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Meta-Analysis

Meta Analysis: Peer Influence on Smoking Behavior in Adolescents

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ABSTRACT

Background: Tobacco smoking is a direct cause of morbidity and mortality worldwide. Five million people die from smoking-related diseases every year in the world. If there is no change, then in the next 3 to 40 years the number of deaths and disabilities due to smoking will increase. This study aims to determine the magnitude of the influence of peers on smoking behavior in adolescents, with a primary study conducted by previous authors.
Subjects and Method: This study uses a systematic review and meta-analysis with PICO, population: adolescents. Intervention: having smoking friends. Comparison: has no smoking friends. Outcome: smoking habit. The articles used were obtained from several databases, namely Google Scholar, Pubmed, SpingerLink and Science Direct from 2014 to 2020. The search keywords for the article were "smoking behavior OR "smoking activity" AND "adolescent" AND "friend smoking status". The inclusion criteria for research articles were full-text articles using a cross-sectional study design. The subjects of the study were adolescents and the results of the study were smoking habits. Multivariate analysis with Adjusted Odds Ratio (aOR) to measure the estimated effect. Data were analyzed using the Review Manager application (RevMan 5.3).
Results: A total of 9 articles with a total sample of 101,436 people, articles from Bangladesh, Sweden, Malaysia, Korea, Taiwan, Ethiopia, USA, Indonesia, and India, with selected cross-sectional studies for this systematic review and meta-analysis, Adolescents who have smoking friends are at risk of having smoking habits 13.74 times compared to adolescents who do not have smoking friends (OR= 13.74; 95% CI= 5.13 to 36.78; p< 0.001).
Conclusion: Having smoking friends can increase the risk of smoking in adolescents.

Keywords: peer, smoking, adolescents, behavior

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BACKGROUND

Tobacco smoking is a major health problem. Tobacco smoking is a direct, preventable cause of morbidity and mortality worldwide. Five million people die from smoking-related diseases every year in the world, especially in developing countries. Around 6.4 million children under 18 years will die at an earlier age as adults because they started their smoking habit during adolescence (Ahmed et al., 2020)

Smoking is the largest preventable cause of death and disability in industrialized countries and is a rapidly growing

problem in many developing countries. The World Health Organization (WHO) estimates that every year as many as 3 million people die from tobacco-related cases. case. In the United States, tobacco use causes more than 438,000 smoking-related deaths per year, this number of deaths exceeds that of HIV, alcohol, car accidents, homicide, suicide, and other illicit drugs (Liang et al., 2022).

The prevalence of smoking adolescents remained relatively stable and even increased in some groups. Recent studies have found that 28% to 36% of today's teens. Meanwhile in the United States for adults over the age of 21 the smoking rate has decreased there is a growing number of smokers among the pre-adult or adolescent population (Thakur et al., 2014).

The argument for the prevention of smoking among adolescents is based on the observation that, if smoking is not started during adolescence, it is unlikely to occur and so on data showing that the probability of cessation among adults is inversely related to age in adolescents. Even trials that rarely smoked in adolescence significantly increased the risk of adult smoking. Once smoking has been started, quitting smoking is difficult and smoking is likely to become a long-term addiction. For example, it has been estimated that quitting humans, for those born from 1975 to 1979 who started smoking in their teens, is 33 years for males and 37 years for adults. women (Hock et al., 2014).

This study aims to determine the magnitude of the influence of peers on smoking behavior in adolescents, with a primary study conducted by previous authors.

SUBJECTS AND METHOD

1. Study Design

The articles in this meta-analysis were obtained from several Pubmed and Google scholar databases published from 2014 to 2022. The search keywords for articles were “smoking behavior OR “smoking activity” AND “adolescent” AND “friend smoking status”. For the article selector, we used the Prism flowchart.

2. Inclusion Criteria

Inclusion criteria in this study include articles that are fully accessible with a study design in the form of cross sectional and cohort, with the language of the article, namely English and Indonesian. Statistical analysis used is multivariate with adjusted odds ratio (aOR). The intervention in this study was in the form of smoking peers. The subjects of this study were adolescents with an age range of 12 to 21 years. The outcome of this study is smoking habits.

3. Exclusion Criteria

Exclusion criteria in this research article were articles published in languages other than English, statistical results reported in the form of bivariate analysis and articles published before 2012.

4. Operational Definition of Variables

In the formulation of the problem in this study, we used the PICO method. The population includes adolescents with an age range of 12 to 18 years. The intervention is a smoker's friend, while the outcome is a smoking habit.

Adolescents is a transition from the age of children to adults, in general, adolescence is considered to be legally mature age. There is attitude behavior.

Smoking behavior in adolescents is as all forms of individual activity in burning tobacco and then being sucked in and exhaling the smoke, which can be observed or measured by volume or smoking frequency by individuals aged 12 to 21 years.

Smoking habits are all forms of individual activity in burning and exhaling the smoke produced from the burning of cigarettes and carried out continuously.

5. Instruments

The study was guided by the PRISMA flow chart and quality assessment using the Critical Appraisal Skills Program (CASP) (CEBM, 2014).

6. Data Analysis

Articles were analyzed using the Review Manager (RevMan) 5.3 application to calculate effect size and heterogeneity, and form the final results of the meta-analysis. The results of data processing are presented in the form of forest plots and funnel plots.

RESULTS

Process of searching article wascarried out by searching several journal databases Google scholar, PubMed, and SpringerLink it can be seen using the PRISMA FLOW flowchart shown in Figure 1.

The initial search for articles sourced from various databases obtained initial results of 1,100 articles, after which they will be filtered again by going through various processes such as checking for duplicates. checking the suitability of the title and abstract and the last is checking the full text. Where after going through several processes obtained 9 articles that meet the inclusion and exclusion criteria that have been set previously.

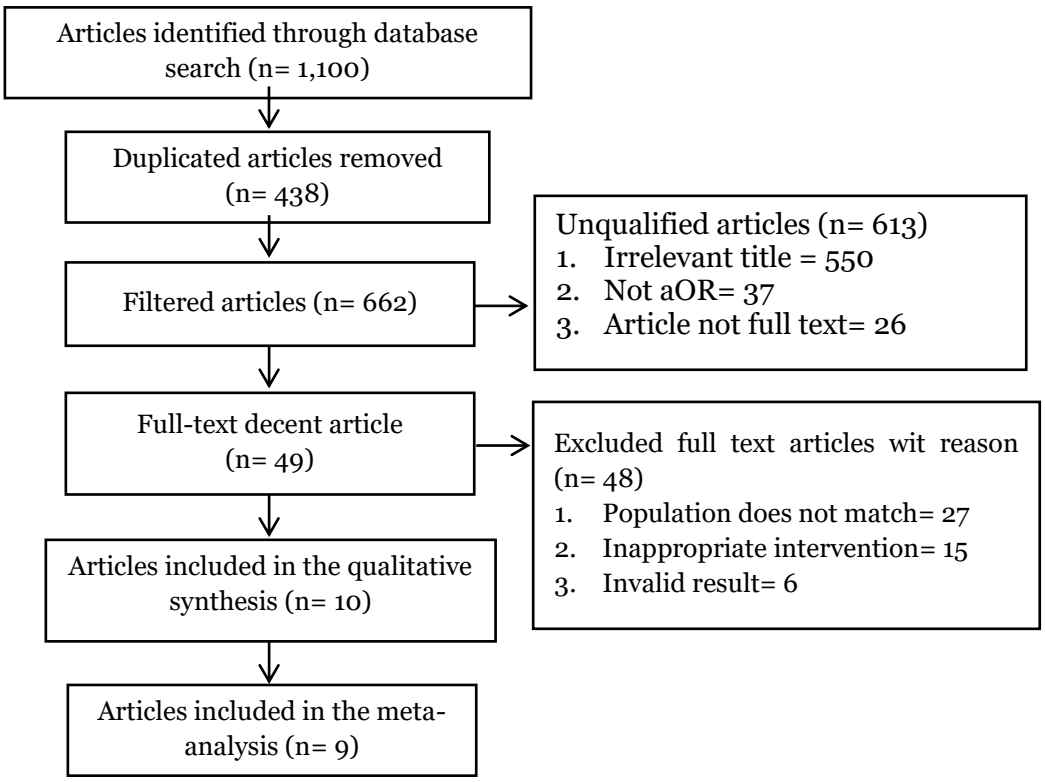

Figure 1. Results of Prisma Flow Diagrams

Figure 1. Resarch Distribution Map

figure 1. Research related to the effect of smoking friends on smoking habits in adolescents consisted of 9 articles from the initial search process yielding 1,100 articles, after the deletion process, articles were published with 49 requirements for full-text review more carry on. A total of 9 articles that met the quality assessment were included in the quantitative synthesis using a meta-analysis.

It can be seen in Figure 2 that the research articles come from five continents such as Europe, Asia and America.

An assessment of the quality of the articles used in this study can be seen in table 1. Then Table 2 shows that 9 articles from a cross-sectional study provide evidence about the effect of smoking friends on smoking habits in adolescents. Then in table 2 it can be seen about the details of the articles used in this study, such as the study population, intervention, comparison, and the results of each study. All articles used in this study are articles with a cross-sectional study design.

Based on the results of the forest plot (figure 3) of the cross-sectional study design, showed that an adolescent who had smoking friends was at risk of smoking 13.74 times compared to an adolescent who did not have smoking friends (aOR= 13.74; 95% CI= 5.13 to 36.78), and the results were statistically significant ($p<0.001$). The heterogeneity of the research data shows I^2= 79% so that the distribution of the data is said to be heterogeneous (random effect model).

In figure 4 it can be seen about the Funnel Plot from the results of the data analysis that has been carried out, where it can be seen that the shape of the funnel plot is asymmetrically distributed. This asymmetrical funnel plot distribution indicates that there is a potential for bias. Funnel plot has bias, right side 3 plots, left side 5 plots. The plot on the right side had a standard error between 2 and 5, and on the left side had standard error between 0 and 2.

Table 1. Assessment of study quality published by Critical Appraisal Skilss Program (CASP)

No	Indicator	Publication (Author and Year)								
		Ahmed et al. (2020)	Aryal et al. (2014)	Ahmed et al. (2020)	Aryal et al. (2014)	Ahmed et al. (2020)	Roble et al. (2020)	Sidani et al. (2019)	Skulberg et al. (2019)	Thakur et al. (2020)
1	Does this research clearly address the focused problem?	2	2	2	2	2	2	2	2	2
2	Was the group recruited in an acceptable way?	2	2	2	2	2	2	2	2	2
3	Is social support accurately measured to minimize bias?	2	2	2	2	2	2	2	2	2
4	Was the outcome (smoking habit) measured accurately to minimize bias?	2	2	2	2	2	2	2	2	2
5	Did the authors identify all the important confounding factors?	2	2	2	2	2	2	2	2	2
6	Was the subject follow-up complete enough? Was the follow-up of the subject long enough?	2	2	2	2	2	2	2	2	2
7	Are the results of this study reported in aOR?	2	2	2	2	2	2	2	2	2
8	What is the precision of the result?	2	2	2	2	2	2	2	2	2
9	Do you believe the results?	2	2	2	2	2	2	2	2	2
10	Can the results be applied to local residents?	2	2	2	2	2	2	2	2	2
11	Are the results of this study consistent with other available evidence?	2	2	2	2	2	2	2	2	2
12	What are the implications of this research for practice?	2	2	2	2	2	2	2	2	2
	Total	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**	**24**

Table 2. Description of Primary Research included in the Meta-Analysis

No	Author (Year)	Country	Study Design	Sample	Population (P)	Intervention (I)	Comparison (C)	Outcome (O)	aOR (95 % CI)
1	Ahmed et al. (2020)	Bangladesh	Cross-sectional	355	Male/ female age 18–26 years	Friend smoking status	No Friend smoking status	Smoking behavior	2.40 (1.5 to 3.64)
2	Aryal et al. (2014)	Sweden	Cross-sectional	352	Male/ female age 14–16 years	Friend smoking status	No Friend smoking status	Smoking behavior	2.14 (1.13 to 4.04)
3	Hock et al. (2014)	Malaysia	Cross-sectional	2300	Male/ female age 13-16 year	Friend smoking status	No Friend smoking status	Smoking behavior	2.22 (1.38 to 3.54)
4	Hwang and Park (2016)	Korea	Cross-sectional	65753	Male/ female age 13-18 years	Friend smoking status	No Friend smoking status	Smoking behavior	2.05 (1.82 to 2.3)
5	Liang et al. (2022)	Taiwan	Cross-sectional	27,524	male/ female age 12-18 years	Friend smoking status	No Friend smoking status	Smoking behavior	8.51 (6.51 to 11.21)
6	Roble et al. (2020)	Ethiopia	Cross-sectional	341	male/ female age 10-19 years	Friend smoking status	No Friend smoking status	Smoking behavior	4.78 (2.12 to 1.76)
7	Sidani et al. (2019)	USA	Cross-sectional	3131	Male/ female age 18-30 years	Friend smoking status	No Friend smoking status	Smoking behavior	0.77 [(0.42 to 1.43)
8	Skulberg et al. (2019)	Indonesia	Cross-sectional	291	Male/ female age 13-15 years	Friend smoking status	No Friend smoking status	Smoking behavior	5.20 (1.6 to 16.5)
9	Thakur et al. (2020)	North India	Cross-sectional	720	Male/ female age 14-19 years	Friend smoking status	No Friend smoking status	Smoking behavior	4.90 (2.5 to 9.5)

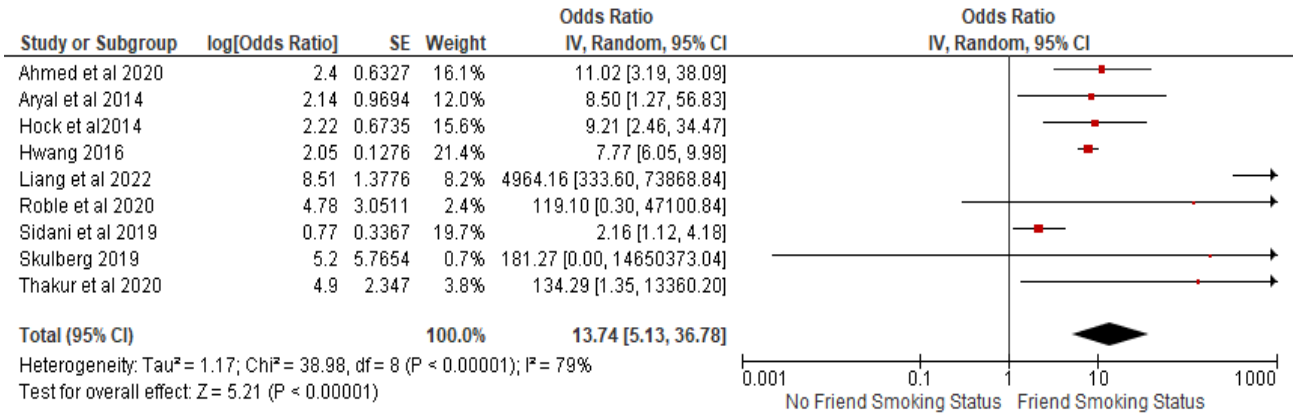

Figure 4. Forest plot of the Effect of Smoking Friends on Smoking Habits

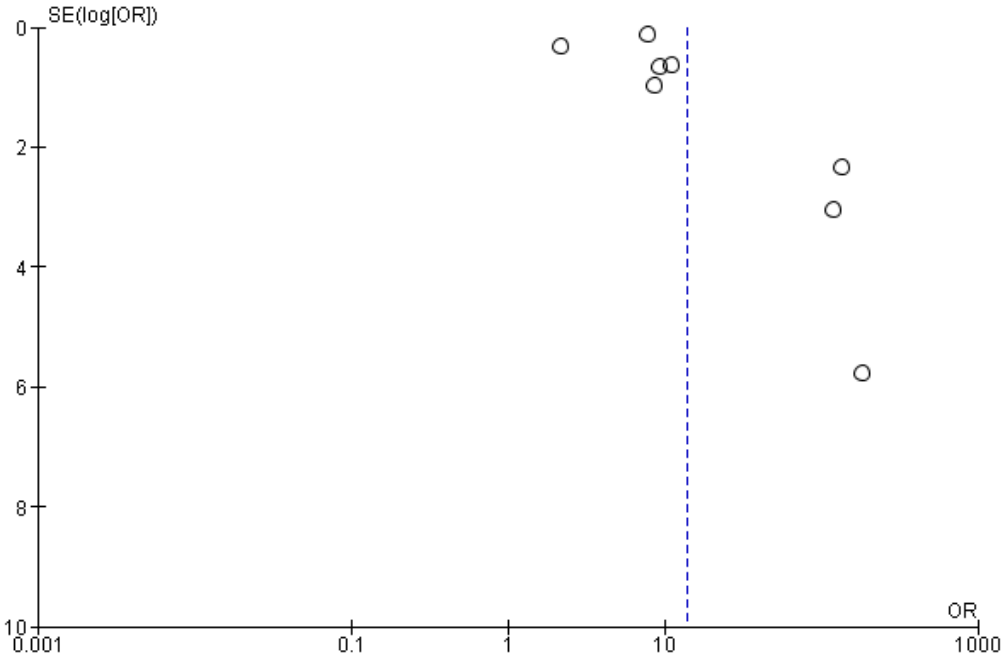

Figure 4. Funnel plot the Effect of Smoking Friends on Smoking Habits

DISCUSSION

This systematic research study and meta-analysis explains the influence of smoking friends on smoking habits. This study discusses the influence of smoking friends which is considered important because it is one of the risk factors for a person to have a smoking habit (Sidani et al., 2018).

Smoking was found to be prevalent among male students aged 13 to 15 years in Pulau Weh, Indonesia, significantly higher in students attending rural schools compared to those attending urban schools. Indonesia should take steps to remedy the smoking epidemic among youth in various ways, for example, minimizing access to tobacco products,

Tighter enforcement of tobacco control laws and changing attitudes towards smoking (Skulberg et al., 2019).

Research Vitória et al. (2014) mention that smoking in vulnerable adolescents is prevalent in a Nepalese peri-urban community. Several family and childhood environmental factors increase susceptibility to smoking among non-smoking Nepalese

adolescents. Intervention efforts need to be focused on the family environment and childhood. factors with an emphasis on the impact of smoking role models, rejection skills in social gatherings, and discussing the harmful effects of smoking with family members and during gatherings with friends.

The study of Vitória et al. (2014) found that, as the number of smokers in the vicinity increased, smoking rates among adolescents increased, and there was a tendency to vary according to social status. Educators and policy makers should use various approaches considering social environmental factors in smoking prevention programs and smoking cessation education for adolescents.

The current smoking rate is 13.3% for boys and 4.1% for girls. It was significantly higher in those with higher exposure to secondhand smoke. With similar current smoking status, higher exposure to secondhand smoke, smoking any family member, more smoking friends, and witnessing smoking at school were associated with current e-smoking status in both sexes (Aryal et al., 2014).

Teacher smoking during school hours is associated with adolescent smoking. This finding has implications for future tobacco prevention strategies in schools in many countries with liberal smoking policies where it can provide support for those working to establish smoke-free schools (Roble et al., 2021).

Vitória et al. (2014) provide support for the need for interventions to limit adolescents from adopting this habit and becoming customers of other tobacco industry addictions. Parents who smoke should quit this habit, which will not only restore their own health, but also protect their children. All parents should be advised to carefully observe their children's leisure activities.

The study of Hock et al. (2014) found that the prevalence of intention to start smoking was low among non-smokers while the majority of current smokers intended to quit smoking in the future. Existing anti-smoking programs that integrate the factors identified in the current study should be undertaken to reduce the prevalence of intention to start smoking and increase intention to quit smoking among adolescents.

As explained above that having smoking friends can contribute to the increased risk of having a smoking habit in adolescents (aOR= 13.74; 95% CI= 5.13 to 36.78); $p<0.001$). The meta-analysis of 9 articles used a cross-sectional observational study design approach with I^2= 79%. The limitation of this research is the language because it only uses English articles and the search uses only four databases.

AUTHOR CONTRIBUTION

Asri Wahyu Azzahro and Anse Putra were the main researchers who chose topics, searched and collected research data, analyzed data, and wrote research manuscripts. Isna Nur Rohmah as research companion.

FUNDING AND SPONSORSHIP

This study is self-funded.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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