Abortion and the risk of suicide：a systematic review and meta-analysis

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Research article

Keywords: Abortion, suicide, meta-analysis, cohort study, cross-sectional study, case-control study

Posted Date: April 15th, 2020

DOI: https://doi.org/10.21203/rs.3.rs-22681/v1

Abstract

Background Abortion had been suggested to be associated with the risk of suicide with inconclusive results. The objective of this study was to assess the association by systematic review and meta-analysis.

Methods We searched PubMed, EMbase, PsycINFO, CNKI, WanFang Data and VIP databases for all studies investigating the association between abortion and the risk of suicide. We included Studies investigating the association between abortion and the risk of suicide. Two reviewers collected the data and assessed risk of bias of included studies. Outcomes included completed suicide, suicide behavior, and suicidal ideation. Data were analyzed by using Revman5.2 software.

Results A total of 13 studies were included in the meta-analysis, including 1 case-control study, 6 cohort studies, and 6 cross-sectional studies. The results of meta-analysis showed that, abortion might be associated with increased risk of completed suicide (OR=3.16, 95CI 2.49 to 3.99, P <0.00001), suicide behavior (OR=1.92, 95CI 1.64 to 2.26, P <0.00001) and suicidal ideation (OR=1.52, 95%CI 1.32 to 1.75, P <0.00001).

Conclusions The current meta-analysis suggested that abortion might be associated with increased risk of suicide. Due to the limited quality and quantity of included studies, more high-quality studies are needed to verify the above conclusions.

Background

Suicide is a complex global public health problem, with close to 800 000 people deaths every year[1]. It is the second leading cause of death in 15 to 29 years old worldwide and 79% of global suicides occur in low- and middle-income countries[2]. Suicide ideation and especially suicide attempts are important predictors of subsequently completed suicide[3, 4]. Since suicide is a preventable issue, it is extremely urgent to understand the risk factors for its immediate precursors, including suicidal ideation, suicide attempt, and to develop useful prevention programs[5, 6]. Previous studies reported that suicidal behavior was associated with genetic, social, biological and family factors[7], including conflict, disaster, violence, abuse, feelings of isolation, feeling of hopelessness and helplessness, stress and distress, sleep disorder, including insomnia, mood disorders, mental disorders, impulsivity, alcoholism or drug abuse, anorexia, anxiety and depression[8–10]. Other factors such as economic problems, the loss of a loved one, employment and problems at work also contributed to suicide[11, 12].

Recently, several studies suggested an increased risk of common mental disorders such as depression in females who underwent abortion[13–15]. They had also suggested increased risk of suicide in females who underwent abortion. Several studies had also evaluated the rate of suicide in females who underwent abortion [16–18]. Although abortion was associated with elevated risk of death overall, with the risk of death from violent causes, including suicide being most prominent.[19] However, the risk of suicide associated with abortion has not received enough attention[18, 20, 21]. In order to provide a

comprehensive and conclusive estimation of the risk of suicide in abortion, we carried out the current systematic review and meta-analysis. We assessed the risk of completed suicide, suicide behavior and suicidal ideation in females who underwent abortion.

Method

The systematic review and meta-analysis was conducted and reported according to the PRISMA statement (Supplement Table 1). The original research protocol was previously registered at PROSPERO (CRD42018104260).

Search strategy

An electronic literature search was conducted of the PubMed, EMbase, PsycINFO, CNKI, WanFang Data and VIP databases to identify all articles evaluating suicide and abortion in females. The last search was performed on July 28th, 2018. The search terms included: (abortion or induced abortion or technical abortion or drug-induced abortion or pregnancy termination) and (suicide or suicid*) and (cross-sectional or cohort or longitudinal or case-control). References of all included studies or relevant systematic reviews or meta-analyses were searched for potential studies.

Inclusion and exclusion criteria

Studies were included as follows: 1) the study design should be case-control, cohort or cross-sectional; 2) addressing the association between risk of suicide and abortion; 3) data could be extracted from original studies: 4) the outcomes of interest were completed suicide, suicide behavior, and suicidal ideation. For case-control study, the cases should be females who underwent abortion, and the control group should be females who did not undergo abortion. In addition, we accepted studies included the following groups of women as controls: women who have given birth to a wanted baby; women who have given birth to an unwanted baby; women who have had no pregnancy. There was no limitation about the mental health status and age for women. Studies were excluded as follows: 1) abstracts or reviews; 2) described the suicide rate among females who underwent abortion without control group; 3) suicide outcomes (ideation, attempt and death) as a whole; 4) duplicated data. If the suicide rate of females who underwent abortion was compared with suicide rate in general population, it should also be excluded.

Data collection and quality assessment

Two reviewers independently screened literature according to the inclusion and exclusion criteria. Disagreements were resolved by discussion until consensus was reached. Two reviewers independently extracted information from each study: first author, published year, country, research design, research population, sample size, outcome, effect estimate and its 95% confidence interval (CI). Two reviewers independently assessed the quality of included studies according to the study design. The cohort studies and case-control studies were assessed using the Newcastle Ottawa Statement (NOS) Manual[22]. The

cross-sectional studies were evaluated according to AHRQ scale[23, 24]. The disagreement was resolved by consensus or by a discussion with the third reviewer.

Statistical analysis

Data were analyzed using Revman5.2 software. Odds ratios (ORs) with their 95% CIs were used to assess the association. Wherever possible, we used the full adjusted forms of OR which was controlled for at least one or more of the potential confounding factors. Heterogeneity was analyzed by *Q*-test, and the quantity of heterogeneity was measured by I^2 statistic, *P* values less than 0.10 were considered as statistically significant. The results were reported by suicide outcomes (completed suicide, suicide behavior, and suicidal ideation). Publication bias was assessed by funnel plots. Sensitivity analysis was assessed by excluding each study. All statistical analyses were performed at a significance level of 0.05.

Results

Study selection

The primary search yielded 151 potential studies. After screening the titles and abstracts, 34 studies were used for further assessment by reading the full-texts and extracted data. Among the 34 studies[13-18, 20, 25-51], a total of 21 studies were excluded[16, 31, 32, 34-51]: 11 were excluded for the objectives of the study were not about the association of abortion and suicide[31, 32, 40, 42-44, 46-48, 51]; 6 studies mentioned about the association of abortion with suicide risk, but no data could be extracted for data analysis[38, 41, 45, 49, 50]; 2 studies did not reported control groups and data could not be extracted[36, 37]; 1 study used the general population as the control group[16]; 1 study did not report the suicide rate in the control group[34]; 1 study was about the pregnancy outcome with suicide and cannot be used for data analysis in the current study[35]; two studies were about abortion with risk of suicide in Finland[39, 52], the data may be duplicated in those two studies, thus we excluded the first study[39]. Finally, a total of 13 studies were included for data analysis[13-15, 17, 18, 20, 25-30, 33]. The studies selection process is shown in Figure 1.

Study characteristics and risk of bias assessment

The characteristics of the included studies are shown in Table 1. The quality of the cross-sectional studies was evaluated by the AHRQ scale, and the results are shown in Table 2. The quality of the case-control and cohort studies were evaluated by the NOS, and the results are shown in Table 3.

Meta-analysis

Completed suicide

A total of 4 studies reporting completed suicide as their outcome were included[13, 17, 28, 30]. The results of the meta-analysis showed that abortion might be associated with an increased risk of completed

suicide(OR=3.16, 95CI 2.49 to 3.99, *P*<0.00001) (Figure 2).

Suicide behavior

A total of 4 studies reporting suicide behavior as their outcome were included[20, 26, 28, 33]. The results of the meta-analysis showed that abortion might be associated with an increased risk of suicide behavior (OR=1.92, 95CI 1.64 to 2.26, *P*<0.00001) (Figure 3).

Suicidal ideation

A total of 7 studies reporting suicidal ideation as their outcome were included[14, 15, 18, 20, 25, 27, 29]. The results of meta-analyses showed that abortion was associated with an increased risk of suicide behavior (OR=1.52, 95CI 1.32 to 1.75, *P*<0.00001) (Figure 4).

Publication bias

Publication bias was assessed by using funnel plots. All funnel plots for the three outcomes were almost symmetrical, suggesting a low possibility of publication bias (Figure not shown).

Sensitivity analysis

For each outcome, the results are compared with the fixed-effect model and the random-effect model, and the consistency of the results can reflect the reliability of the combined results, indicating that the results of this study were reliable. In addition, the results were not obvious influenced when excluding each study, suggesting the stable of the results.

Discussion

In this meta-analysis, we included a total of 13 studies, completed suicide, suicide behavior, and suicidal ideation was used as outcomes. The results of the meta-analysis suggested that abortion might contribute to increased risk of suicide from suicidal ideation to completed suicide.

The results should be interpreted with caution because it is impossible for any study to fully control for all the differences between women who have abortions and those who do not[19]. Some studies compared females who underwent abortion with women who have never had an abortion or who choose to give birth. Because abortion was associated with many factors, including financial or socioemotional resources and mental disorders. Women had an abortion may have increased prevalence of mental disorders than women who never had or who gave a birth. In addition, some studies did not control the preexisting confounding factors, such as the mental status or age, which might also lead to bias of the current study. It is also worthy to compare the suicide rate between abortion to a natural pregnancy loss(miscarriage), which would reveal other kind of results and give potential recommendation for future suicide preventions.

Another concern about the current study was the studied age of the included populations. According to the report of WHO, suicide contributed to the fifth cause of death in the Chinese populations and the first cause of death among population aged 15 to 34 years. At the age of 15 to 34 years, the family stress, social stress and economic stress might contribute to mental diseases. Women who underwent abortion in some places might get more stresses, and thus increase suicide. In addition, the suicide acceptability was measured by different tools, the reliability and the validity of the scale deserve further tests in different populations.

Because there have been many efforts in preventing suicide in recent years, and the suicide rates in some places have decreased. The prevention of suicide in pregnancy women had risen the attention from public, especially in women who underwent abortion. In the current meta-analysis, studies from different countries may have different suicide rates, mental health's status and socioeconomic status, thus, the relationship between abortion and suicide should be mentioned with carefully. We should know that women who underwent abortion should be taking care more and more for preventing potential suicide.

There were also some limitations in this study. First, the study did not include unpublished data; second, because there is not such enough studies, we could not perform subgroup analysis based the original of controls, the status of mental health status and other factors; third, some heterogeneity of the included studies existed, especially the large inconsistency of the study population; fourth, the confounders of the included study limited potential application of the results.

Conclusions

This meta-analysis suggested abortion might be associated with increased risk of suicide. Therefore, more attention should be paid to females who underwent abortion. In addition, large sample, multi-center cohort study should be carried out to further study the correlation between abortion and suicide, so as to guide the clinicians and give appropriate psychological counseling to reduce the suicide rate.

Abbreviations

PRISMA:the Preferred Reporting Items for Systematic Reviews and Meta-Analyses; NOS:Newcastle Ottawa Statement Manual; AHRQ:The Agency for Healthcare Research and Quality ; CI: confidential interval; ORs:Odds ratios.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

All data generated or analysed during this study are included in this published article.

Competing interests

The authors declare that they have no competing interests.

Funding

This study was partly supported by a grant (2016SZ0016) from the Science and Technology Department of Sichuan Province. This study was partly supported by National Clinical Research Center for Geriatrics, West China Hospital, Sichuan University(Z2018A01).The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Authors’ contributions

YGZ and LLZ designed the study. YGZ and LLZ searched the data, extracted the data and performed the data analysis; LLZ ,YY and YGZ assessed the quality of the included studies. YGZ and LLZ drafted the manuscript. All authors read and approved the final manuscript.

Acknowledgements

Not applicable.

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Figures

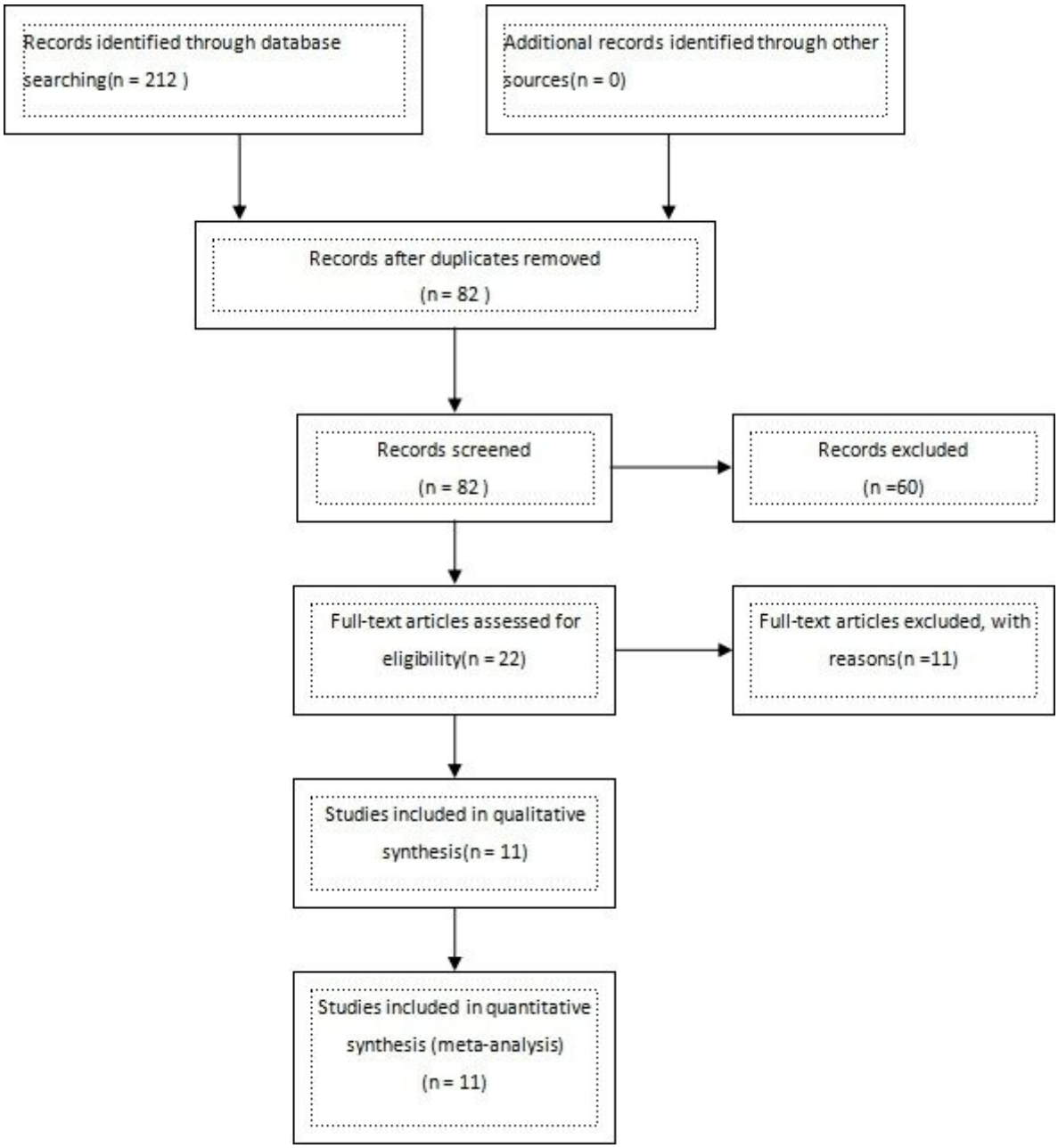

Figure 1

Flowchart

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