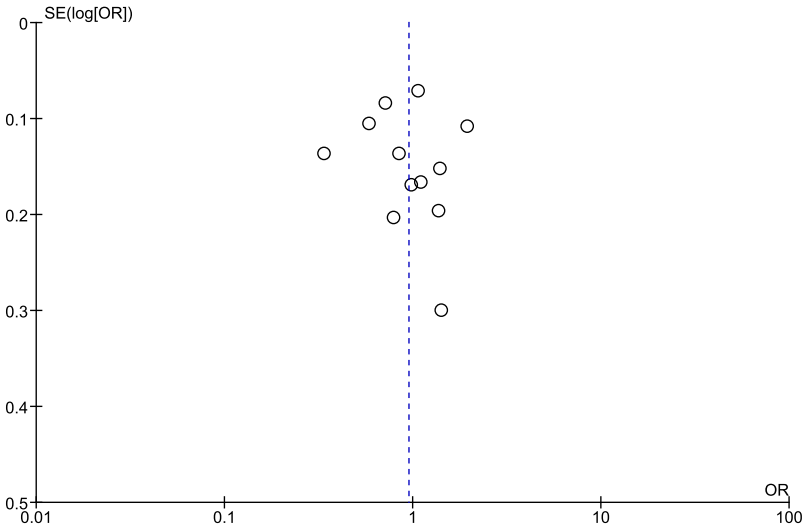

Figure 4. Funnel plot the correlation of gender with suicidal ideation.

b. Correlation of social support with suicidal ideation

Table 4. aOR and 95% CI data the correlation of social support with suicidal ideation.

(Author, year)	aOR	95% CI	
		Lower Limit	Upper Limit
Bracic et al. (2017)	0.82	0.75	0.90
Amare et al. (2018)	1.79	0.07	44.50
Pandey et al. (2019)	0.48	0.11	2.09
Weibenga et al. (2020)	0.70	0.52	0.94
Banstola et al. (2020)	0.95	0.91	0.99

(Author, year)	aOR	95% CI	
		Lower Limit	Upper Limit
Zhou et al. (2021)	0.48	0.37	0.62
Boduszek et al. (2021)	0.99	0.98	1.00
Bete et al. (2023)	0.76	0.49	1.18

Table 4 showed the effect sizes of the primary studies used in the meta-analysis about the correlation of social support with suicidal ideation, with largest adjusted odd ratio conducted by Amare et al. (2018) is 1.79, and the lowest aOR conducted by Pandey et al. (2019) is 0.48.

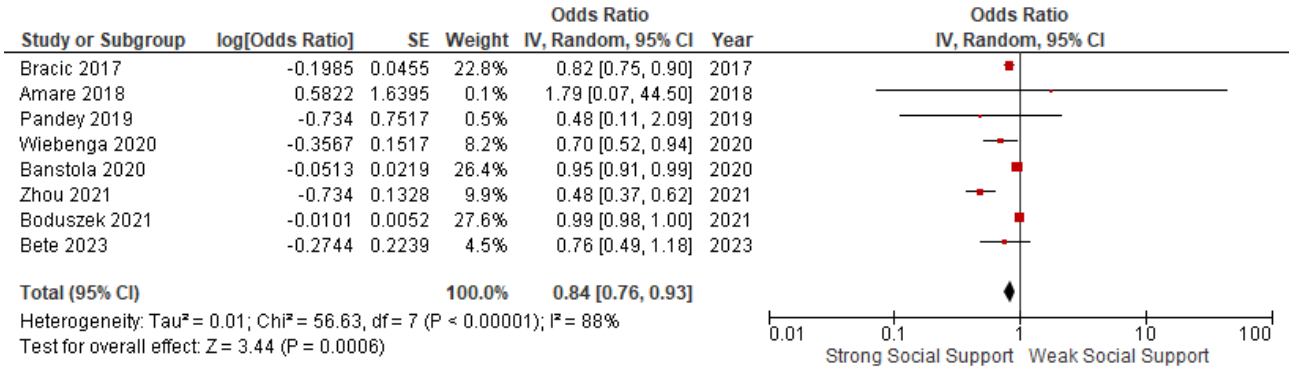

Figure 5. Forest plot the effect of social support on suicidal ideation

Figure 5 presents a forest plot about the influence of social support on suicidal ideation. The results of the study showed that strong social support lowered the risk of suicidal ideation, and the effect was statistically significant. Adolescents who received strong social support were 0.84 times less likely to have suicidal ideation compared to weak social support (aOR= 0.84; 95% CI= 0.76 to 0.93; p< 0.001). The forest plot also showed a large heterogeneity of estimates between studies (I^2= 88%). Thus, the average calculation of the effect estimate is carried out using the random effect mode approach.

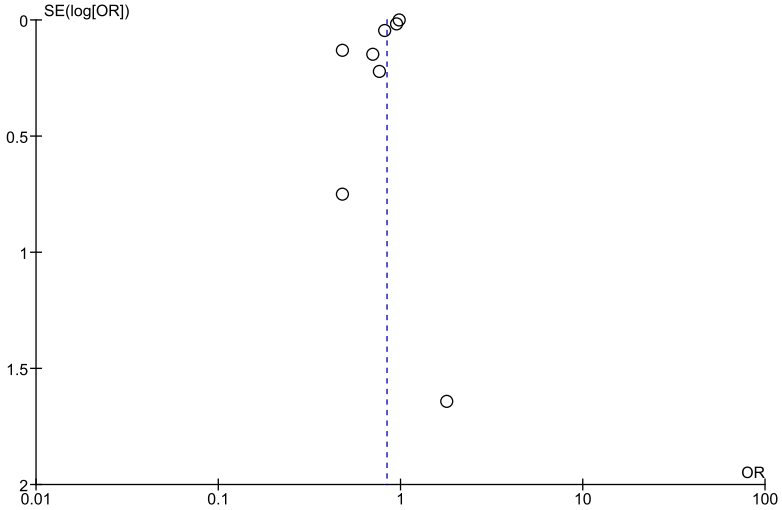

Figure 6. Funnel plot the effect of social support on suicidal ideation

Figure 6 presents a funnel plot about the influence of social support on suicidal ideation. The plot funnel shows that the distribution of the effect estimate is more located to the left than to the right of the average vertical line of the estimate. Thus, the plot funnel indicates the existence of publication bias. Because the distribution of the estimated effect is more to the left of the vertical line of the average estimate in the funnel plot, which is the same as the diamond image of the average estimated effect to the left of the vertical line of the null hypothesis in the forest plot, the bias of the publication tends to overestimate the effect of social support.

c. Correlation of loneliness with suicidal ideation

Table 5. aOR and 95% CI data the correlation of loneliness with suicidal ideation

Author (year)	aOR	95% CI	
		Lower Limit	Upper Limit
Bracic et al. (2017)	5.33	3.00	9.47
Amare et al. (2018)	2.42	1.34	4.37
Baiden et al. (2019)	9.91	8.65	11.35
Pandey et al. (2019)	2.51	1.44	4.38
Weibenga et al. (2020)	0.89	0.63	1.26
Gomboc et al. (2020)	1.86	1.51	2.29
Kim et al. (2021)	4.21	2.21	8.02
Sarfo et al. (2022)	2.07	1.59	2.69

Table 5 showed the effect sizes of the primary studies used in the meta-analysis the correlation of loneliness with suicidal ideation, with largest adjusted odd ratio conducted by Baiden et al. (2019) is 9.91, and the lowest aOR conducted by Weibenga et al. (2020) is 0.89.

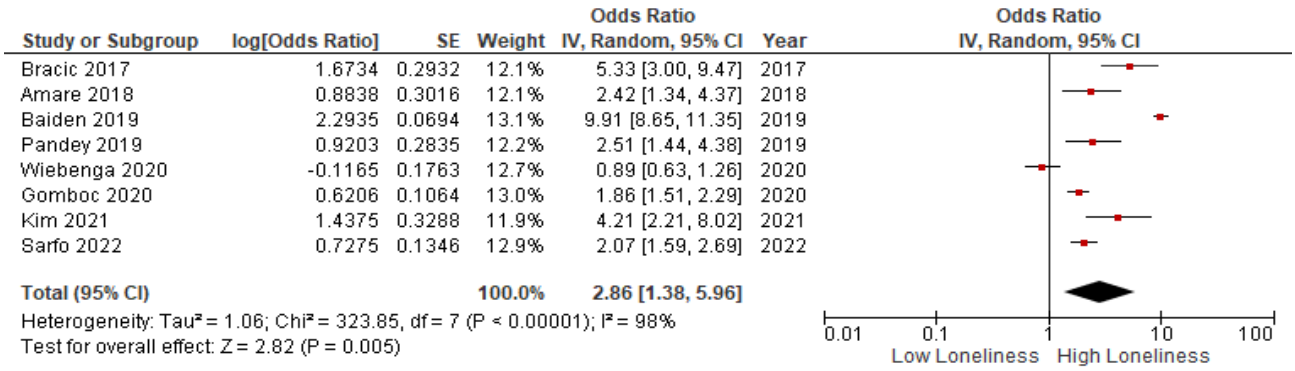

Figure 7. Forest plot the effect of loneliness with suicidal ideation

Figure 7 presents a forest plot about the influence of loneliness on suicidal ideation. The results of the study showed that strong loneliness increased the risk of suicidal ideation, and the effect was statistically significant. Adolescents with high loneliness were 2.86 times more likely to have suicidal ideation than adolescents with low loneliness (aOR = 2.86; 95% CI= 1.38 to 5.96; p= 0.005).

The forest plot also showed a large heterogeneity of estimates between studies (I^2= 98%). Thus, the average calculation of the effect estimate is carried out using the random effect mode approach.

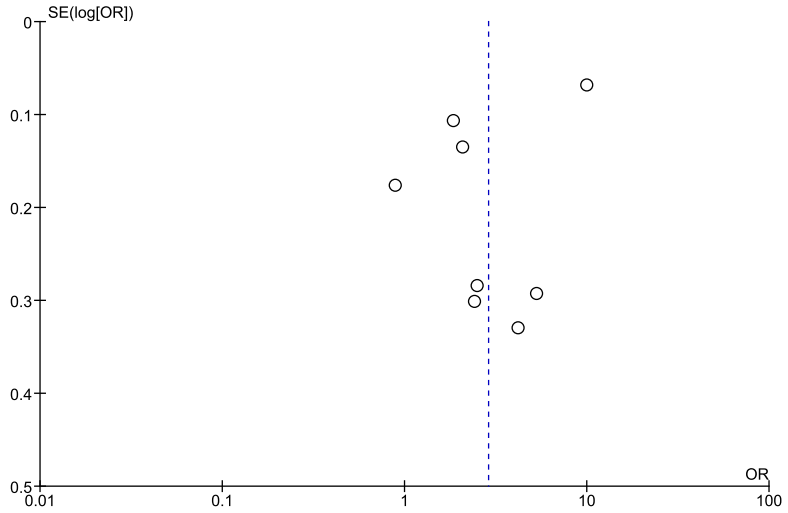

Figure 8. Funnel plot the effect of loneliness with suicidal ideation

Figure 8 presents a funnel plot about the influence of loneliness on suicidal ideation. The plot funnel shows that the distribution of the effect estimate is more located to the left than to the right of the average vertical line of the estimate. Thus, the plot funnel indicates the existence of publication bias. Because the distribution of the effect estimate is more to the left of the vertical line of the average estimate in the funnel plot, which is opposite to the diamond image of the average estimated effect to the right of the vertical line of hypothesis zero in the forest plot, the bias of the publication tends to reduce the effect of loneliness (underestimated).

d. Correlation of anxiety with suicidal ideation

Table 6. aOR and 95% CI data the correlation anxiety with suicidal ideation

Author (year)	aOR	95% CI	
		Lower Limit	Upper Limit
Pandey et al. (2019)	2.54	1.49	4.33
Papadoupoulpu et al. (2020)	3.51	2.55	4.83
Adewura et al. (2020)	1.55	1.25	1.92
Zhou et al. (2021)	5.56	4.53	6.82
Boduszek et al. (2021)	1.62	0.77	3.41
Sarfo et al. (2022)	2.07	1.56	2.75
Bete et al. (2023)	1.88	1.32	2.68

Table 6 showed the effect sizes of the primary studies used in the meta-analysis the correlation of anxiety with suicidal ideation, with largest adjusted odd ratio conducted by Sarfo et al. (2022) is 2.07, and the lowest aOR conducted by Adewura et al. (2020) is 1.55.

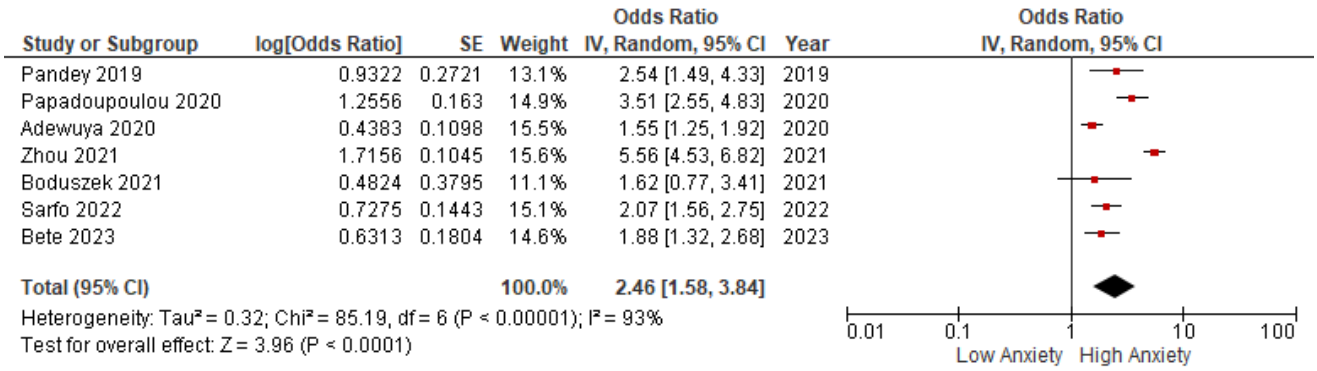

Figure 9. Forest plot the effect of anxiety with suicidal ideation

Figure 9 presents a forest plot about the influence of anxiety on suicidal ideation. The results of the study showed that anxiety affected the risk of suicidal ideation and that the effect was statistically significant. Adolescents with high anxiety were 2.46x more likely to have suicidal ideation than adolescents with low anxiety levels (aOR= 2.46; 95% CI= 1.58 to 3.84; p<0.001).

The forest plot also showed a large heterogeneity of estimates between studies (I^2= 93%). Thus, the average calculation of the effect estimate is carried out using the random effect mode approach.

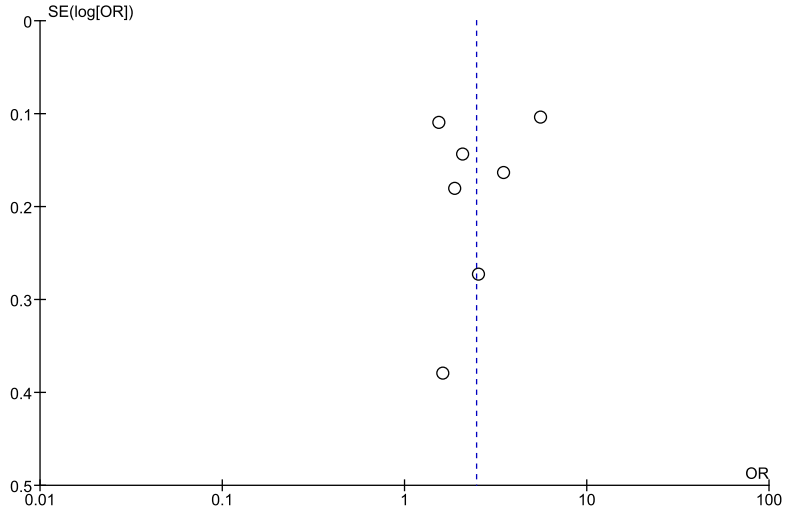

Figure 10. Funnel plot the effect of anxiety with suicidal ideation

Figure 10 shows a funnel plot about the effect of anxiety on the risk of having suicidal ideation. The funnel plot shows that the estimated effect is evenly distributed to the right and left of the average vertical line. Thus the plot funnel indicates the absence of publication bias.

e. Correlation of depression with suicidal ideation

Table 7. aOR and 95% CI data the correlation depression with suicidal ideation

Author (year)	aOR	95% CI	
		Lower Limit	Upper Limit
Bracic et al. (2017)	4.96	3.39	7.26

Author (year)	aOR	95% CI	
		Lower Limit	Upper Limit
Amare et al. (2018)	4.66	2.31	9.40
Papadoupoulou et al. (2020)	4.64	3.27	6.58
Adewuya et al. (2020)	5.14	4.12	6.41
Zhou et al. (2021)	10.62	7.84	14.38
Boduszek et al. (2021)	9.55	4.93	18.50
Halli et al. (2021)	4.00	1.98	8.08
Bete et al. (2023)	1.44	1.02	2.03
Baiden et al. (2023)	13.16	9.67	17.91

Table 7 showed the effect sizes of the primary studies used in the meta-analysis the correlation of depression with suicidal ideation, with largest adjusted odd ratio conducted by Baiden et al. (2021) is 13.16, and the lowest aOR conducted by Bete et al. (2023) is 1.44.

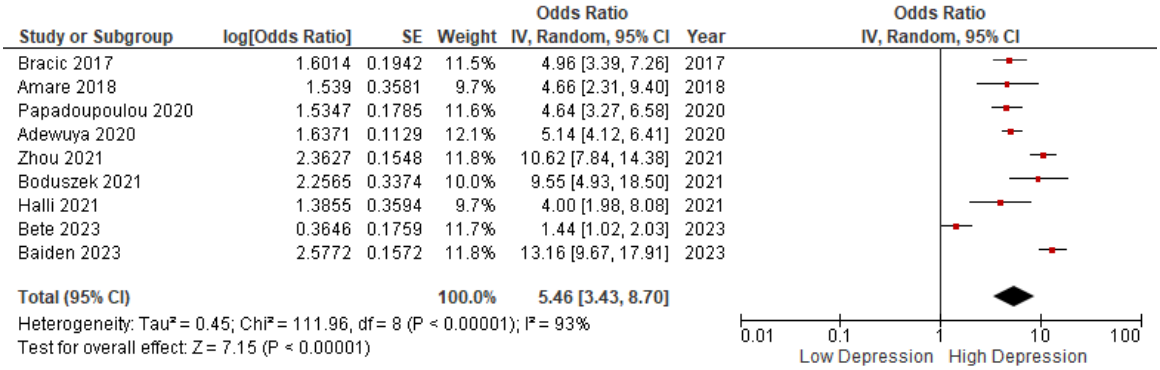

Figure 11. Forest plot the effect of depression with suicidal ideation

Figure 11 presents a forest plot about the influence of depression on suicidal ideation. The results of the study showed that depression affected the risk of suicidal ideation, and that the effect was statistically significant. Adolescents with high depression were 5.46x more likely to have suicidal ideation than those with low levels of depression (aOR= 5.46; 95% CI= 3.43 to 8.70; p<0.001).

The forest plot also shows large heterogeneity in estimates between studies (I^2= 93%). Thus, the calculation of the average estimated effect is carried out using the random effect mode approach.

Figure 12 shows a funnel plot about the influence of deprssion on the risk of having suicidal ideation. The funnel plot shows that the estimated effect is evenly distributed to the right and left of the average vertical line. Thus, the plot funnel indicates the absence of publication bias.

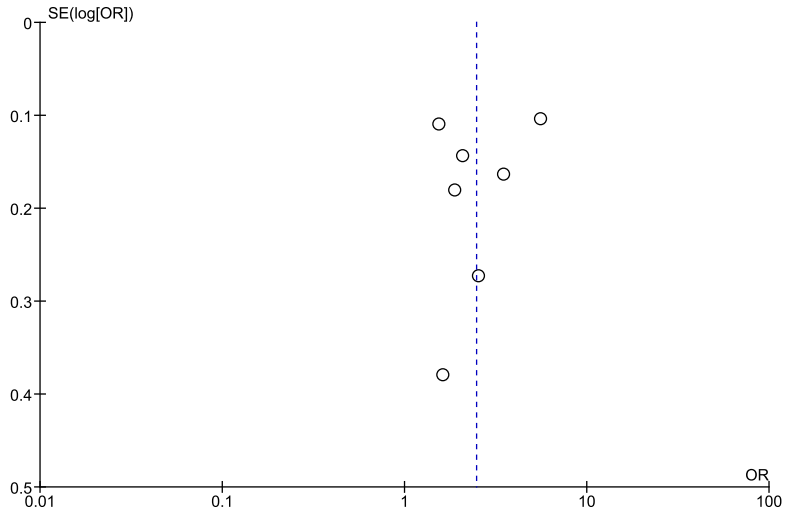

Figure 12. Funnel plot the effect of depression with suicidal ideation

Figure 12 shows a funnel plot about the influence of deprssion on the risk of having suicidal ideation. The funnel plot shows that the estimated effect is evenly distributed to the right and left of the average vertical line. Thus, the plot funnel indicates the absence of publication bias.

DISCUSSION

This meta-analysis study analyzed factors that affect alcohol consumption in adolescents. This study used aOR statistics of multivariate analysis results which aims to get the same final results for the studies to be analyzed.

1. Gender with Suicidal Ideation

There were 12 articles from several countries used to measure the magnitude of the influence of gender on suicidal ideation. The article uses a cross-sectional study design. Studies show a statistically unsignificant relationship between sex and suicidal ideation. Adolescents with male sex were 0.95 times more likely to have suicidal ideation than females (aOR= 0.95; 95% CI = 0.73 to 1.24; p= 0.700).

The study conducted by Baiden et al. (2019) showed a difference in suicidal ideation of 22.3% in adolescent girls compared to adolescent boys of 11.4%. Women were identified as having higher suicidal ideation than men because women experienced more depressive emotions and reached the onset of puberty and psychological maturity earlier than men. Another study that is not in line with the results of the study stated that adolescent girls have a greater risk for the appearance of suicidal ideation (OR= 14.44; 95% CI= 8.35 to 24.96) (Zhu et al., 2022).

2. Social Support with Suicidal Ideation

There were 8 articles used for several countries to measure the magnitude of the influence of social support on suicidal ideation. Strong social support lowered the risk of suicidal ideation, and the effect was statistically significant. Adolescents who received strong social support were 0.84x more likely to have suicidal ideation than those with weak social support (aOR= 0.84; 95% CI= 0.76 to 0.93; p= 0.006).

Social support plays a role in the emergence of a person's suicidal ideation. Suicidal ideation arises as a result of a person's condition such as depression. In this depression-like condition, a person needs social support from family, friends

and significant others (Bete et al., 2023). Living together with family and/or peers encourages teens to share their feelings and thoughts especially during stressful events, which can reduce emotional or mental fuss. When living alone does not have the opportunity to share feelings so their social support is poor, so it can be stressful leading to suicide attempts.

3. Loneliness with Suicidal Ideation

There were 8 articles used from several countries to measure the magnitude of loneliness with suicidal ideation. It showed that loneliness increased the risk of suicidal ideation, and the effect was statistically significant. Adolescents with high levels of loneliness were 2.86x more likely to have suicidal ideation compared to low loneliness (aOR= 2.86; 95% CI= 1.38 to 5.96; p = 0.005).

This study is in line with a study conducted on adolescents in China who had feelings of loneliness were shown to have a higher susceptibility to suicidal ideation. Adolescent girls with loneliness symptoms have a greater prevalence of experiencing suicidal ideation than men so adolescent girls need psychological help and support in their daily lives, especially the loneliness experienced by a person will make them experience severe and chronic stress associated with suicidal ideation (Yao and Zhong, 2014).

4. Anxiety with Suicidal Ideation

Seven articles were used showing that anxiety affected the risk of suicidal ideation, and the effect was statistically significant. Adolescents with high anxiety levels were 2.46x more likely to have suicidal ideation compared to those with low anxiety levels (aOR= 2.46; 95% CI= 1.58 to 3.84; p <0.001). The results of this study showed that anxiety occurred significantly related to suicidal ideation.

Adolescents with anxiety symptoms have excessive feelings of worry. Anxiety is the main and key symptom of anxiety. This condition refers to extraordinary or distressing circumstances and excessive thinking about the past, present, and future. Individuals with anxiety symptoms may worry about themselves, their friends, and their families for no sufficient reason or beyond the reasons that make teens have suicidal ideation and suicide attempts (Bete et al., 2023).

Other studies prove that anxiety affects adolescent suicidal ideation, anxiety is a form of psychosocial distress in adolescents that causes unbearable feelings so it is proven to be a factor that increases the risk of suicidal ideation (Jung et al., 2023).

5. Depression with Suicidal Ideation

Nine articles were used to show that depression affected the risk of suicidal ideation, and that the effect was statistically significant. Adolescents with high levels of depression were 5.46x more likely to have suicidal ideation compared with lower rates of depression (aOR= 5.46., 95% CI= 3.43 to 8.70; p <0.001).

Depression often makes individuals feel isolated and lonely, despite the possibility of social support. In addition, depression can also give rise to negative thought patterns so that cognition becomes distorted. Previous studies have shown that depressed adolescents have a greater risk of suicidal ideation (OR= 1.07; 95% CI= 1.03 to 1.11) (Kang et al., 2021). The higher the level of depression, the lower the protective effect of a teenager against suicide attempts (Bianchi and Mirkovic, 2020)

AUTHOR CONTRIBUTION

Zain Nadaa Nisriina and Epin Pakanna work together to determine the topic of study, find articles relevant to the title of the study, process data, and then continue with the

preparation of articles. Bhisma Murti and Aem Ismail contribute in terms of assisting the data processing process and compiling articles.

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This study is self-funded.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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