



## Associations between suicidal behavior and childhood abuse and neglect: A meta-analysis



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### ARTICLE INFO

#### Keywords:

Childhood maltreatment  
Abuse  
Neglect  
Suicidal behavior  
Meta-analysis

### ABSTRACT

**Background:** Relationships of some types of childhood maltreatment and suicidal behavior remain controversial and inconclusive.

**Methods:** Medline, Embase, PsycINFO and Cochrane library were searched for eligible studies, and the results were synthesized in meta-analyses.

**Results:** childhood maltreatment was associated positively with suicidal behavior in the total population and maltreatment subgroups. Emotional abuse had the strongest effect (OR = 2.33, SMD = 0.660,  $P < 0.001$ ). Subgroup analyses showed that the effects of childhood abuse (OR = 1.55, SMD = 0.523) and neglect (OR = 1.25, SMD = 0.31) were significant. According to the analysis of dichotomous outcomes, childhood maltreatment was associated positively with suicidal behavior in men and women (women: OR = 4.84,  $P < 0.001$ ; men: OR = 1.03,  $P < 0.001$ ). Among populations, childhood maltreatment had the strongest effect on suicidal behavior in the general population (OR = 3.78,  $P < 0.001$ ). However, the analysis of continuous outcomes showed that the effect was strongest in patients with chronic schizophrenia (SMD = 0.89,  $P < 0.001$ ). In addition, childhood maltreatment was associated positively with suicide attempt (OR = 1.11, SMD = 0.48,  $P < 0.001$ ), but not with suicidal ideation.

**Limitations:** Some subgroup samples were not sufficiently large.

**Conclusions:** Childhood maltreatment increases the risk of suicidal behavior. Emotional abuse had the strongest effect among the five types of maltreatment. The risk of suicidal behavior is higher in the general population, women, and individuals with chronic schizophrenia who have histories of childhood maltreatment.

### 1. Introduction

Suicide is a serious public health problem; more than 800,000 suicides occur globally each year, and suicide was the second leading cause of death among 15–29-year-olds worldwide in 2012. (WHO, 2014). Furthermore, Pompili and colleagues (Pompili et al., 2012) reported that more than 2% of traffic accidents constitute suicidal behavior. Suicidal behavior includes suicidal ideation (thoughts and plans of ending one's life), suicide attempt (engagement in potentially self-injurious behavior that does not result in death), and completed suicide (ending one's life). (De la Cruz-Cano, 2016; Thelma Beatriz et al., 2014) Suicidal behavior is affected by multiple factors, such as gender, mental disease, personality traits, economic level, family history of suicide, interpersonal difficulties, family conflict, and anti-

depressant use. (Cho et al., 2016; Menon et al., 2015; Oyesanya et al., 2015; Roy, 2011; Silverman, 2009) In addition, a large body of research shows that childhood maltreatment is a risk factor for suicidal behavior. (Affi et al., 2016; Barbosa et al., 2014; Janiri et al., 2015).

Childhood maltreatment encompasses physical and emotional mistreatment, sexual abuse, and neglect and negligent treatment of children, including commercial and other forms of exploitation. (WHO, 2006) It is a major public health problem worldwide, imposing huge socioeconomic burdens and increasing affected individuals' risk of mental disorders, including suicidal behavior. (Affi et al., 2016; Chang et al., 2016; Holshausen et al., 2016) Child maltreatment is very prevalent. In Canada, the prevalence of child abuse in the general population in 2012 was 32%, attributable mostly to physical neglect (26.0%), followed by sexual abuse (10.1%). (Affi et al., 2014) Survey

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<http://dx.doi.org/10.1016/j.jad.2017.03.060>

Received 7 December 2016; Received in revised form 22 January 2017; Accepted 5 March 2017

Available online 29 March 2017

0165-0327/© 2017 Published by Elsevier B.V.

results have shown that the prevalence of physical child abuse experience in general Chinese populations of students and residents was 36.6%, (Ji and Finkelhor, 2015) with 24.8% of female and 17.6% of male college students reporting experience of one or more types of nonphysical and/or physical childhood sexual abuse before the age of 16 years. (Chen et al., 2010).

In the past few years, several studies have investigated the relationship of childhood maltreatment to suicidal behavior. A meta-analysis showed that childhood sexual abuse increased the risk of suicidal behavior. (Devries et al., 2014) However, several questions remain to be answered. First, some forms of maltreatment were not associated with suicidal behavior in some recent analyses that controlled for confounding variables. For example, Hadland et al. (2015) found in adjusted analyses that physical abuse, emotional abuse, and emotional neglect, but not sexual abuse or physical neglect, increased the risk of suicide attempt. Yildirim et al. (2014) also found that only physical abuse was a predictor of suicide attempt in a logistic regression analysis. Thus, another meta-analysis including these negative results and subgroup analyses according to maltreatment type are needed to test the stability of relationships to suicidal behavior. Second, although mental disorders and childhood maltreatment are known risk factors for suicidal behavior, we do not know whether the coexistence of these factors increases the risk. Third, different scales have been used to measure childhood maltreatment in previous studies, which can increase heterogeneity. Thus, this meta-analysis was conducted to further analyze the interaction between childhood maltreatment and mental disorders, and its effects on suicidal behavior. To increase reliability, only studies in which the Childhood Trauma Questionnaire (CTQ) was used to evaluate childhood maltreatment were included. The CTQ is used to assess emotional, physical, and sexual abuse, as well as emotional and physical neglect (Bernstein et al., 2003). It is used and accepted widely throughout the world, and it has shown high degrees of reliability and validity in populations in many countries (Bernstein et al., 2003). According to the prior research findings described above, we formulated two hypotheses: that different types of childhood maltreatment would increase the risk of suicidal behavior and have different extended effects on this behavior, and that childhood maltreatment would increase the risk of suicidal behavior to different extents in different populations.

## 2. Materials and methods

### 2.1. Search strategy

The following databases were searched through 26 March 2016 to identify articles regarding the association between childhood maltreatment and suicidal behavior risk: Medline, Embase, PsycINFO, the Cochrane Register of Controlled Trials, and the Cochrane Database of Systematic Reviews (Ovid). The following keywords were used: (suicide or suicid\* or parasuicid\*) and (child\$ trauma or child\$ abuse or child abuse and neglect or abuse) and (Childhood Trauma Questionnaire or CTQ)(see Supplement information). To identify additional relevant publications, reference lists of included articles were screened manually.

### 2.2. Inclusion and exclusion criteria

Studies meeting the following criteria were considered for inclusion in this meta-analysis: (a) case-control or cohort study evaluating childhood maltreatment and suicidal behavior, (b) use of the CTQ to evaluate childhood maltreatment, (c) publication in English, and (d) reporting of sufficient data as continuous (CTQ scores) or dichotomous [odds ratios (ORs), relative risks (RRs), and/or hazard ratios (HRs)] outcomes for individuals with/without suicidal behavior. Studies were excluded based on the following: (a) insufficient data for inclusion in the meta-analysis, (b) reporting of only positive results of analyses of

suicidal behavior in which all types of childhood maltreatment were entered together in regression equations, and (c) duplicate reporting. When two or more articles were written by the same authors, we examined the degree of overlap in samples or populations, and used the study with the largest sample in cases of overlap.

### 2.3. Study selection

Articles were selected by the following process. First, titles and abstracts were read, and unrelated studies were excluded. Second, full texts of articles were read, and those not meeting the inclusion criteria were excluded. When two or more similar studies were published by the same authors, we chose the study with the largest sample.

### 2.4. Quality assessment and data extraction

Two authors (JBL and YMF) independently extracted data and assessed the quality of studies included in the meta-analysis using the Newcastle-Ottawa Scale (NOS). The NOS has three broad evaluation categories for case-control and cohort studies: selection, comparability, and exposure. Its validity has been demonstrated, but intra-rater reliability is currently being examined. (Wells et al., 2004) The maximum NOS score is 9, and scores > 5 are usually considered to indicate high methodological quality. (Qi et al., 2015).

The following data were recorded: first author, publication year, country, population, tool used for suicidal behavior assessment, tool used for child maltreatment assessment, outcomes assessed, and adjustment for covariates (Table 1). For dichotomous outcomes, unadjusted or multivariate-adjusted data [ORs, RRs, HRs, and/or 95% confidence intervals (CIs)] were extracted. For continuous variables, we extracted means and standard deviations. We attempted to obtain missing and unreported effect sizes from the study authors.

## 3. Statistical analysis

Data were analyzed using Stata software (version 12.0; Stata Corp., College Station, TX, USA). We performed all meta-analyses using random effects models. For articles reporting simultaneously on suicide attempts and suicidal ideation, we included data of suicidal ideation in the meta-analysis of the total sample. For continuous outcomes, we calculated standardized mean differences (SMDs) and 95% CIs for CTQ scores. SMDs were used to represent the effect sizes of childhood maltreatment scores in suicide attempters and non-attempters. For dichotomous outcomes, we regarded RRs and HRs as ORs and calculated ORs and 95% CIs. ORs were used as a common measure of the association between childhood maltreatment and the risk of suicidal behavior. *P* values were two sided, with a significance level of 0.05.

We performed subgroup analyses according to types of suicidal behavior (suicidal ideation and suicide attempt) and child maltreatment (abuse, neglect, emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect). We also performed meta-analyses to evaluate the association between childhood maltreatment and suicidal behavior in different populations (with and without suicidal behavior, males and females, general population, street youth, substance-dependent patients, prisoners, patients with mood disorder, patients with conversion disorder, and patients with chronic schizophrenia). Heterogeneity was tested using the *Q* test (*P<sub>Q</sub>*).

Begg's funnel plots were used to assess publication bias, and the stability of meta-analysis results was tested by a sensitivity analysis.

## 4. Results

### 4.1. Study characteristics and quality assessment

Of 155 studies initially identified using the search strategy, 23

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