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Effects of Social Network, Social Trust, and Social Participation on Depression: A Meta-Analysis

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ABSTRACT

Background: An estimated 3.8% of the population is depressed, including 5% of adults (4% in men and 6% in women), and 5.7% of adults over the age of 60. Around 280 million people in the world are depressed (World Health Organization, 2023). Depression not only impairs functional abilities, lowers the quality of life, and increases the mortality rate of the elderly, but also poses a heavy economic burden on the elderly themselves, the community, and the health care system. This study aims to determine the effects of social network, social trust, and social participation on depression.
Subjects and Method: The meta-analysis study was carried out according to the PRISMA flowchart and the PICO model. Population: adults. Intervention: high social network, high social trust, and high social participation. Comparison: low social network, low social trust, and low social participation. Outcome: Depression. The basic data used involves Google Scholar, PubMed, BMC, ScienceDirect, and Springer Link. Multivariate analysis criteria that attach aOR values. Data analysis using the Review Manager 5.3 application.
Results: Seven primary studies were used to analyze trust with depression. Adults with high trust may lower depression 0.80 times compared with low trust (OR= 0.80; 95% CI = 0.76 to 0.83); p<0.001). Five primary studies were used to analyze social participants with depression. Adults with high social participation may reduce depression by 0.81 times compared to low social participants (OR= 0.81; 95% CI= 0.75 to 0.88; p<0.001). Four primary studies were used to analyze social networks with depression. Adults with high social networks may reduce depression by 0.62 times compared with low social networks (OR= 0.62; 95% CI= 0.57 to 0.68; p<0.001).
Conclusion: Social networks, social trust, and social participation reduce depression in adults.

Keywords: Social network, social trust, social participation, depression

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BACKGROUND

Depression is one of the most common mental disorders, and is expected to be a major cause of disease burden by 2030 globally (Gianfredi et al., 2021). An estimated 3.8% of the population experiences depression, including 5% of adults (4% in men and 6% in women), and 5.7% of adults

aged 60 years and older. Approximately 280 million people worldwide experience depression (WHO, 2023). Depression not only impairs functional ability, reduces quality of life, and increases mortality in the elderly, but also causes a heavy economic burden for the elderly themselves, society, and the health care system (Bai et al., 2020). Depression is often expressed by someone who has had a bad social experience and impaired social functioning. In addition, depression can also result in long-term behavioral changes by increasing social avoidance that impacts a person's work, such as social participation. Because people with depression are burdened with negative thoughts and have a lower drive to participate in social activities, they are at high risk for symptom recurrence, resulting in reduced self-love, life satisfaction, and quality of life (Yavuzer and Karatas, 2017).

Social issues substantially contribute to the development of depression, including a variety of things such as income inequality, gender and racial discrimination, violence, abuse, parental separation, child abuse, social conflict, and social isolation. Unpleasant social interactions on mental health, several studies have attempted to identify whether and which social personalities act as premorbid risk factors for depression vulnerability. Individual differences in social personality traits, such as high neuroticism, agreeableness, and extraversion or low concern for the welfare of others and low trust in others have been shown to predict future depressive states and symptoms, including pathological depression (Fermin et al., 2022).

Social trust is a cognitive social capital that refers to what people feel. It consists of individual and generalized/community trust and is a core component of social capital that is often considered the key or the best way to achieve these goals. A study in the UK showed that generalized trust is the only social capital variable that has a positive and highly significant relationship with psychological health (Fahmi et al., 2019).

Depressed patients with social network support are more likely to improve their performance while patients who lack social support will experience it gradually falling into social isolation and experiencing poor conditions. Patients often seek social support from their family, friends, and community members, but many of them keep their mental illness a secret to avoid labeling and discrimination related to depression. A survey of online depression communities showed that 41% of users thought that social support received from online communities was very helpful in treating their illness (Lu et al., 2021).

Social participation, compared to social exclusion/isolation, has been identified as an important social determinant of health. As people age, it becomes increasingly difficult for them to maintain active social networks, maintain existing relationships, and initiate new ones. Older adults often lack the opportunity to engage in social activities due to reduced physical and motor function, making them more susceptible to loneliness and isolation, which are then associated with depression and cognitive impairment (Guarnera et al., 2023).

Participation in social activities influences individuals' health-related behaviors which in turn can lead to better health and mental health outcomes. Health-related behaviors are important factors in the social participation-mental health relationship, participating in more social activities and having a stronger social network encourages individuals to engage in positive health-related behaviors, and this, in turn, improves health-related lifestyles and reduces the likelihood of experiencing health pro-

blems such as depression (Won and Kim 2020).

Based on the background description, a comprehensive review of various primary studies is needed on the effects of social trust, social networks, and social participation on depression in adults. This study aimed to estimate the effects of social trust, social networks, and social participation on depression in adults, with a meta-analysis of primary studies conducted by previous authors.

SUBJECTS AND METHOD

1. Study Design

This study is a systematic review and meta-analysis guided by the PRISMA flowchart. The databases used include Google Scholar, PubMed, ScienceDirect, and Springer Link. The search keywords were "adults" AND "social trust" AND "social network" AND "social participation" AND "depression" AND (multivariate OR "Adjusted Odds Ratio").

2. Step of Meta-Analysis

Meta-analysis is carried out in 5 stages as follows:

1) Formulate research questions using the PICO model.
2) Searching for articles on electronic databases used includes Google Scholar, PubMed, ScienceDirect, and others.
3) Determine inclusion and exclusion criteria from research articles and conduct critical assessments.
4) Collect primary research data and analyze data using Review Manager 5.3.
5) Interpreting results and concluding.

3. Inclusion Criteria

The inclusion criteria are: (1) The research article is in the form of a complete text paper with a cross-sectional study design (2) The association size used is the Adjusted Odds Ratio (aOR); (3) The subject of the study is an adult; (4) The interventions studied were high social network, high social trust, and high social participation; (5) The result obtained is depression.

4. Exclusion Criteria

Exclusion criteria are articles published in non-English languages and the statistical results not reported in logistic regression.

5. Operational Definition of Variable

Social Network: a social structure that consists of individuals or organizations that are interconnected through various types of bonds, such as friendship, family, or public interest. In the context of technology and the internet, this term also refers to online platforms that allow users to interact, share information, and establish relationships electronically.

Social Trust: believes in honesty, integrity, and reliability by others, as well as trust in individuals.

Social Participation: a mental and emotional drive (a person or group) that moves them to jointly achieve goals and take responsibility together.

Depression: is a mood disorder, a prolonged emotional condition that colors a person's thinking, feeling and behaving process

6. Study 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 the data processing were represented as [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 baseline data generated 1,150 potentially relevant articles. The PRISMA literature search flowchart along with the results is reported in Figure 1 based on the selection criteria, a total of 316 articles were identified for further full-text research. In the end, 8 articles were included for meta-analysis with cross-sectional studies. Furthermore, in Tables 1 and 2, the researcher assessed the quality of the research article.

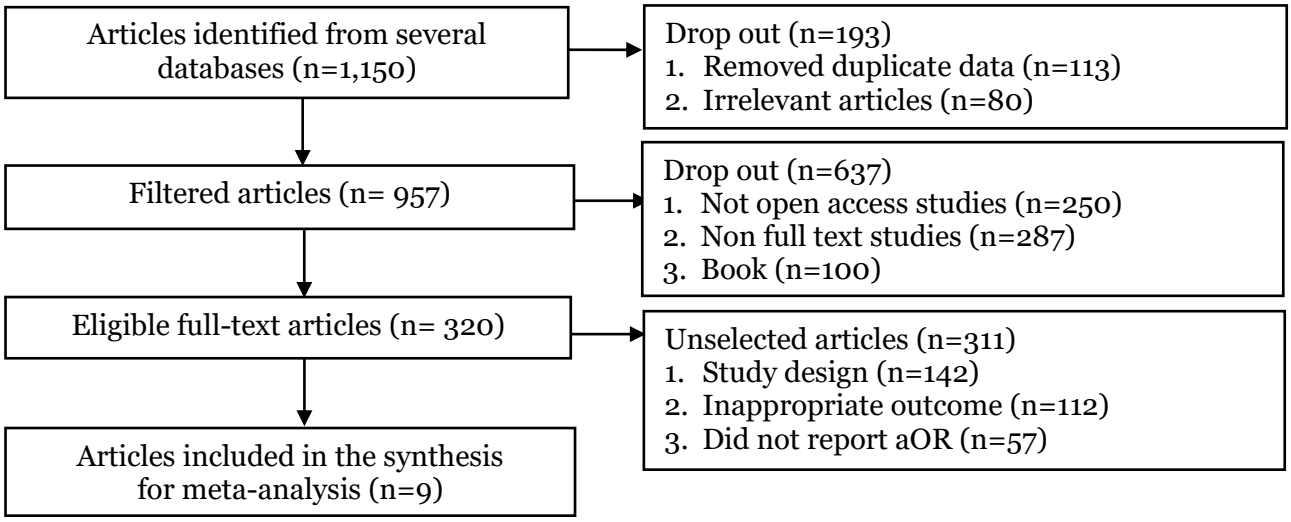

Figure 1. PRISMA flowchart effects of social networks, social trust, and social participation in depression

Figure 2. Location map of research on effects of social networks, social trust, and social participation in depression

Table 1. Critical appraisal for cross-sectional study of social netrowk, social trust, and social participant against depression

Primary Study	Criteria													Total
	1a	1b	1c	1d	2a	2b	3a	3b	4	5	6a	6b	7	
Wang et al. (2023)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Murayama et al. (2015)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Bai et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Han et al. (2018)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Basset and Moore (2013)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Han et al. (2018)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Cohen-Cline et al. (2015)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Fujiwara and Kawachi (2008)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Li et al. (2017)	2	2	2	2	2	2	2	2	2	2	2	2	2	26
Wang et al. (2023)	2	2	2	2	2	2	2	2	2	2	2	2	2	26

Description of the question criteria:

1. 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 exposure/ intervention in the primary study the same as the definition intended in the meta-analysis?

c. Are the comparisons used in the primary study the same as those planned in the meta-analysis?

d. Are the outcome variables studied in the primary study the same as those planned in the meta-analysis?

2. Methods for selecting research subjects.

a. In cross-sectional analytical studies, do researchers randomly select samples from the population (random sampling)?

b. Alternatively, if the cross-sectional analytical sample is not randomly selected, does the researcher select the sample based on outcome status or based on intervention status?

3. Methods for measuring interventions and outcome variables

a. Are exposures/interventions and outcome variables measured with the same instruments in all primary studies?

b. If the variables are measured on a categorical scale, are the cutoffs or categorical used the same between primary studies?

4. If the sample is not randomly selected, has the researcher made efforts to prevent bias in selecting the research subjects?

5. Whether the primary study researcher has made any effort to control the influence of confounding factors (e.g. conducting multivariate analysis to control the influence of several confounding factors)

6. Statistical analysis methods

a. Did the researcher analyze the data in this primary study with a multivariate analysis model.

b. Do primary studies report the size of the effect or the relationship between the results of the multivariate analysis?

7. Is there no possibility of conflict of interest with the research sponsor, which causes bias in concluding the research results

The assessment instructions are as follows:

1. The total answer score for each question is "2".
2. If in one question all answer items are "Yes", then give a score of "2" to the question.

3. If there is one item in one question whose answer is "No", then give the question a score of "1".
4. If in one question all the answer items are "No", then give the question a score of "0".

Table 2. PICO table summary of cross-sectional study of social netrowk, social trust, and social participant against depression used in the meta-analysis

Author (year)	Country	Sample	P	I	C	O
Wang et al. (2023)	China	15,428	Elderly people	Social Participation	Low Social Participation	Depression
Murayama et al. (2015)	Japan	6,416	Aged 65 and above	Strong General Trust	Weak General Trust	Depression
Bai et al. (2020)	China	1,810	Older people	High Social Participation	Low Social Participation	Depression
Han et al. (2018)	Tanzania	579	Men who have sex with men	High Trust	Low Trust	Depression
Basset et al. (2018)	China	4,983	Men who have sex with men (MSM) aged 18 and above	High Reciprocity	Low Reciprocity	Depression
Han et al. (2018)	Korea	5,969	Elderly people	High Inter-personal Trust	Low Inter-personal Trust	Depression
Cline et al. (2015)	Brazil	522	Men who have sex with men	High Reciprocity	Low Reciprocity	Depression
Bassett and Moore (2013)	Canada	2,624	Montreal neighborhood	High Generalized Trust	Low Generalized Trust	Depression
Fujiwara and Kawachi (2008)	American	1,888	Aged between 25 and 74 years	High Social Trust	Low Social Trust	Depression
Wang et al. (2023)	China	4,496	Men who have sex with men	High Community Participation	Low Community Participation	Depression
Hannah et al. (2018)	American	1,586	Adult twins	High General Trust	Low General Trust	Depression
Li et al. (2017)	China	1,248	60 years old and over	High Genera-lized Trust	Low Genera-lizad Trust	Depression
Han et al. (2018)	China	934	Men who have sex with men	High Reciprocity	Low Reciprocity	Depression
Seung-sup (2012)	Korea	16,694	Older people	High Reciprocity	Low Reciprocity	Depression

Table 3. Description of the primary study meta-analysis for the effect of social networks on depression

Author (Year)	aOR	95%Cl	
		Lower Limit	Upper Limit
Seung-sup (2012)	0.81	0.72	0.91
Li et al. (2017)	0.40	0.33	0.48
Han et al. (2018)	0.52	0.44	0.61
Bai et al. (2020)	0.30	0.11	0.82

Figure 3 presents a forest plot about the influence of social networks on the risk of depression in adults. Adults with a high social network may reduce the risk of depression by 0.52 times compared to low social participants (OR= 0.52; CI 95%= 0.35 to 0.78; p= 0.001). The forest plot also showed high heterogeneity, estimated effect

between studies (I^2= 93%). Thus, the average calculation of effect estimation uses the random effect model approach

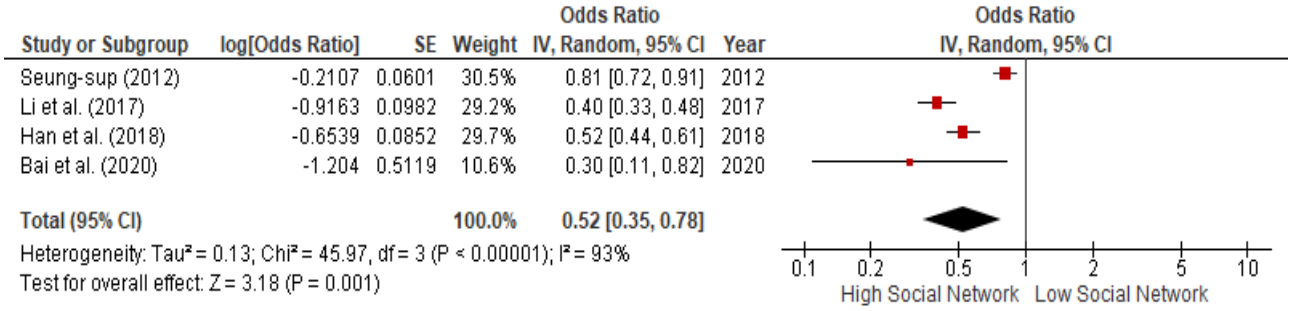

Figure 3. Forest plot of the effect of social networks on depression

Figure 4 illustrates a funnel plot showing the distribution of effect estimates across the included studies of social networks on depression. The data points are relatively not balanced on the right and left sides of the vertical line. This asymmetry in the funnel plot shows publication bias.

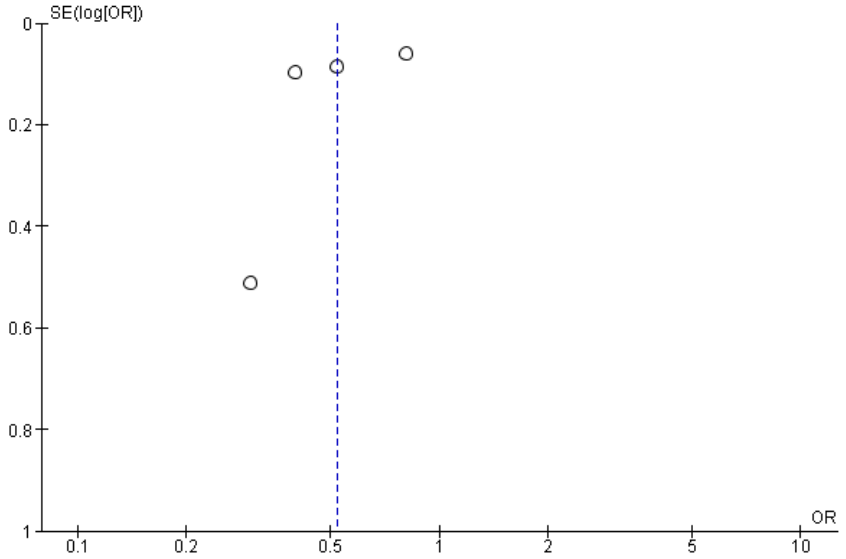

Figure 4. Funnel plot of the effect of social networks on depression

Table 4. Description of a meta-analysis primary study on the effect of social trust on depression

Author (Year)	aOR	95%CI	
		Lower Limit	Upper Limit
Fujiwara and Kawachi (2008)	1.11	0.58	2.12
Basset and Moore (2013)	0.68	0.53	0.87
Murayama et al. (2015)	0.53	0.43	0.65
Li et al. (2017)	0.46	0.36	0.59
Han et al. (2018)	0.69	0.59	0.81
Hannah et al. (2018)	0.85	0.81	0.89
Bai et al. (2020)	0.62	0.33	1.16

Figure 5 presents a forest plot about the effect of trust on the risk of depression in adults. Adults with high trust may lower the risk of depression by 0.66 times compared with low trust (OR= 0.66; CI 95%= 0.53 to 0.82; p<0.001). The forest plot also showed high heterogeneity and estimated effect between studies (I^2= 87%). Thus, the average calculation of effect estimation uses the random effect model approach.

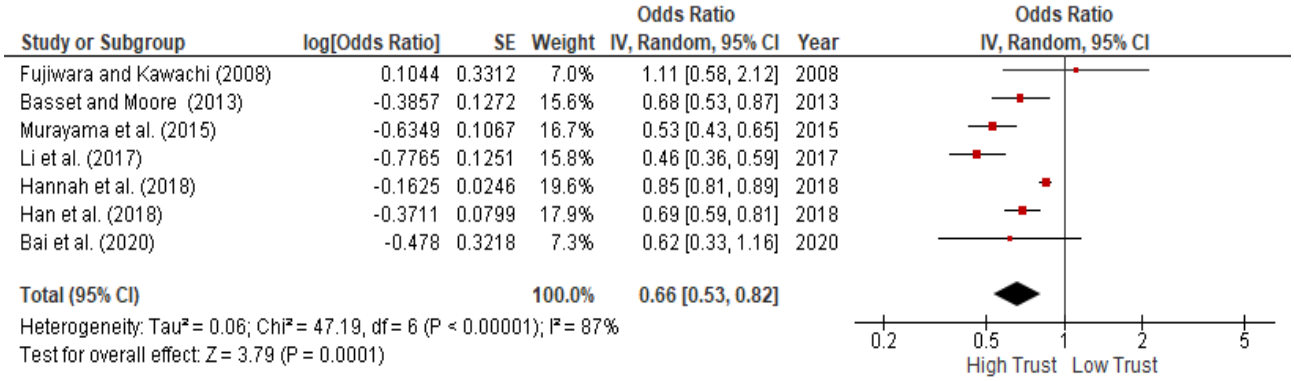

Figure 5. Forest plot of the effect of social trust on depression

Figure 6 illustrates a funnel plot showing the distribution of effect estimates across the included studies of social trust on depression. The data points are relatively not balanced on the right and left sides of the vertical line. This asymmetry in the funnel plot shows publication bias.

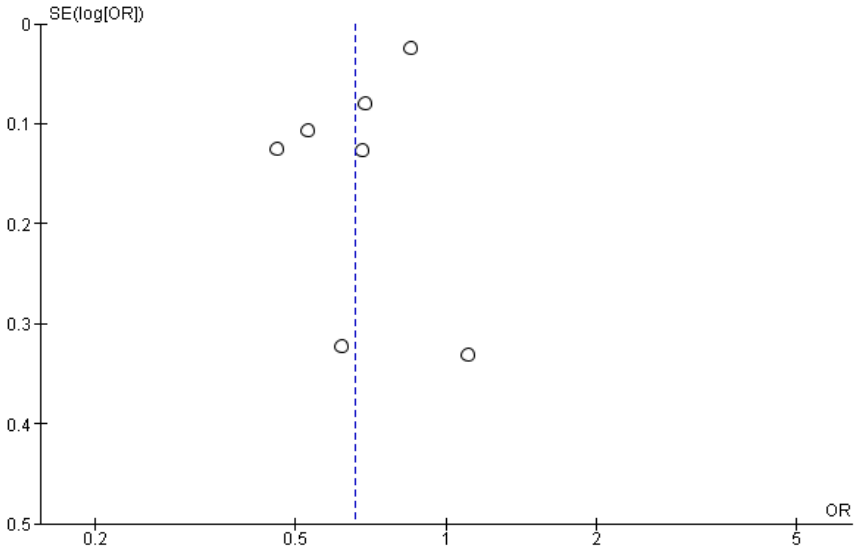

Figure 6. Funnel plot of the effect of social trust on depression

Table 5. Description of the primary study meta-analysis for men of the effect of social participation on depression

Author (Year)	aOR	95%Cl	
		Lower Limit	Upper Limit
Fujiwara and Kawachi (2008)	0.77	0.45	1.32
Basset and Moore (2013)	0.85	0.77	0.94
Li et al. (2017)	0.84	0.68	1.04

Author (Year)	aOR	95%CI	
		Lower Limit	Upper Limit
Fujiwara and Kawachi (2008)	0.77	0.45	1.32
Bai et al. (2020)	0.35	0.22	0.56
Wang et al. (2023)	0.79	0.68	0.92

Figure 7 presents a forest plot about the influence of social participants on the risk of depression in adults. Adults with high social participation may reduce the risk of depression by 0.75 times compared to low social participants (OR= 0.75; CI 95%= 0.63 to 0.90; p=0.002). The forest plot also showed high heterogeneity and estimated effect between studies (I^2= 71%). Thus, the average calculation of effect estimation uses the random effect model approach.

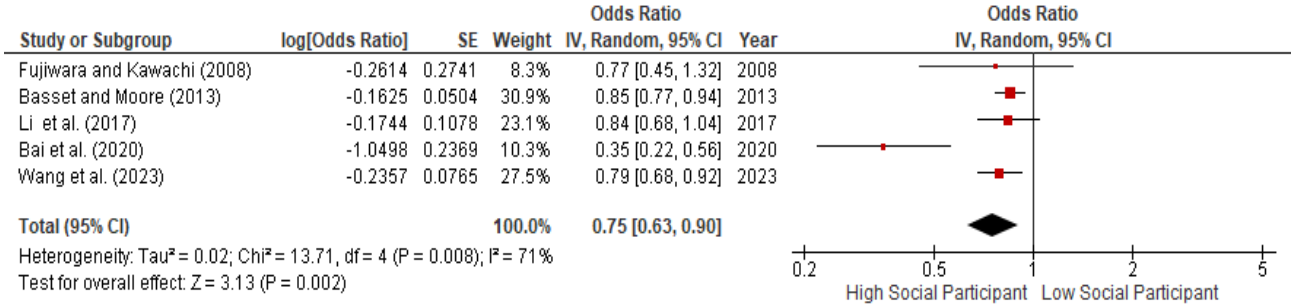

Figure 7. Forest plot of the effect of social participation on depression

Figure 8 shows the distribution of the estimated effect of social participants on the risk of depression. The plot funnel shows that the distribution of the effect estimates is balanced to the right and left of the average vertical line. Thus, the plot funnel does not show any publication bias.

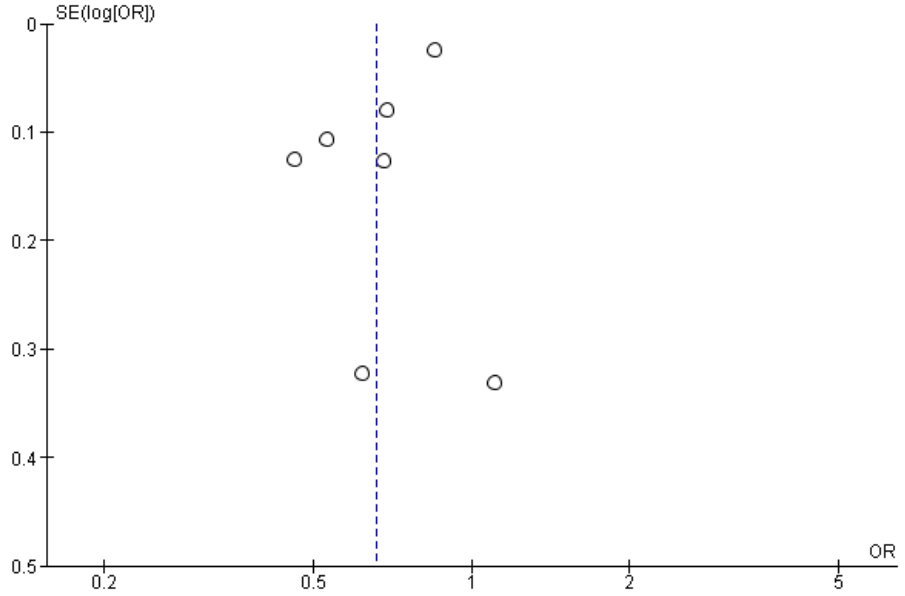

Figure 8. Funnel plot of the effect of social participation on depression

DISCUSSION

1. Social Trust and Depression

There are 7 articles from several countries used to measure the magnitude of the influence of social trust on depression. Each article has a study design, namely 3 cross-sectional studies. Studies have shown a strong link between social trust and depression. Data shows that high social trust can lower depression in adults.

One study conducted by Fujiwara and Kawachi (2008) found that the perception of social beliefs at the individual level was found to be associated with better physical health assessments, thereby reducing the rate of depression. In addition, the effect of social trust with depression is that those who have a high level of trust in others, those who trust their neighbors, and those who consider their environment to have a high level of cohesion are less likely to experience depressive symptoms (Bassett and Moore 2013). There is an interaction between bridging social capital and general trust at the environmental level among women, which suggests that women who live in environments with weaker bridging social capital and higher public trust are less likely to experience depressed moods.

Research shows that migrant seniors may experience a higher prevalence of depression and lower levels of social capital than urban older adults. Losses due to depression are partly due to low levels of social cognitive capital (trust and reciprocity). Interpersonal trust was found to be significantly associated with depressive symptoms in the elderly in a nationally representative sample of the Korean population (Han et al., 2018). Belief suggests that older people with higher social capital have a lower chance of experiencing depression Social Participation with Depression. Common beliefs and government beliefs showed a significant paired relationship in both unadjusted and adjusted models, with higher scores for both forms of trust associated with fewer depressive symptoms (Cohen-Cline et al., 2018).

2. Social Participation and Depression

There are 5 articles from several countries used to measure the magnitude of the influence of social participation on depression. The article uses a cross-sectional study. Studies have shown a strong link between social participation and depression. Data shows that high social participation can lower the rate of depression in adults.

The results of this study are in line with the research of Fujiwara and Kawachi (2008) found that a positive sense of belonging is related to one-item mental health actions, while a sense of belonging and community participation are also positively related to the number of depression. The difference in the relationship between social participation, trust, social cohesion, and network action with depressive symptoms may be due to fundamental differences in the components of social capital (Bassett and Moore 2013).

Research by Li et al. (2017) showed that support from individuals affects the level of depression in elderly migrants in China. One possible cause of the inconsistency is that physical function health has been shown to influence the relationship between social participation and depression among the elderly , Bai et al. (2020) official participation in the use of WeChat and symptoms of depression. Among the four types of social participation, the mediation impact of recreational activities is quite significant, while the mediation impact of voluntary activities, cultural activities, and other activities is not significant. Meanwhile, the influence of WeChat use on depression and the mediating effect of social participation is heterogeneous due to age and gender differences.

3. Social Networks and Depression

There are 4 articles from several countries used to measure the magnitude of the influence of social networks on depression. Each article with a cross-sectional study design. Studies have shown a strong link between social networks and depression. Data shows that high social networks can lower depression in adults.

A significant mediating effect of reciprocity in the pathway of the relationship between household income levels and depression was observed in this reciprocal variable (coefficient:0.30, 95% CI:0.11–0.48), which suggests that older people with higher social capital have a lower chance of developing depression. The complex combined effects of certain dimensions of social capital on depression were also observed (Bai et al., 2020).

Social capital measurement includes cognitive aspects and reciprocal affects the level of depression, which means that high reciprocity can reduce the level of depression (Li et al., 2017). Groups with low and intermediate reciprocity also have a higher likelihood of developing depression compared to groups with high reciprocity, Reciprocity is also lower in workers who tend to increase depression (Kim et al., 2012).

AUTHOR CONTRIBUTION

All authors contribute to the conceptualization, data collection, analysis, and drafting of the manuscript.

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CONFLICT OF INTEREST

There are no conflicts of interest.

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