

Prevalence of Suicide Ideation and Attempt during COVID-19 Pandemic: A Systematic Review and Meta-Analysis

Abstract

An epidemic of infectious diseases such as COVID-19 can affect mental health, which may be associated with suicidal behaviors. This study was conducted based on the systematic review and meta-analysis methods for evaluating the prevalence of suicide ideation during COVID-19. This study used Preferred Systematic Review Reporting System and Meta-Analysis guideline and valid keywords. The articles related to the prevalence of suicide ideation during COVID-19 pandemic were obtained by searching among different databases including Scopus, Web of science, PubMed, ISC, Google scholar, SID, and Magiran. All of the articles published from the beginning of January 2020 to the end of May 2021 were reviewed. Among 478 articles screened, 377 articles were related to the studied topic, among which 38 articles were selected after assessing the title and abstract of which for reviewing the full text and finally 18 studies were included in the meta-analysis. Based on the results, the prevalence of suicide ideation and attempt among all studies were equal to 13% (95% confidence interval = 0.11-0.15, I² = 99.7%, *P* = 0.00) and 1% (95% confidence interval = 0.00-0.01, I² = 95.5%, *P* = 0.00), respectively. Based on the results, the prevalence of suicide attempt and ideation is possible during the COVID-19 pandemic. Therefore, health officials should pay attention to mental health issues in addition to the protective measures for preventing or reducing the infection with COVID-19. The increase of psychological consequences is probably related to the effect of lifestyle changes which associates with the spread of the disease. In the current meta-analysis performed, the prevalence of suicidal ideation and suicidal attempt was examined during the COVID-19 pandemic period and compared to the previous period without COVID-19. The effect of COVID-19 on suicidal ideation and suicidal attempt has never been studied.

Keywords: COVID-19, suicidal attempt, suicidal ideation, suicidal thought

Introduction

Coronavirus 2019 (COVID-19) first appeared in late 2019 as the outbreak of respiratory diseases in Wuhan City, Hubei Province, China, and rapidly spread around the world.^[1] It was first reported to the World Health Organization on December 31, 2019. Then, the outbreak of COVID-19 was considered as a global health emergency on January 30, 2020 and declared as a pandemic on March 11, 2020.^[2,3] COVID-19 pandemic affects many aspects of people's lives including health, economic welfare, individual and social life, family relationships, job, food, hygiene, and emotions around the world. Lack of vaccine and antiviral drugs causes some restrictive measures and nonpharmacological interventions such as quarantine, isolation, social distance, and the closure of institutions and cancellation

of gatherings were used for controlling the spread of the virus. Therefore, this infectious disease causes lifestyle changes, worry and obsessive-compulsive disorder, and unpleasant feelings such as sadness, anxiety, and loss of life control,^[4] which can be a sign of mental disorders such as depression or anxiety.^[5] Uncertainty about the time of return to the normal life or whether it will return at all causes the difficulty in managing plans, which leads to the additional pressures.^[6] Moreover, the issues such as economic and social harm, increased stress, and job loss are considered as the major causes for mental health problems related to COVID-19 pandemic, which may be related to suicidal behaviors.^[7-9] Environmental changes are a source of stress^[10] which leads to the neurological and psychological changes associated with suicidal behaviors.^[11] Suicidal behavior is multifactorial;^[12] the stress of an unfavorable life was reported

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Access this article online

Website:
www.ijpvmjournal.net/www.ijpvm.ir

DOI:
10.4103/ijpvm.ijpvm_507_21

Quick Response Code:



How to cite this article: Tardeh S, Adibi A, Mozafari AA. Prevalence of suicide ideation and attempt during COVID-19 pandemic: A systematic review and meta-analysis. *Int J Prev Med* 2023;14:9.

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as a risk factor for suicide ideation.^[13] This study aimed to investigate the prevalence of suicide ideation and attempt during COVID-19 pandemic through a systematic review and meta-analysis.

Method

This study was performed by using Preferred reporting items for systematic reviews and meta-analyses criteria.^[14] The protocol of this review study is registered in PROSPERO International Prospective Register of Systematic Review with the code CRD42021276988.

Search strategy

Searches were conducted on various databases including Scopus, ISC, Web of Science, PubMed, SID, Google scholar, and Magiran by using valid keywords such as suicidal ideation OR suicidal thought, mental health problem OR mental health disorder, psychiatric disease OR psychiatric disorder, 2019 novel coronavirus disease OR COVID-19 OR COVID-19 pandemic OR SARS-CoV-2 infection OR COVID-19 virus disease OR 2019 novel coronavirus infection OR 2019-nCoV infection OR coronavirus disease 2019 OR coronavirus disease-19 OR 2019-nCoV disease OR COVID-19 virus infection OR coronavirus infection OR 2019-nCoV OR Wuhan coronavirus OR SARS-CoV-2 and appropriate strategies from the beginning of January 2020 to the end of May 2021.

Samples of the search strategy used in PubMed included “suicidal ideation*” OR “suicidal thought*” OR “mental health problem*” OR “mental health disorder*” OR “psychiatric disease*” OR “psychiatric disorder*” AND “2019 novel coronavirus disease” OR “COVID-19” OR “COVID-19 pandemic” OR “SARS-CoV-2 infection” OR “COVID-19 virus disease” OR “2019 novel coronavirus infection” OR “2019-nCoV infection” OR “coronavirus disease 2019” OR “coronavirus disease-19” OR “2019-nCoV disease” OR “COVID-19 virus infection” OR “coronavirus Infection” OR “Middle East respiratory syndrome” OR “MERS” OR “2019-nCoV” OR “Wuhan coronavirus” OR “SARS-CoV-2”.

Eligibility criteria

Inclusion criteria included the studies examining the association between COVID-19 and the suicide ideation and attempt. Exclusion criteria included the report of suicide risk, letter to the editor, systematic review, and studies which did not have sufficient information to participate in the study.

Study selection

Among 478 articles reviewed, 201 cases were deleted related to the irrelevance and duplication of which. Then, 41 articles were selected for a full-text review by considering the title and abstracts of 377 studies. Finally, 18 studies entered the statistical evaluation process.

Quality assessment and data extraction

The quality of the studies was assessed using the standard STROBE checklist.^[15] The minimum and maximum scores were 0 and 44 in this checklist, respectively. The studies with a minimum score of 16^[16] were selected for the meta-analysis. The required data were extracted from the selected final studies using a checklist prepared by the research team. Data included author name, year of publication, place of study, type of study, sample size, number of suicide ideation and attempt, and number of men and women.

Statistical analysis

Random effects model was used for this meta-analysis. The heterogeneity was assessed among the studies using I^2 method,^[17] when the value of I^2 index is less than 25%, between 25%-75% and 75% and more indicates low, and moderate and high heterogeneity, respectively. Publication bias was quantitatively evaluated by using the Egger's test.^[18] STATA software version 14 was used for data analysis.

Results

After reviewing 478 articles, 201 cases were deleted due to irrelevance and duplication. Therefore, 377 studies were screened and titles and abstracts of which were evaluated. Among which, 41 articles were selected for a full-text review. Finally, 18 studies entered the meta-analysis process [Figure 1]. Among 243,114 people evaluated, 147,654 and 92,019 cases were women and men, respectively, and the gender of the rest was unknown [Tables 1 and 2]. Using the random effects model indicated that the prevalence of suicide ideation and attempt among all studies were equal to 13% (95% confidence interval [CI] = 0.11-0.15, I^2 = 99.7%, P = 0.00) and 1% (95% CI = 0.00-0.01, I^2 = 95.5%, P = 0.00), respectively [Figures 2 and 3]. Evaluating the heterogeneity among all the studies graphically showed that not all the studies were within the 95% CI. Therefore, the results of the studies of this meta-analysis were heterogeneous [Figures 4 and 5]. Moreover, the Egger diagram among suicide ideation studies was almost crossed the origin below regression line. Therefore, no significant publication bias occurred in suicide ideation studies [Figure 6]. However, the presence of bias publication was confirmed among suicide attempt studies because the result of Egger's test is almost significant (P = 0.05) and its confidence range (-0.16 to 11.42) is variable [Figure 7].

Discussion

This meta-analysis provided a review of the prevalence of suicide ideation and attempt during the COVID-19 pandemic, which was reported 0.13% and 0.01%, respectively.

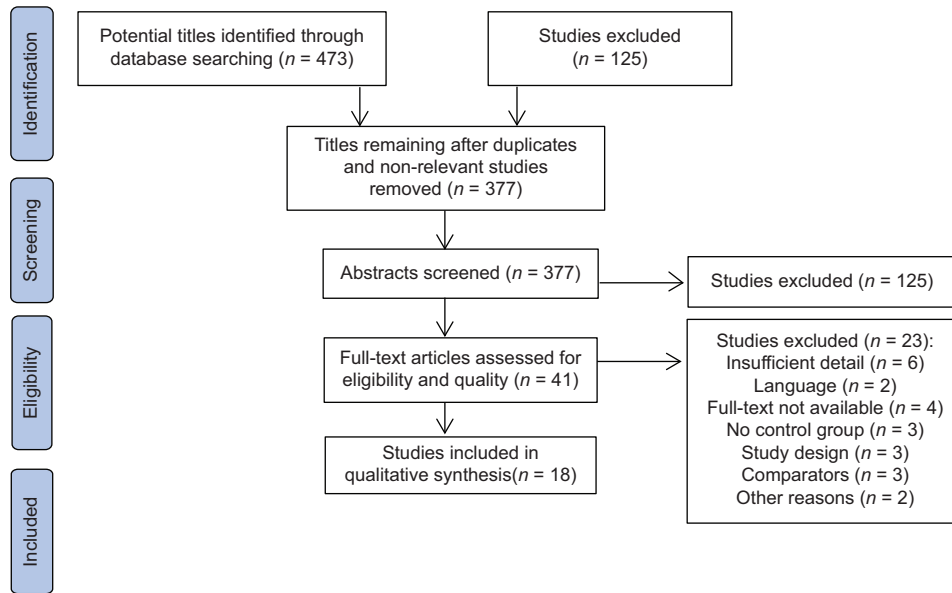


Figure 1: Flowchart of the study and selection of studies based on the PRISMA steps

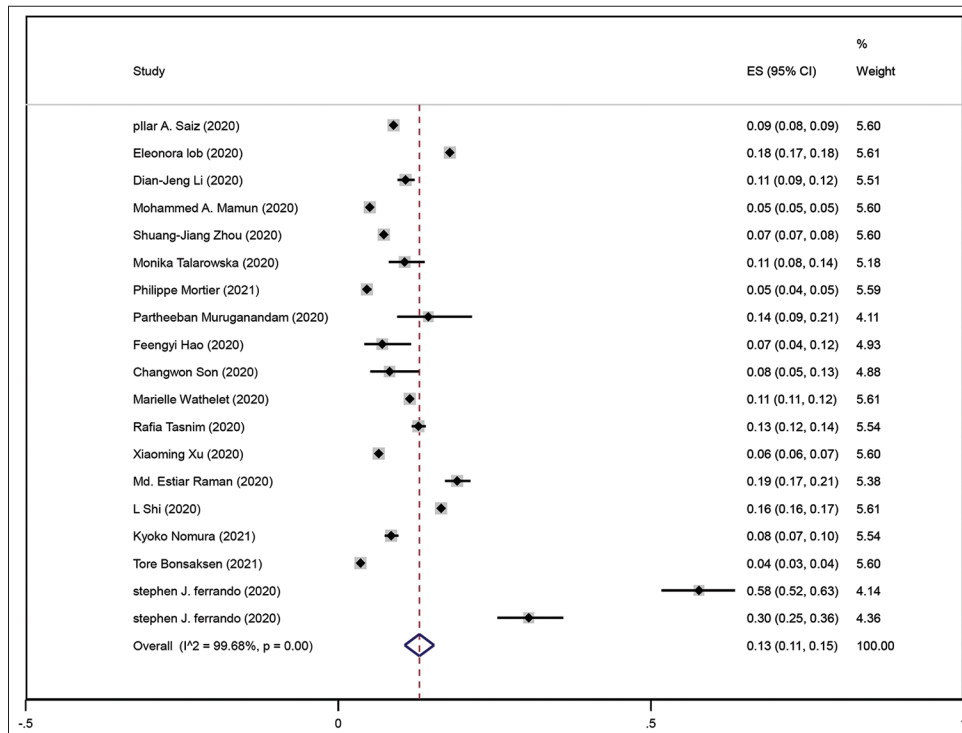


Figure 2: Forrest plot of the prevalence of suicide ideation during COVID-19

The meta-analysis conducted by Justin P Dube indicated that the average prevalence of suicide ideation and attempt and self-harm was 10.81%, 4.68%, and 9.63%, respectively. Furthermore, the psychological, economic, behavioral, and psychosocial-social problems related to COVID-19 were associated with an increase in suicidal behaviors compared to before the pandemic.^[36] The problems including job instability, poverty, and low income can cause suicidal behaviors. Meta-analysis of

Eric Robinson demonstrated an overall increase in symptoms of mental health disorders including anxiety, depression, and mood disorders compared to before the outbreak of COVID-19.^[37] Based on the results, the epidemic of infectious diseases can be considered as a factor endangering the mental health of people in society. A cross-sectional study of Mohammed A. Mamun showed that the prevalence of depression and suicide thoughts associated with COVID-19 was 33% and 5%, respectively. The main factors of suicide and depression included

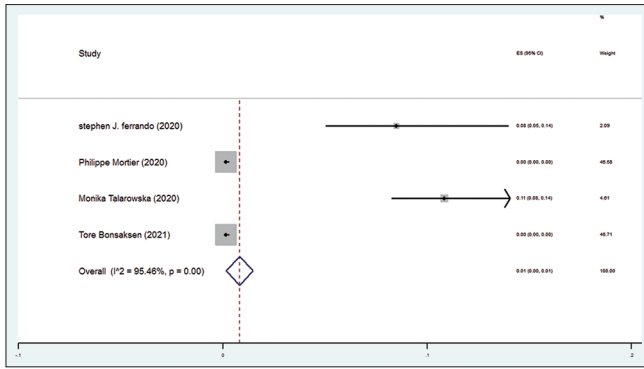


Figure 3: Forrest plot of the prevalence of suicide attempt during COVID-19

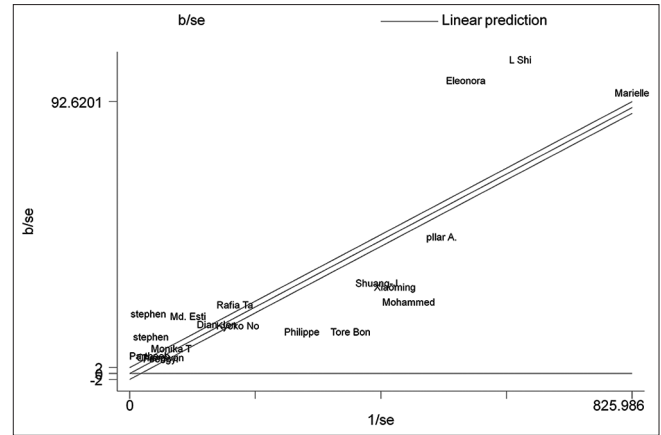


Figure 4: Evaluating the heterogeneity among all suicide ideation studies graphically

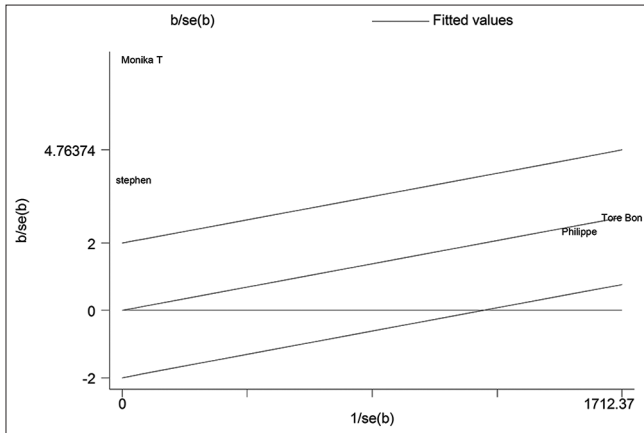


Figure 5: Evaluating the heterogeneity among all suicide attempt studies graphically

young age, being a woman, smoking, having various diseases, having a higher score than the COVID-19 fear scale, and insomnia.^[21]

The meta-analysis of Sofia Pappa indicated that the prevalence of anxiety and depression among healthcare workers was 23.2% and 22.8%, respectively.^[38] Meta-analysis of Tianchen Wu demonstrated that the overall prevalence of depression, anxiety, distress, and insomnia was 31.4%, 31.9%, 41.1%, and 37.9%, respectively. Patients with noninfectious chronic disease, quarantined persons, and patients with COVID-19 had the highest risk of depression ($Q = 26.73, P < .01$) and anxiety ($Q = 21.86, P < .01$). The general population and nonmedical staff had a lower risk of distress compared to other populations ($Q = 461.21, P < .01$). Physicians, nurses, and nonmedical staff showed a higher prevalence of insomnia than other populations ($Q = 196.64, P < .01$).^[39]

Meta-analysis of Eric Robinson which was related to the mental health changes during and before the COVID-19 pandemic demonstrated that an overall increase was observed in mental health outcomes during the COVID-19 pandemic (standardized mean change), which was more pronounced during March to April 2020 (standardized mean change = 0.102 [95% CI: 0.026 to .192], $P = 0.03$).^[37]

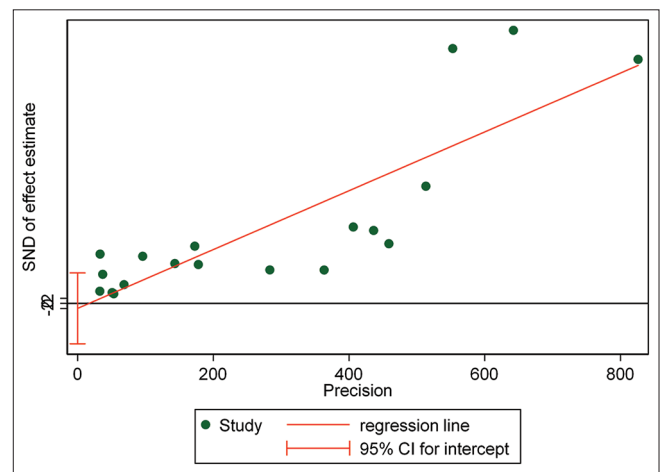


Figure 6: Results of publication bias test in suicide ideation studies based on the Egger's test

The meta-analysis conducted by Gabriele Prati showed that COVID-19 pandemic had the little effect on mental health symptoms ($g = 0.17, S.E. = 0.05, 95\% CI (0.06-0.24), P = 0.001$). Due to the significant heterogeneity among the data, it was possible that the effects of COVID-19 pandemic were different in various groups of the society and were influenced by social and contextual factors.^[40] Further studies are suggested for assessing the risk factors and predisposing factors of mental disorders. Moreover, the necessary measures should be done for reducing stress, anxiety disorders, depression, and obsessive-compulsive disorder, which may be associated with suicidal behaviors.

Conclusion

Health officials should pay attention to mental health issues in addition to the protective measures for preventing or reducing the infection with COVID-19 because the prevalence of suicide attempt and thought is possible during the COVID-19 pandemic. The increase of psychological consequences is probably related to the effect of lifestyle changes which is related to the spread of the disease. In the

Table 1: Characteristics of extracted papers for meta-analysis

Author	Year	Design	Location	Subjects	Male	Female	Suicidal ideation	Male	Female
Sáiz <i>et al.</i> ^[19]	2020	cross-sectional	Spain	21,207	6,439	14,768	1,873	469	1,404
Iob <i>et al.</i> ^[20]	2020	cross-sectional	London	44,775	21,929	22,846	7,984	3,885	4,099
Li <i>et al.</i> ^[9]	2020	cross-sectional	Taiwan	1,970	650	1,305	212		
Mamun <i>et al.</i> ^[21]	2020	cross-sectional	Bangladesh	10,056	5,650	4,406	506	215	291
Zhou <i>et al.</i> ^[22]	2020	cross-sectional	China	11,133	4,195	6,938	810	341	469
Talarowska <i>et al.</i> ^[23]	2020	cross-sectional	Poles	443			47		
Mortier <i>et al.</i> ^[24]	2021	cross-sectional	Spain	3,500	1,583	1,917	20		
Muruganandam <i>et al.</i> ^[25]	2020	cross-sectional	South India	132			19		
Hao <i>et al.</i> ^[26]	2020	cross-sectional	China	185			13		
Son <i>et al.</i> ^[27]	2020	cross-sectional	Texas	195	84	111	16		
Wathelet <i>et al.</i> ^[28]	2020	cross-sectional	France	69,054	18,019	51,035	7,891	1,783	6,108
Tasnim <i>et al.</i> ^[29]	2020	cross-sectional	Bangladesh	3,331	1,979	1,352	427	227	200
Xu <i>et al.</i> ^[30]	2020	cross-sectional	China	11,507	2,521	8,986	744	151	593
Raman <i>et al.</i> ^[31]	2020	cross-sectional	Bangladesh	1415	875	540	269		
Shi <i>et al.</i> ^[32]	2020	cross-sectional	China	56,679	27,149	29,530	9,322	5,195	4,127
Nomura <i>et al.</i> ^[33]	2021	cross-sectional	Japan	2,449			207		
Bonsaksen <i>et al.</i> ^[34]	2021	cross-sectional	Norwegian	4,527	659	3,650	161	17	143
Ferrando <i>et al.</i> ^[35]	2020	retrospective cohort	New York City	cnt: 202 case: 65	cnt: 85 case: 38	cnt: 111 case: 38	cnt: 93 case: 61		
Ferrando <i>et al.</i> ^[35]	2020	retrospective cohort	New York City	cnt: 153 case: 136	cnt: 91 case: 73	cnt: 59 case: 62	cnt: 28 case: 60		

Table 2: Characteristics of the extracted papers for meta-analysis

Author	Year	Design	Location	Subjects	Male	Female	Suicidal attempt	Male	Female
Ferrando <i>et al.</i> ^[35]	2020	retrospective cohort	New York City	cnt: 202 case: 65	cnt: 85 case: 38	cnt: 111 case: 38	cnt: 10 case: 1		
Ferrando <i>et al.</i> ^[35]	2020	retrospective cohort	New York City	cnt: 153 case: 136	cnt: 91 case: 73	cnt: 59 case: 62	cnt: 6 case: 7		
Talarowska <i>et al.</i> ^[23]	2020	cross-sectional	Poles	443			48		
Mortier <i>et al.</i> ^[24]	2020	cross-sectional	Spain	3,500	1,583	1,917	5		
Bonsaksen <i>et al.</i> ^[34]	2021	cross-sectional	Norwegian	4,527	659	3,650	7	2	5

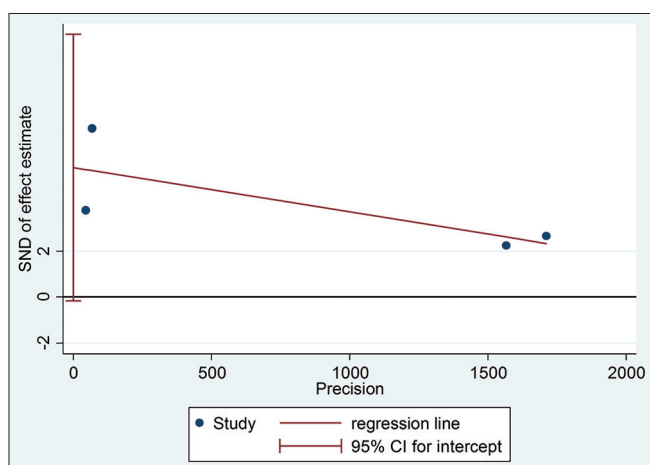


Figure 7: Results of publication bias test in suicide attempt studies based on the Egger's test

current meta-analysis performed, the prevalence of suicidal ideation and suicidal attempt was examined during the COVID-19 pandemic period and compared to the previous

period without COVID-19. The effect of COVID-19 on suicidal ideation and suicidal attempt has never been studied.

Limitations

Reporting the suicide risk instead of reporting the total number of suicide ideation and attempts in some studies was one of the limitations of this study, along with a lack of reporting the prevalence of suicide ideation and attempt based on the gender in some studies. Moreover, full text of some articles was not available. Finally, the reported high heterogeneity, which may be related to the large difference in sample size.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Received: 10 Dec 21

Accepted: 27 Oct 22

Published: 25 Jan 23

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