PROGRESS IN MEDICAL SCIENCES, 2021
VOL 5, NO. 2, PAGE 1 – 7
DOI: doi.org/10.47363/PMS/2021(5)158

REVIEW ARTICLE

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The Association between Depression and Suicidal Ideation A Systematic Review and Meta-Analysis

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ABSTRACT

The purpose of this meta-analysis was to assess the association between Depression and suicidal ideation. We use data from six studies to do a meta-analysis. We applied the random-effects analytic model and calculated a pooled odds ratio. The combined effect size showed that odds of suicidal ideation among people with Depression is 4.88 times higher than those peoples without Depression (ORMH 4.88 95%CI 2.04, 11.72) Test for overall effect: Z = 3.55 (P = 0.0004) Heterogeneity: Tau² = 1.11; Chi² = 100.97, df = 5 (P < 0.00001); I² = 95%. The magnitude of suicidal ideation among people with Depression is 46.39% (528) and peoples without Depression is 17.79 %(315). From the total, 39.13 %(1138) is depressed and 60.86% (1779) not depressed. The overall proportion of Suicidal Ideation among the included studies is 28.98 %(843). The total number of study subjects included in our systematic review and meta-analysis is 2908.

ARTICLE HISTORY

Received September 21, 2021
Accepted September 28, 2021
Published October 05, 2021

KEYWORDS

Depression, Suicidal Ideation, Ethiopia

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Introduction

The Diagnostic and Statistical Manual of Mental Disorders defines suicidal ideation as thinking about, making plans for suicide and self-destructive act with a clear expectation of death that is non-fatal [1].

The magnitude of suicide indicates as it is a serious public health problem in the world [2]. It affects more than 50 million people in the world [3]. The worldwide prevalence of suicide is estimated to raise to 2.4% by 2020 year, and the rate of death due to suicide will be one person every 20 s [4]. It is the second leading cause of death among adolescents and young adults [5, 6].

Suicidal acts result from a combination of biological, psychological, sociological, cultural and environmental factors [7]. Depression is the top risk factor and risk factors for suicidal ideation can be divided into 3 categories: psychiatric disorders, life events, and family history [8].

The most frequently reported factors correlated with suicidal behavior are being male, psychological distress, depression, dissatisfaction with academic performance, feeling neglected by parents, substance abuse, psychiatric disorders,drug use, depressive symptoms, first year and pre-clinical phase, homesick, alteration in thyroid, and prolactin hormone [9-17]. The loss of loved one by suicide and emotional turmoil related to bereavement also linked with increase in suicidal behavior [18]. There is also a strong positive correlation of suicide in those who are young age, male and a higher level of education [19]. However, there are limited data specifically on the association between Depression and suicide ideation.

Therefore, this study aimed to assess the association between Depression and suicidal ideation

This study would help as an input of information for health providers /psychiatrists on the relationship between depression and suicidal ideation and leads to plan suicide prevention strategies.

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Materials and Methods

Data

Electronic databases were searched .on reference manager software and quality assessments of the included studies were performed by assessing the risk of bias.

A meta-analysis was applied to test the association between Depression and suicidal ideation

Words used to search literatures are, 'factors associated with suicidal ideation and suicidal ideation

Study Selection

Figure 1 shows the selection process of the articles searched. The initial search on reference manager software results in 89 and after duplicates removed 47 records remain and 14 studies assess for eligibility and finally 6 studies included in our systematic review and meta-analysis.

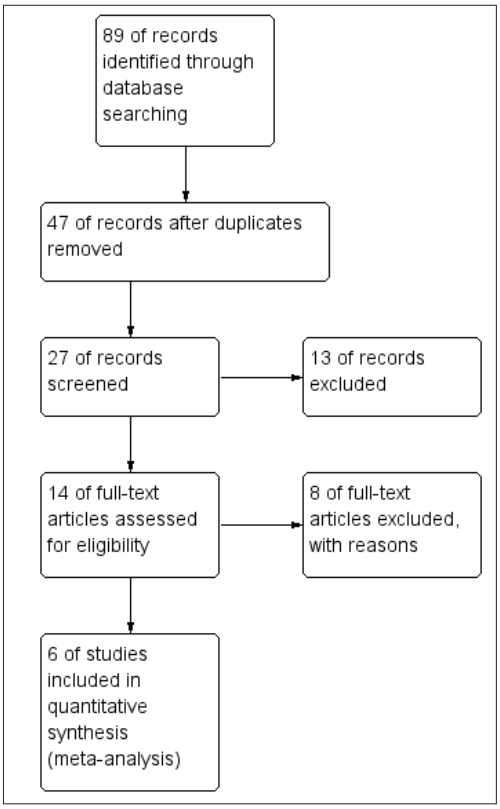

Figure 1: Study flow Diagram

Measures

Suicidal ideation was the outcome variable.

Depression was the exposure.

The two variables measured in deferent way in different studies included in our systematic review and met analysis.

Analysis

By design, this study is secondary data analysis. Using Review Manager Version 5.3 software and Meta Essential software. We determined combined effect size and associated 95% confidence intervals to describe the relationship between Depression and Suicidal ideation

We calculated combined effect size across the studies using the Mantel-Haenszel (MH) statistic (the DerSimonian-Laird method or random effect model). We applied the random effects analytic model to account for inter survey variation and to provide a more conservative effect than a fixed model would have provided. The I 2 statistics were used to assess the variability among the included studies and above 50% was considered as significant.

Result

The Characteristics of Included Studies according to Sample Size. Depression and Suicidal Ideation

Table 1: Characteristics of the Included Studies

S no	Article			Suicidal ideation		Sample size
1	Asfaw H, Yigzaw N, Yohannis Z, Fekadu G, Alemayehu Y (2020) Prevalence and associated factors of suicidal ideation and attempt among undergraduate medical students of Haramaya University, Ethiopia. A cross sectional study. PLoS ONE 15(8): e0236398. https://doi.org/10.1371/ ournal. pone.0236398	Depression		Yes	No	757
			Yes	131	193	
			No	37	349	523
2	Abdu et al Suicidal Behavior and Associated Factors Among Students in Mettu University, South West Ethiopia, 2019: An Institutional Based Cross-Sectional Study Psychology Research and Behavior Management 2020:13 233–243	Depression	Yes	165	128	
			No	140	90	395
3	Tamirat et al Psychosocial Factors Associated with Suicidal Ideation Among HIV/AIDS Patients on Follow-Up at Dessie Referral Hospital, Northeast Ethiopia: A Cross-Sectional Study HIV/AIDS - Research and Palliative Care 2021:13 415–423	Depression	Yes	24	56	
			No	13	303	
4	Nigussie K, Tesfaye B, Lemma A, et al. Magnitude and associated factors of suicidal ideation and attempt among people with epilepsy attending outpatient treatment at primary public hospitals in northwest Ethiopia: a multicentre cross-sectional study. BMJ Open 2021;11:e043227. doi:10.1136/ bmjopen-2020-043227	Depression	Yes	91	77	563
			No	58	337	
5	Michael Berhe Prevalence Of Suicidal Ideation And Associated Risk Factors Among College Students: Eritrea DOI: https://doi.org/10.21203/rs.3.rs-17587/v1	Depression	Yes	58	78	466
			No	61	263	
6	Chong et al Prevalence and Factors Associated with Suicidal Ideation in Institutionalized Patients with Schizophrenia Psychology Research and Behavior Management 2020:13 949–962	Depression	Yes	59	78	
			No	6	113	256

The magnitude of suicidal ideation among people with Depression is 46.39% (528) and peoples without Depression is 17.79 %(315). From the total, 39.13 %(1138) is depressed and 60.86% (1779) not depressed. The overall proportion of Suicidal Ideation among the included studies is 28.98 %(843). The total number of study subjects included in our systematic review and meta-analysis is 2908.

Meta-Analysis

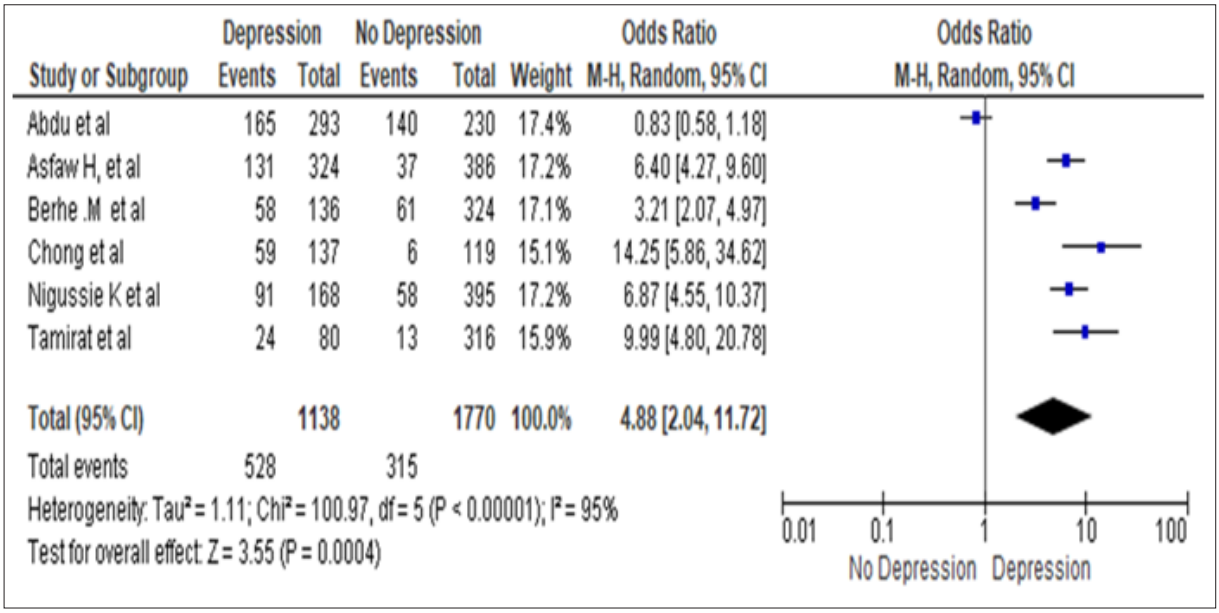

Figure 2: Forest Plot for the Association between Depression and Suicidal Ideation

The combined effect size showed that odds of suicidal ideation among people with Depression is 4.88 times higher than those peoples without Depression (ORMH 4.88 95%CI 2.04, 11.72) Test for overall effect: Z = 3.55 (P = 0.0004). Heterogeneity: Tau² = 1.11; Chi² = 100.97, df = 5 (P < 0.00001); I² = 95%.

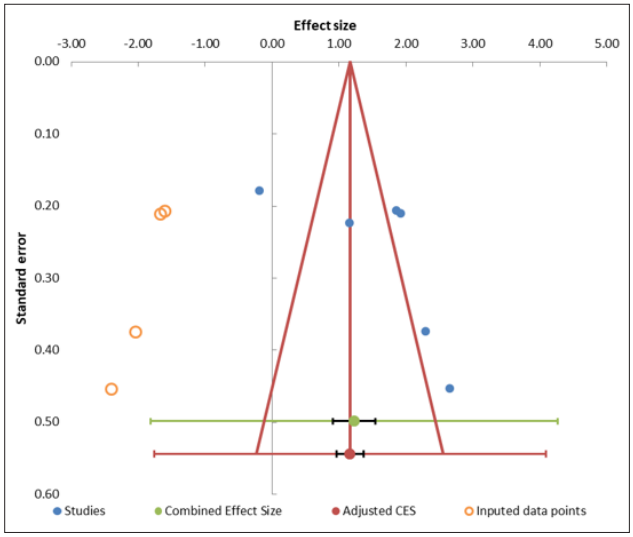

Figure 3: Funnel plot for the Association between Depression and Suicidal Ideation

Egger Regression				
	Estimate	SE	CI LL	CI UL
Intercept	8.66	5.72	-6.05	23.38
Slope	-0.72	1.34	-4.17	2.73

t test	1.51
p-value	0.205

Begg & Mazumdar	
Δ_{x-y}	1.00
Kendall's Tau a	0.07
Z	0.19
P	0.851

As funnel plot showed there is no publication bias Egger Regression p value =- 0.205 Begg & Mazumdar p value = 0.851

Source of Heterogeneity

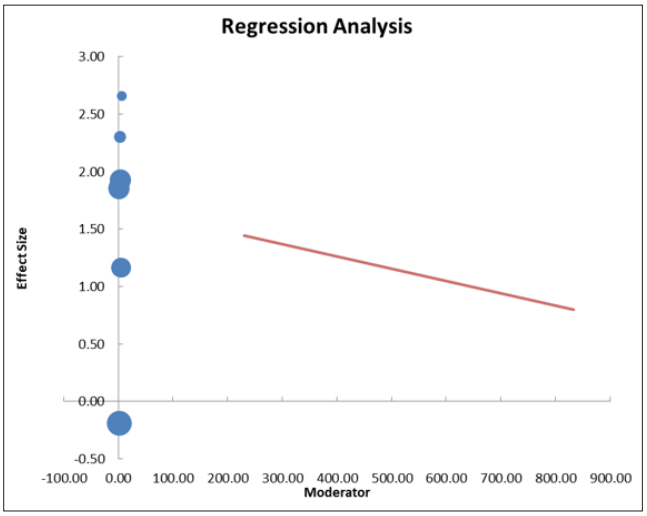

Figure 4: Moderator analysis for the association between Depression and suicidal ideation

	B	SE	CI LL	CI UL	β	Z-value	p-value
Intercept	1.69	0.19	1.20	2.17		8.96	0.000
Moderator	0.00	0.00	0.00	0.00	#VALUE!	-2.85	0.004

As sample size increase the effect size decrease (B=0.00 p Value =0.004) , so the source of heterogeneity is sample size difference of the included studies

Discussion

This study is similar with previous studies in USA (20) ,Colombia, (21), Brazil (22), China (10) Nepal (11), Washington (23), Canada,(24), Bosnia and Herzegovina,(25), Poland,(26), Brazil(27), Malaysia(28) ,, South Africa (29), Nigeria(30), Eriteria (8), in India(31), Ethiopia (32-35), Addis Ababa Ethiopia (36)

This may be due to high depressive symptoms that are related to suicidal risk and thoughts.

A Depression that affects everyday activities, social interactions, and low self esteem can cause increased suicidal thoughts

Many of this previous studies explained that the presence of depression is highly associated with suicidal ideation.

It also indicated that the decreased level of serotonin neurotransmitter in the brain of a depressed individual was found to be associated with increased suicidal behavior (37)

The possible explanation may also be due to a direct effect of depression which makes individuals to feel hopeless, isolated and worthless(17)

The other possible explanation might be due to high levels of stress associated with adjusting to a new social environment and could be due to the effect of high dose of alcohol consumption (8)

This systematic review and meta-analysis is inconsistence with previous study (38)

The reason for the difference between our findings and this study may be the difference in sample size , study population and study participants characteristic

This study indicated that depressed persons have higher risk of suicidal ideation than non depressed persons and health provider should give focus or priority to identify depressed people as well as to assess risk of suicide in depressed people

Conclusion

This study showed that peoples with Depression are more likely to have suicidal ideation than people without Depression

Data Availability

All data are included in the paper.

Conflicts of Interest: The authors declare that they have no conflicts of interest.

Authors' Contributions:

- Kaleab Tesfaye Tegegne, Eleni Tesfaye Tegegne and Mekibib Kassa Tessema were responsible for conceptualization, project administration, software, supervision, and development of the original drafting of the manuscript.
- Kaleab Tesfaye Tegegne, Eleni Tesfaye Tegegne , Wosenyeleh Semeon Bagajjo, and Mekibib Kassa Tessema , Muse Rike , Alelign Tadele Abebe , Berhanu Bifato 1were participated in quality assessment of articles, methodology, validation, and screening of research papers
- All authors contributed with data analysis, critically revised the paper, and agreed to be accountable for their contribution.

Acknowledgments

We would like to thank all the primary authors of the included articles

Declaration

Ethics approval and consent to participate

Not applicable

Competing of interest

The authors have declared that there is no competing interest

Consent for publication

Not applicable

Funding

Not any funding received for this work

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