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Application of Social Cognitive Theory on Factors Related to Alcohol Consumption in Adolescents: Meta-Analysis

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ABSTRACT

Background: Alcoholic drinks are all types of drinks that contain ethanol. In several countries, alcohol is a drink that is easy to obtain, so it tends to be abused a lot. Continuous alcohol consumption can lead to alcohol dependence. The purpose of this research is to analyze the application of social cognitive theory about the factors that influence alcohol consumption in adolescents.
Subjects and Method: The meta-analysis was carried out using the PRISMA flowchart and the PICO model. Population: Teenagers. Intervention: anxiety, drinking parents and drinking friends. Comparison: No anxiety, no drinking parents, and no drinking friends. Outcome: Consumption of alcoholic beverages. The online databases used are: PubMed, Google Scholar, Science Direct, and Scopus with the keywords “factors associated” AND “alcohol consumption” AND “anxiety” OR “parents alcohol consumption” OR “peers alcohol consumption” AND “adolescents” AND " cross-sectional." The inclusion criteria for this study were complete articles using cross-sectional research, published years from 2013-2023. Data analysis used RevMan 5 software.
Results: A total of 16 cross-sectional studies from several countries namely Ethiopia, Canada, United States, Taiwan, South Africa, Buthan, Myanmar, Uganda, Thailand, Zambia, Brazil, Ghana, and Iran were selected for systematic review and meta-analysis. The results of the meta-analysis showed that adolescents with anxiety had the possibility of consuming alcohol 1.57 times higher than adolescents who were not anxious (aOR= 1.57; 95% CI= 1.30 to 1.89; p< 0.001), adolescents whose parents drank had a probability of consuming alcohol 1.53 times higher than adolescents whose parents do not drink (aOR=1.53; 95%CI= 1.23 to 1.89; p= 0.001), adolescents whose friends drink have the possibility of consuming alcohol 2.63 times higher than adolescents whose friends are not drinkers (aOR=2.63 ; 95%CI= 1.59 to 4.35; p= 0.002).
Conclusion: Teenagers with anxiety, have drinking parents, and have drinking friends are more likely to consume alcohol.

Keywords: social cognitive theory, anxiety, drinking parents, alcohol consumption, teenagers.

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BACKGROUND

Alcoholic drinks are all types of drinks that contain ethanol or commonly called grain alcohol. In several countries, alcohol is a drink that is easy to obtain, so it tends to be abused a lot. Continuous alcohol consumption can lead to alcohol dependence. In 2020, the World Health Organization (WHO) reported that 3 million deaths each year are attributable to alcohol use, accounting for 5.3% of all deaths globally, and 13.5% of deaths among people aged 20–39 years are caused by alcohol (Dorji et al., 2020).

Increased consumption of alcohol also occurred in Indonesia. Based on data from the 2018 Basic Health Research (Riskesdas) conducted by the Indonesian Ministry of Health, the prevalence of alcohol consumption in Indonesia is 2.9%. This prevalence is higher in males (5.8%) than females (0.1%).

The results of the 2015 PUSLITBANG data also found 17.93% of adolescents consuming alcohol from the 11,110 adolescent population with details of 14.38% being male youth and 3.55% being female adolescents (Sandi et al., 2021). According to WHO, in Indonesia, the age limit for adolescents is divided into three categories based on age ranges, namely early adolescence aged 10-14 years, middle adolescence aged 15-17 years and late adolescence: aged 18-19 years. Based on research by Latyani et al. (2020), a teenager has a high curiosity and always wants to try new things, not infrequently they try negative things such as smoking, consuming alcohol and falling into drugs and free sex.

In the short term, excessive alcohol consumption can cause drunkenness and poisoning (Maula and Yuniastuti, 2017). In addition, alcohol use is associated with other direct and indirect long-term effects such as liver disease and obesity especially among men (Kabwama et al., 2021).

According to Butler et al. (2019) adolescents who have anxiety disorders have the possibility of consuming alcohol 0.57 times higher than adolescents who do not have anxiety disorders. This is because teenagers can imitate the behavior of adults around them in overcoming anxiety. Teenagers who experience anxiety may think that alcohol can help them relieve anxiety, even though in reality alcohol consumption only has temporary and short-term effects. This can influence adolescents' decision to consume alcohol.

In a study by Kabwama et al. (2021), male adolescents in Kampala, Uganda whose parents/guardians consumed alcohol were 2.24 times more likely to consume alcohol compared to adolescents whose parents/guardians did not consume alcohol. This is because teenagers tend to imitate the behavior of their parents, including the behavior of consuming alcohol. If parents frequently consume alcohol in the presence of adolescents, then adolescents may perceive it as an accepted behavior and become more likely to imitate it. The family is the closest social environment, so it is hoped that it can help control and shape behavior to carry out health behaviors (Islami et al., 2021).

According to Luecha et al. (2022) adolescents who directly observe their peers drinking alcohol have a 4.21 higher probability of consuming alcohol compared to adolescents who do not directly observe their peers consuming alcohol. Studies show that teens tend to imitate the behavior of their peers when it comes to alcohol consumption, especially if they perceive their group as "popular" or want to be accepted within it. Therefore, adolescents are influenced both directly by friends who offer alcohol and change their perceptions to make underage drinking behavior appear acceptable.

Social cognitive theory has a concept that fits the research topic. The concept is reciprocal determinism which means that human behavior and the environment interact and influence each other which leads to a change in behavior, including the behavior of consuming alcohol.

The results of various studies stating that there is an influence between social cognitive theory models in alcohol consumption, have prompted researchers to conduct a meta-analysis. This study aims to analyze previous primary studies in assessing the influence of alcohol consumption factors, namely personal factors (anxiety) and environmental factors which include the influence of drinking parents and drinking friends.

SUBJECTS AND METHOD

1. Study Design

Meta-analysis was performed using the PRISMA flowchart using the PubMed, Google Scholar, Science Direect, and Scopus databases published from 2013 to 2023. The keywords used were “Factors associated" AND "Alcohol consumption" AND "Anxiety" OR "Parents alcohol consumption” OR “Peers alcohol consumption” AND “Adolescents" AND "Cross sectional". There were 16 studies with cross-sectional design that met the inclusion criteria. Analysis was performed with Rev-Man 5.3 software".

2. Step of Meta-Analysis

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

1) Formulate research questions in the PICO format (Population, Intervention, Comparison, Outcome). P = Youth; I= Anxiety, drinking parents, Drinking friends; C = No anxiety, No drinking parents, No drinking friends; O = Consumption of alcohol.
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

Full paper article with cross sectional observational study. The research subjects were teenagers, the interventions given were teenagers with anxiety, teenagers who had drinking parents, and teenagers who had drinking friends. The outcome analyzed was alcohol consumption. The relationship size used was the adjusted odds ratio.

4. Exclusion Criteria

Statistical results reported in the form of bivariate analysis, articles published before 2013, articles published in languages other than English.

5. Operational Definition of Variables

Anxiety is a discrepancy between the desired situation and the biological, psychological state of the individual which causes feelings that arise in the individual due to the situation or condition of fear/worry/anxiety.

Drinking parents is an act of parental behavior that can be observed either directly or indirectly includes the use of alcoholic beverages.

Drinking friends is a friend's behavior that can be observed either directly or indirectly includes the use of alcoholic beverages.

6. Data Analysis

Data analysis using RevMan 5.3. Forest plots and funnel plots are used to determine the size of the relationship and the heterogeneity of the data. The fixed effect model is used for homogeneous data, while

the random effect model is used for heterogeneous data across studies.

RESULTS

The article search process is carried out through several journal databases which include PubMed, Google Scholar, Science Direct, and Scopus. The article review process can be viewed at PRISMA flow diagram in Figure 1.

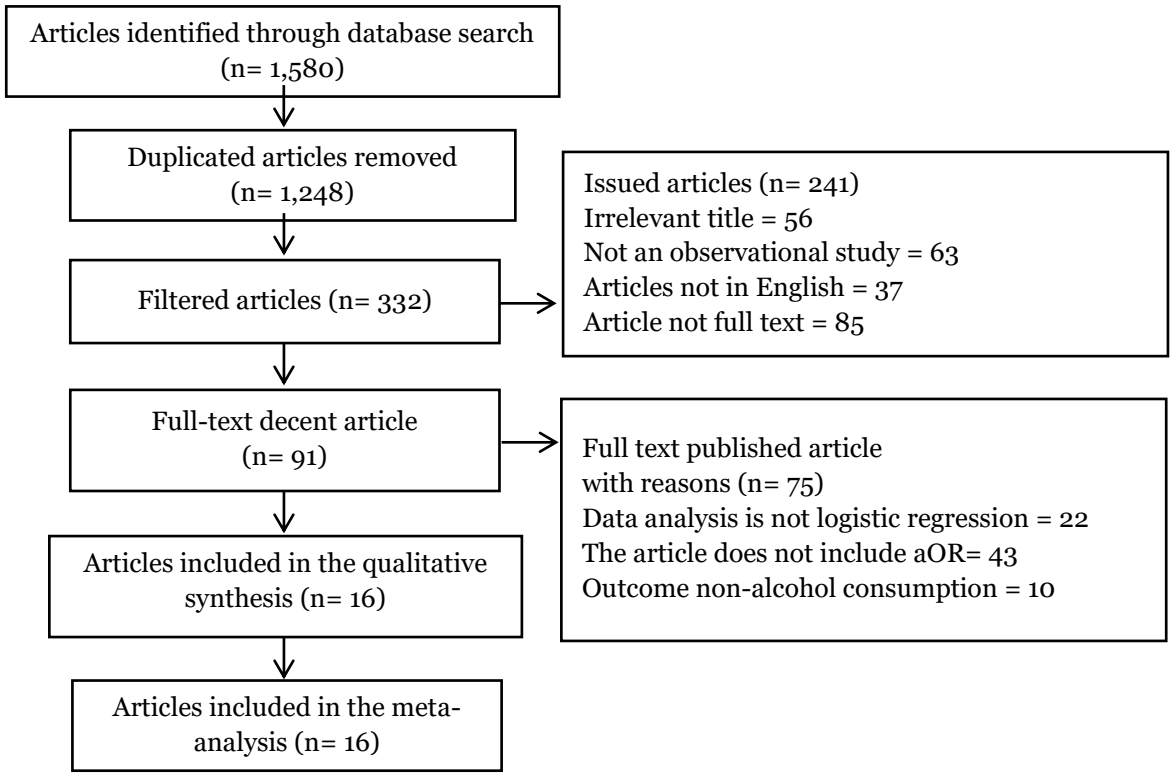

Figure 1. Results of PRISMA Flow Diagrams

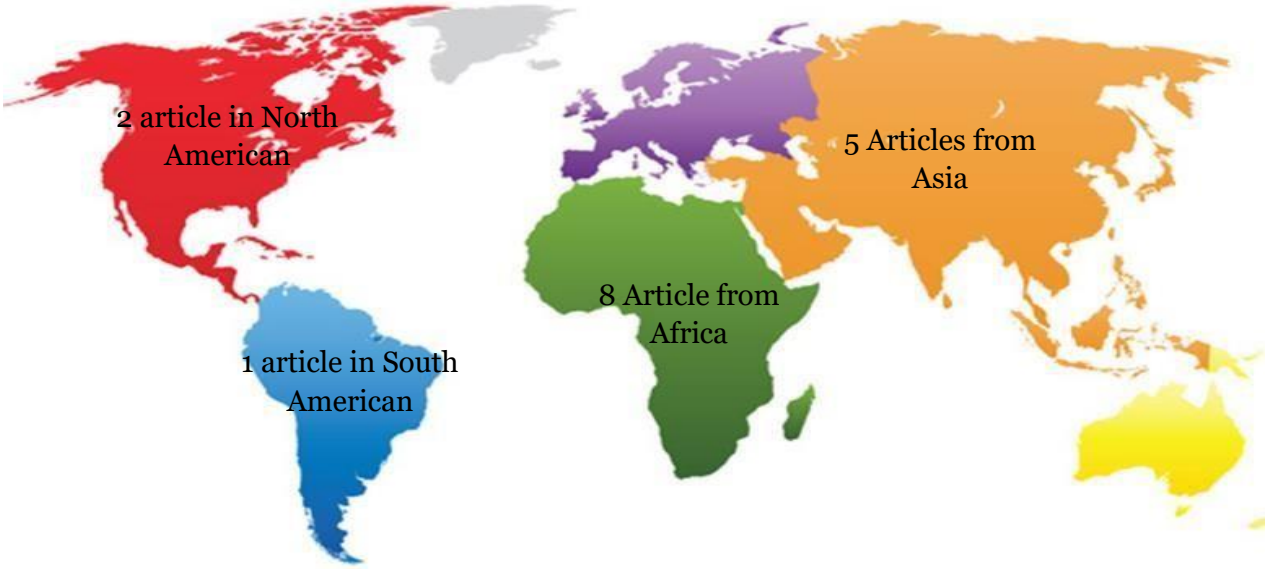

Figure 2. Research Distribution Map on the influence of anxiety, drinking parents, and drinking friends

Research related to the application of social cognitive theory on the factors that influence alcohol consumption consists of 16 articles. The initial search process yielded 1,580, after the deletion process 332 articles were obtained, of which 91 met the requirements for further full-text review, 16 articles that met the quality assessment were included in the quantitative synthesis meta-analysis.

It can be seen in Figure 2 that research articles come from 4 continents namely North America (Canada, United States of America) South America (Brazil), Africa (Ghana, Ethiopia, South Africa, Zambia), and Asia (Iran, Bhutan, Taiwan, Myanmar, Thailand).

Figure 2 shows an overview of the study area used in this meta-analysis that spread across 3 continents, namely Asia, Africa, and Europe. There were 7 articles at the end of the review process that met quantitative needs. All articles used cross-sectional studies.

Table 1. The Quality Assessment Result of Articles with a Cross-Sectional Study using CEBM.

Primary Study	Criteria							
	1	2	3	4	5	6	7	Total
Aboagye *et al.* (2021)	2	2	2	2	2	2	2	14
Asante *et al.* (2019)	2	2	2	2	2	2	2	14
Asfaw *et al.* (2022)	2	2	2	2	2	2	2	14
Baheiraei *et al.* (2013)	2	2	2	2	2	2	2	14
Boka *et al.* (2021)	2	2	2	2	2	2	2	14
Butler *et al.* (2019)	2	2	2	2	2	2	2	14
Chen *et al.* (2017)	2	2	2	2	2	2	2	14
Chen *et al.* (2022)	2	2	2	2	2	2	2	14
Conway *et al.* (2017)	2	2	2	2	2	2	2	14
Dorji *et al.* (2020)	2	2	2	2	2	2	2	14
Htet *et al.* (2020)	2	2	2	2	2	2	2	14
Kabwama *et al.* (2021)	2	2	2	2	2	2	2	14
Luecha *et al.* (2020)	2	2	2	2	2	2	2	14
Mekuria *et al.* (2016)	2	2	2	2	2	2	2	14
Siwale *et al.* (2019)	2	2	2	2	2	2	2	14
Zuquetto *et al.* (2019)	2	2	2	2	2	2	2	14

Description of the question criteria:

1. Is the population in the primary study the same as the population in the PICO meta-analysis??
2. method for selecting research subjects:
   - Descriptive cross-sectional study (prevalence): Is the sample randomly selected?
   - Analytical cross-sectional study: Are samples randomly or purposively selected?
3. Methods for measuring comparisons (intervention) and outcome variables:
   - Are both exposure/intervention and outcome variables measured with the same instruments in all primary studies?
   - If variables are measured on a categorical scale, are the cut-offs or categories used the same across primary studies?
4. Bias of the design:
   - How much is the response rate?

- Is non-response related to outcomes?

5. Methods to control confounding:
   - Is there any confusion in the results / conclusions of the primary study?
   - Have primary study researchers used appropriate methods to control the effects of confusion?
6. Method of statistical analysis:
   - In the cross-sectional study, is multivariate analysis performed?
   - 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. PICO table summary of cross-sectional articles on the effect of anxiety on alcohol consumption.

Author (years)	Country	Sample	P	I	C	O
Asfaw et al. (2022)	Ethiopia	523	Student	Anxiety	No anxiety	Alcohol consumption
Boka et al. (2021)	Ethiopia	423	Student	Social anxiety	No social anxiety	Alcohol consumption
Butler et al. (2019)	Canada	6,570	Grade 9-12 students	Anxiety	No anxiety	Alcohol consumption
Conway et al. (2017)	The USA	10,123	Teenagers aged 13-18 years	Anxiety	No anxiety	Alcohol consumption
Mekuria et al. (2016)	Ethiopia	386	High school student	Social fobia	No social fobia	Alcohol consumption

Table 3. aOR and 95% CI data the effect of anxiety on alcohol consumption.

Author (year)	aOR	95% CI	
		Lower Limit	Upper Limit
Asfaw et al. (2022)	1.50	0.94	2.21
Boka et al. (2021)	1.66	1.09	2.53
Butler et al. (2019)	0.66	0.20	2.16
Conway et al. (2017)	1.58	1.22	2.06
Mekuria et al. (2016)	1.75	1.03	2.98

Forest plot Figure 3 shows that there is an effect of anxiety on alcohol consumption and this effect is statistically significant. Adolescents with anxiety are 1.57 times more likely to consume alcohol than adolescents who are not anxious (aOR= 1.57; 95% CI= 1.30 to 1.89; p< 0.001). This meta-analysis showed a homogeneous variation in effect estimates (I^2= 0%; p=0.68). Thus, the calculation of effect estimation is carried out using the fixed effect model. The funnel plot shows there is no publication bias.

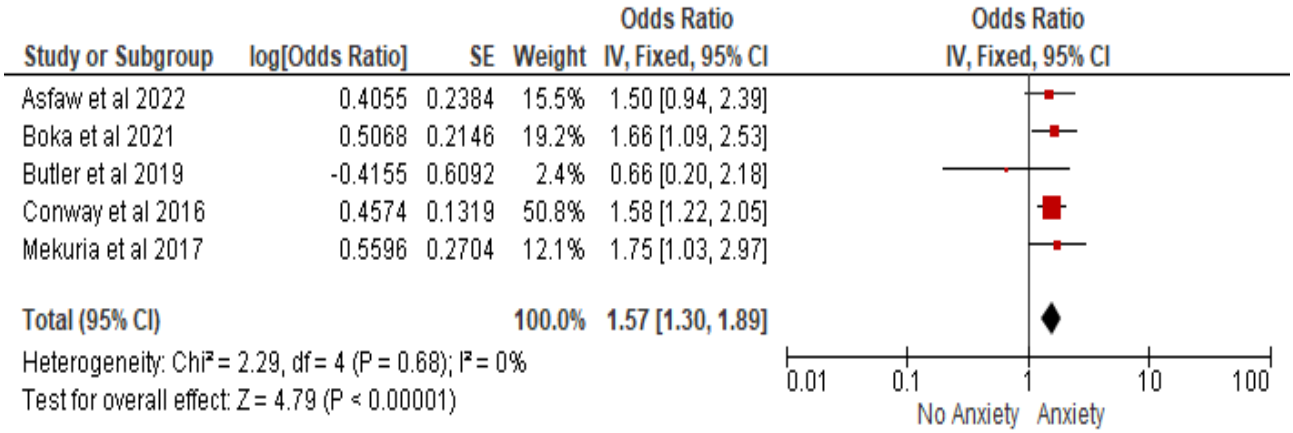

Figure 3. Forest plot of the effect of anxiety on alcohol consumption

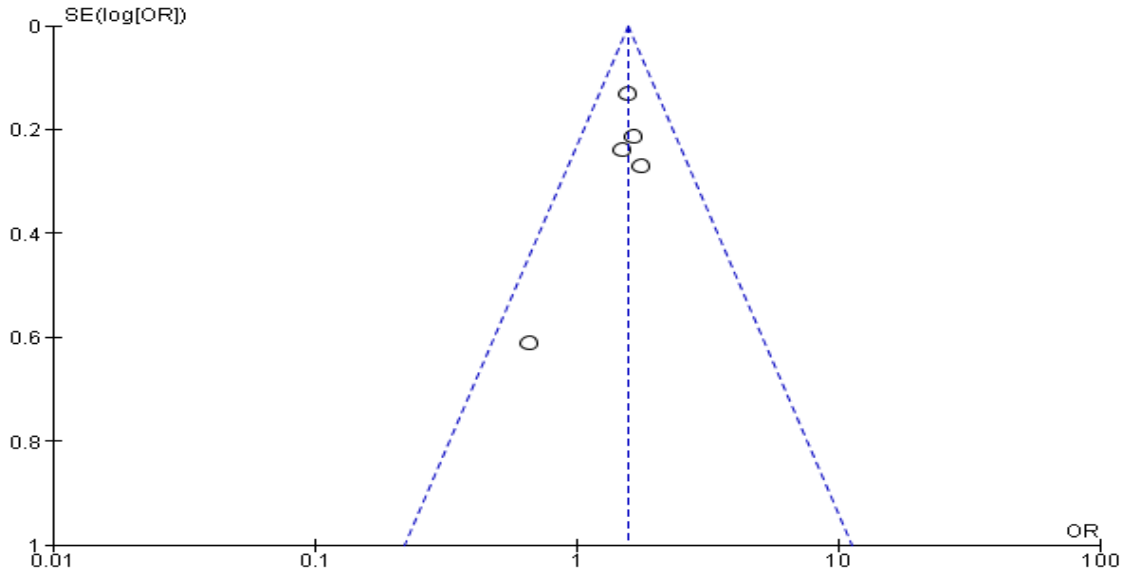

Figure 4. Funnel plot of the effect of anxiety on alcohol consumption

The funnel plot in Figure 4 shows a symmetrical distribution of effect estimates. The distribution or distribution of effect estimates to the right of the average vertical line is relatively the same as the distribution of effect estimates to the left. Thus this funnel plot indicates that there is no publication bias.

Table 4. Table PICO summary of cross-sectional articles on the effect of parental drinking on alcohol consumption

Author (years)	Country	Sample	P	I	C	O
Chen et al. (2017)	Taiwan	1,926	Grade 7-11 students	Drinking parents	Parents are not drinkers	Alcohol consumption
Chen et al. (2022)	south Africa	4,016	Health student	Have drinking parents	Did not have drinking parents	Alcohol consumption
Dorji et al. (2020)	Buthan	432	Student	Have drinking friends	Has no drinking friends	Alcohol consumption
Htet et al. (2020)	Myanmar	3,456	Students aged 15-24 years	Parent or guardian consuming alcohol	Parents or guardians do not consume	Alcohol consumption
Kabwama et al. (2021)	Uganda	2,500	Youth aged 10-24 years	Parents or guardians drink alcohol	Parents or guardians do not drink	Alcohol consumption
Luecha et al. (2020)	Thailand	9,509	Teens aged 10-14 years	Parents drink alcohol	Parents don't drink	Alcohol consumption
Siwale et al. (2019)	Zambia	357	Grade 8-11 students	Parents consume alcohol	Parents do not consume alcohol	Alcohol consumption
Zuquetto et al. (2019)	Brazil	17,028	Age 13-18 years	Drinking parents	Parents don't drink	Alcohol consumption

Table 5. Adjusted Odds Ratio (aOR) and 95% CI data on the effect of drinking parents on alcohol consumption.

(Author, year)	aOR	95% CI	
		Lower Limit	Upper Limit
Chen et al. (2017)	0.86	0.06	1.13
Chen et al. (2022)	4.56	2.06	10.09
Dorji et al. (2020)	1.75	1.02	3.01
Htet et al. (2020)	1.40	1.20	1.80
Kabwama et al. (2021)	2.24	1.38	3.64
Luecha et al. (2020)	1.18	0.86	1.62
Siwale et al. (2019)	1.76	1.39	2.23
Zuquetto et al. (2019)	1.56	1.31	1.87

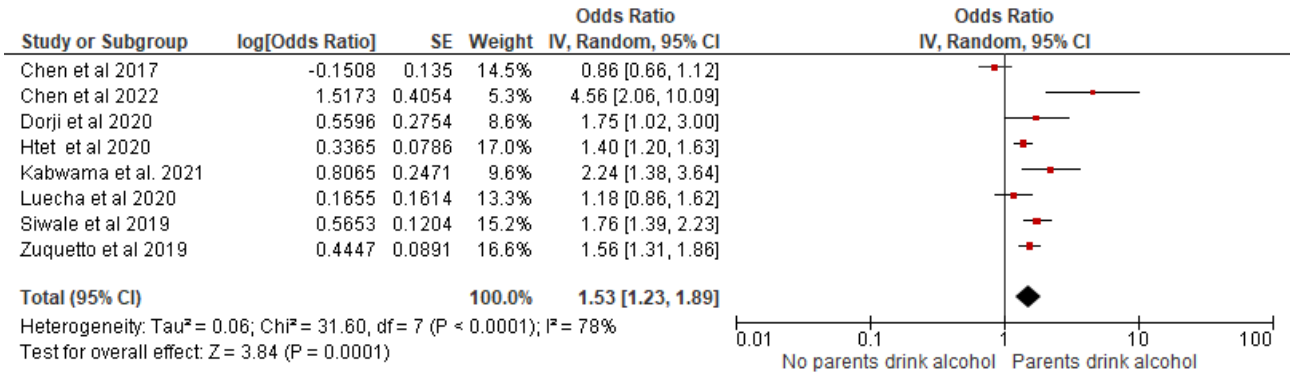

Figure 5. Forest plot of the influence of drinking parents on alcohol consumption.

Forest plot Figure 5. shows that there is an influence of drinking parents on alcohol consumption and this effect is statistically significant. Adolescents whose parents drink are 1.53 times more likely to consume alcohol than adolescents whose parents are non-drinkers (aOR= 1.53; 95% CI= 1.23 to 1.89; p=0.001). The forest plot in Figure 5 shows heterogeneous variations in effect estimates (I^2= 78%; p< 0.001). Thus the calculation of the average effect estimate is carried out using the random effect model approach.

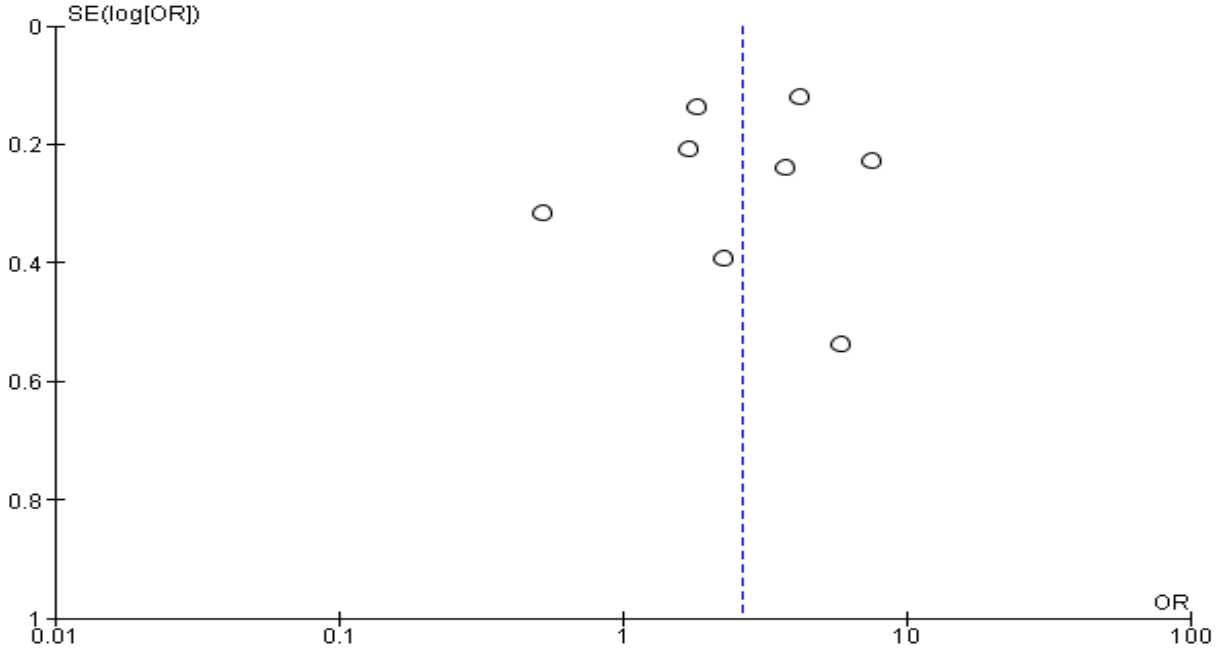

Figure 6. Forest plot of the influence of drinking parents on alcohol consumption.

The funnel plot in Figure 6 shows a symmetrical distribution of effect estimates. Thus this funnel plot indicates that there is no publication bias.

Table 6. PICO table summary of cross-sectional articles on the influence of drinking friends on alcohol consumption.

Author (years)	Country	Sample	P	I	C	O
Aboagye et al. (2021)	Ghana	418	Student	Peers influence	Peers do not influence	Alcohol consumption
Asante et al. (2019)	Ghana	1,984	Teens aged 11-19 years	Drinking friends	Close friends don't drink	Alcohol consumption
Baheiraei et al. (2013)	Iran	1,201	Teenagers aged 15-18 years	Having friends consume alcohol	Do not have friends who consume alcohol	Alcohol consumption
Chen et al. (2017)	Thaiwan	1,926	Grade 7-11 students	Drinker's best friend	Best friends don't drink	Alcohol consumption
Dorji et al. (2020)	Buthan	432	Student	Drinking parents	Old people don't drink	Alcohol consumption
Htet et al. (2020)	Myanmar	3,456	Student aged 15-24 years	Parent or guardian alcohol consumption	Parents or guardians do not consume	Alcohol consumption
Luecha et al. (2020)	Thailand	9,509	Teens aged 10-14 years	Alcohol drinking friends	Non-drinking friends	Alcohol consumption
Zuquetto et al. (2019)	Brazil	17,028	Students aged 13-18 years	Drinker friend	Friends don't drink	Alcohol consumption

Table 7. Adjusted Odds Ratio (aOR) data on the influence of drinking friends on alcohol consumption

(Author, year)	aOR	95% CI	
		Lower Limit	Upper Limit
Aboagye et al. (2021)	3.70	2.31	5.82
Asante et al. (2019)	0.52	0.28	0.96
Baheiraei et al. (2013)	5.84	2.04	16.72
Chen et al. (2017)	1.70	1.13	2.56
Dorji et al. (2020)	2.26	1.05	4.87
Htet et al. (2020)	7.50	4.80	11.70
Luecha et al. (2020)	4.21	3.32	5.33
Zuquetto et al. (2019)	1.82	1.39	2.38

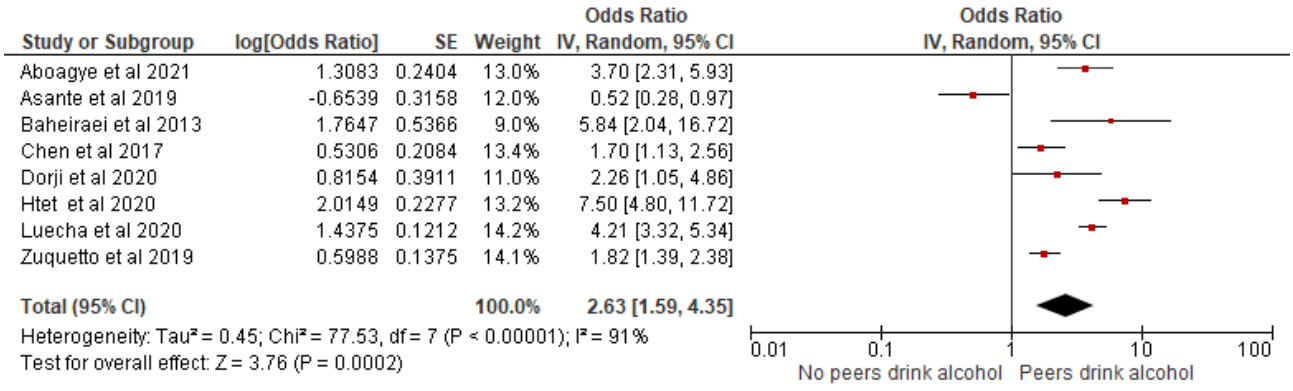

Figure 7. Forest plots of the influence of drinking friends on alcohol consumption.

Forest plot Figure 7. shows that there is an effect of drinking friends on the probability of consuming alcohol and this effect is statistically significant. Adolescents whose friends drink are 2.63 times more likely to consume alcohol than those whose friends are not drinkers (aOR= 2.63; 95% CI= 1.59 to 4.35; p= 0.002). The forest plot in Figure 7 shows variations in effect estimates with heterogeneity (I^2= 91%; p< 0.001). Thus the calculation of the average effect estimate is carried out using the random effect model approach.

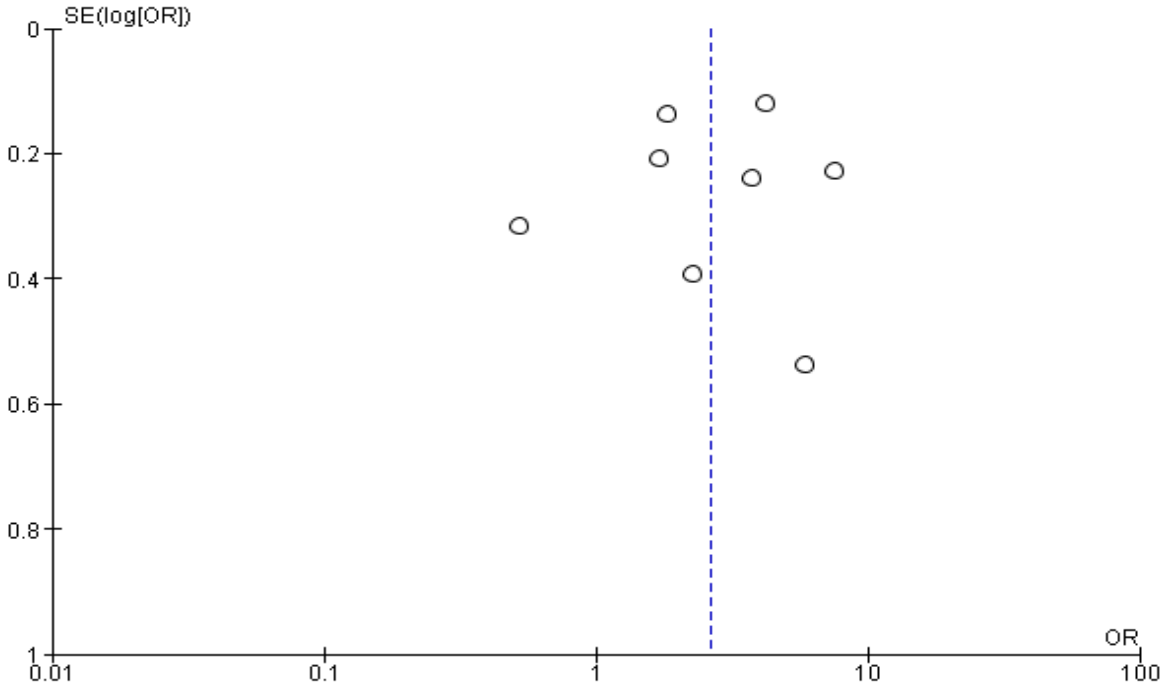

Figure 8. Funnel plots of the influence of drinking friends on alcohol consumption.

The funnel plot in Figure 8 shows a symmetric distribution of effect estimates. The distribution or distribution of effect estimates to the right of the average vertical line is relatively the same as the distribution of effect estimates to the left. Thus, this funnel plot indicates that there is no publication bias.

DISCUSSION

Social cognitive theory is a psychological theory that has been proven effective in understanding human behavior. Thus, researching the application of social cognitive theory in understanding the factors that influence alcohol consumption in adolescents is very important in efforts to reduce the problem of alcohol consumption in adolescents.

This systematic research study and meta-analysis raises the theme of the application of social cognitive theory about the factors that influence alcohol consumption in adolescents. The independent variable analyzed was alcohol consumption. Research that addresses alcohol consumption in adolescents is considered important because it is a serious health problem and can have a negative impact on mental and physical health, and can lead to behavioral problems such as accidents, violence and crime. Adolescents are a group that is

vulnerable to environmental and social influences in making decisions, so an understanding of the factors that influence their behavior in social contexts can help design interventions that are more effective, sustainable, and improve their health and well-being.

1. **The effect of anxiety on alcohol consumption**

A total of 5 cross-sectional observational research articles as a source of meta-analysis of the effect of anxiety on increased consumption of alcoholic beverages in adolescents. This study shows that the results of the analysis of adolescents who experience anxiety have a risk of increasing the behavior of consuming alcoholic beverages 1.57 times compared to adolescents who do not have anxiety (aOR = 1.57; 95% CI= 1.30 to 1.89; p< 0.001). The heterogeneity of the research data shows I2 = 0% so that the spread of the data is said to be homogeneous (fixed effect model).

This research is in line with the research by Mekuria et al. (2017) conducted among high school students in Ethiopia, with a total sample of 386 students who aimed to assess the prevalence and related factors of social phobia among high school students in Ethiopia. Students with social phobia have difficulty speaking in front of groups of people and fail or drop out of school because of fear. Students with social phobia tend to get involved in drinking and alcohol use problems. In this study it can be seen that anxiety can increase students' likelihood of consuming alcohol by 1.75 times (aOR= 1.75; 95% CI= 1.03 to 2.98; p= 0.001).

This is because alcohol consumption can be used as self-medication for students' fears and worries of negative evaluation by others. The link between anxiety and alcohol use is a function of alcohol as a form of self-medication in which individuals can manage their anxiety symptoms through its anxiolytic properties just as students believe that by consuming alcohol they can manage distress related to their concerns about negative evaluations from the supervision of others (Butler et al. , 2019).

2. **The effect of drinking parents on alcohol consumption**

There are 8 observational research articles with cross-sectional studies as a source of meta-analysis of the influence of drinking parents on alcohol consumption in adolescents. The results of the research article's forest plot show that adolescents whose parents drink alcohol are 1.53 times more likely to consume alcohol than adolescents who do not have parents who drink (aOR= 1.53; 95% CI= 1.23 to 1.89; p= 0.001). The heterogeneity of the research data shows I^2 = 78% so that the spread of the data is stated to be heterogeneous (random effect model).

In the concept of social learning theory put forward by Bandura it can be said that adolescents can learn to drink directly by observing the attitudes and consumption of alcohol by their parents and followed by imitating them. By observing their parents drink, adolescents form ideas about how they might drink, and over time this becomes embedded as coded information that will help them as a guide to drinking. This is because parents are important role models for their children. The indirect effects of parents' alcoholic drinking on their adolescent children can be explained using Bandura's social learning theory, which also states that environmental impacts on behavior are mediated through cognition. Adolescents receive environmental stimuli when they see their parents drinking alcohol and internalize related cognitions, leading to the promotion of alcohol consumption.

This is in line with research conducted by Siwale et al. (2019) showed that the involvement of parents who consume alcohol significantly influences attitudes towards alcohol consumption so that school adolescents with drinking parents have a positive tendency to consume alcohol. The results of another study by Luecha et al. (2021) showed that observations of parents who drank alcohol had a 1.18 times higher likelihood of consuming alcohol compared to observations of parents who did not drink alcohol in adolescents in Thailand. One possible explanation is that alcohol is kept easily accessible in the home, making it easy for teens to consume.

3. The effect of drinking friends on alcohol consumption

There are 8 observational research articles with cross-sectional studies as a source of meta-analysis of the influence of drinking friends on alcohol consumption in adolescents. The results of the forest plot of the research article show that adolescents who have friends who drink alcohol are 2.63 times more likely to have alcohol consumption habits than adolescents who do not have friends who drink alcohol are statistically significant (aOR= 2.63; 95% CI= 1.59 to 4.35; p< 0.001).

This is in line with research conducted by Luecha et al. (2018) conducted a survey involving 9,509 young people aged 10-14 in Chonburi Province, Thailand with the aim of research to examine the relationship between factors related to alcohol consumption. In this study, it was said that peer alcohol consumption behavior was ranked highest and was the most significant factor for developing drinking behavior in adolescents. This relationship can be explained by the fact that during adolescence, adolescents spend more time with their friends and experience things together. Therefore, adolescents are influenced both directly and indirectly by friends who offer alcohol and change their perceptions so that underage drinking behavior appears acceptable.

AUTHOR CONTRIBUTION

Hana Fathiya Dasairy as a researcher who selects topics, searches for and collects research data. Argyo Demartoto and Hanung Prasetya analyzed the data and reviewed research documents.

FUNDING AND SPONSORSHIP

This study is self-funded.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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