

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

# Child Abuse & Neglect

journal homepage: [www.elsevier.com/locate/chiabuneg](http://www.elsevier.com/locate/chiabuneg)

Invited Review

## Gender differences in the effects of childhood maltreatment on adult depression and anxiety: A systematic review and meta-analysis



Erika Alejandra Giraldo Gallo<sup>a</sup>, Tiago Neuenfeld Munhoz<sup>a</sup>, Christian Loret de Mola<sup>b</sup>, Joseph Murray<sup>a,\*</sup>

<sup>a</sup> Postgraduate Program in Epidemiology, Universidade Federal de Pelotas, Rua Marechal Deodoro, 1160, 3° Piso, Pelotas, RS, Brazil

<sup>b</sup> Graduate School of Nursing, Universidade Federal de Pelotas RS – Brazil, Rua Gomes Carneiro, 01 - Centro Pelotas, RS, Brazil

### ARTICLE INFO

#### Keywords:

Childhood maltreatment  
Abuse  
Neglect  
Depression  
Anxiety  
Meta-analysis

### ABSTRACT

Child maltreatment has well-documented long-term, adverse effects on mental health, but it is not clear whether there are gender differences in these effects. We conducted a systematic review to investigate whether there are gender differences in the effects of maltreatment on adult depression and anxiety. Medline, PsycINFO, Web of Science, and Lilacs were searched for relevant studies published up to May 2016. Eligible studies included population-based studies (with a cohort, case-control or cross-sectional design) which assessed maltreatment during childhood or adolescence ( $\leq 18$  years) and its association with major depression or generalized anxiety disorder (DSM/ICD diagnostic criteria) in adulthood ( $> 18$  years) separately for females and males. Meta-analysis was performed to estimate the association between each exposure and outcome using fixed and random effects models. Pooled odds ratios (OR) were estimated separately for women and men and compared. Five studies of physical and sexual abuse were included in the meta-analyses. These provided twenty-two effects sizes estimates (11 for men, 11 for women) for associations between physical/sexual abuse and depression/anxiety. Exposure to each kind of abuse increased the odds of depression/anxiety. Associations were larger for women than for men, however, these gender differences were not statistically significant. Physical and sexual abuse in childhood/adolescence are risk factors for depression/anxiety in adulthood and the effect could be larger for women; however, currently there is insufficient evidence to definitively identify gender differences in the effects of maltreatment.

### 1. Introduction

According to the World Health Organization (Butchart & Kahane, 2006), maltreatment of children and adolescents, also referred to as abuse and neglect, includes all forms of physical and emotional ill-treatment, sexual abuse, neglect, and exploitation of children that results in actual or potential harm to health, development or dignity. Global estimates from self-report studies suggest that 127 per 1000 people have experienced sexual abuse during childhood, 226 physical abuse, and 363 emotional abuse (Stoltenborgh, Bakermans-Kranenburg, Alink, & van Ijzendoorn, 2015). Sexual abuse tends to be two-three times higher among girls than among boys (Stoltenborgh, Bakermans-Kranenburg, Alink, & van Ijzendoorn, 2015; WHO, 2014). The United Nations' Sustainable

\* Corresponding author.

E-mail addresses: [eralgiga@hotmail.com](mailto:eralgiga@hotmail.com) (E.A.G. Gallo), [tyagomunhoz@hotmail.com](mailto:tyagomunhoz@hotmail.com) (T.N. Munhoz), [chlhz@yahoo.com](mailto:chlhz@yahoo.com) (C. Loret de Mola), [prof.murray@outlook.com](mailto:prof.murray@outlook.com) (J. Murray).

<https://doi.org/10.1016/j.chiabu.2018.01.003>

Received 22 March 2017; Received in revised form 22 December 2017; Accepted 5 January 2018

0145-2134/© 2018 Elsevier Ltd. All rights reserved.

Development Goals include ending abuse, exploitation, trafficking and all forms of violence and torture against children and adolescents (UNDP, 2015).

Maltreatment in childhood and adolescence has important consequences for health throughout the life-course (Gilbert et al., 2009), including depression and anxiety, which are leading causes of the global burden of disease (Whiteford et al., 2013). Many studies show a strong link between childhood abuse and the development of depression and anxiety in adulthood (Chaffin, Silovsky, & Vaughn, 2005; Comijs et al., 2007, Comijs et al., 2013; Cogle, Timpano, Sachs-Ericsson, Keough, & Riccardi, 2010; Fonzo et al., 2016; Harkness, Bruce, & Lumley, 2006; Levitan, Rector, Sheldon, & Goering, 2003; Nanni, Uher, & Danese, 2012; Paul, & Eckenrode, 2015; Sachs-Ericsson, Kendall-Tackett, & Hernandez, 2007; Safren, Gershuny, Marzol, Otto, & Pollack, 2002; Shapero et al., 2014; White, 2011; Widom, DuMont, & Czaja, 2007). A recent meta-analysis of prospective studies found positive associations between abuse in childhood/adolescence and adult depression (OR = 2.0) and anxiety (OR = 2.7) (Li, D'Arcy, & Meng, 2016).

It is not clear whether the effects of abuse on mental health are similar or different for females and males. Depression and anxiety disorders are more common among women compared to men (Kessler et al., 2005), and some research suggests that the effects of abuse may be larger for women (Gershon, Minor, & Hayward, 2008). However, individual empirical studies have had mixed results: some found a stronger association between childhood abuse and depression and anxiety for females (Brensilver, Negri, Mennen, & Trickett, 2011; Dunn, Gilman, Willett, Slopen, & Molnar, 2012; Hanson et al., 2008; Iverson et al., 2013; Moses, 1999; Singer, Anglin, Song, & Lunghofer, 1995; Wainwright, & Surtees, 2002), while others showed similar associations or even larger effects for males (Dinwiddie et al., 2000; Pimlott-Kubiak, & Cortina, 2003; Reinherz, Paradis, Giaconia, Stashwick, & Fitzmaurice, 2003). These differences may be explained by methodological differences between studies, such as their designs, sample differences (clinical samples versus population-based samples, for example), as well as types of exposure and outcome measures.

In 2008, a narrative literature review on gender differences found four studies that showed larger effects of abuse on mental health for women, and seven studies that found no significant differences by gender (Gershon et al., 2008). This review did not use meta-analysis and included studies with various different types of mental health outcomes, such as social phobia, post-traumatic stress disorder, alcohol and drug abuse, behavioural disorders and depression. The aim of the present study was to quantitatively synthesise the current evidence concerning possible gender differences in the effects of maltreatment in childhood and adolescence on the occurrence of depression and anxiety in adulthood.

## 2. Methods

This study followed the protocol proposed by the Preferred Reporting Items for Systematic reviews and Meta-analysis (PRISMA) (Moher, Liberati, Tetzlaff, & Altman, 2009). A search for eligible original articles was conducted in four electronic databases: MEDLINE (1950–2016), PsycINFO (1967–2016), Web of Science (1900–2016) and the Latin American and Caribbean Health Sciences (Lilacs) (1986–2016) from inception to 26 May 2016. The search terms used for the outcomes of interest were: "depression," "anxiety," "common mental health" and "internalizing". The search terms used for the exposures of interest were: "abuse", "neglect" and "maltreatment". The combination of search terms was performed using the following connectors: ("depression" OR "anxiety" OR "common mental health" OR "internalizing") AND ("abuse" OR "neglect" OR "maltreatment"). The initial search was not restricted by age, date of publication or language.

After the search process, references were imported into EndNote software (Thompson Reuters, USA) and duplicate references were excluded. We also examined reference lists from all prior literature reviews found in our search, regarding the effects of maltreatment on mental health (Chen et al., 2010; Gershon et al., 2008; Hillberg, Hamilton-Giachritsis, & Dixon, 2011; Infurna et al., 2016; Li et al., 2016; Lindert et al., 2014; Maniglio, 2009; Nanni et al., 2012; Norman et al., 2012; Ribeiro, Andreoli, Ferri, Prince, & Mari, 2009; Trevillion, Oram, Feder, & Howard, 2012).

Original population-based studies were included in the review (including cohort, case and control, and cross-sectional studies) that evaluated maltreatment occurring during childhood or adolescence ( $\leq 18$  years) and major depression or generalized anxiety disorder in adulthood ( $> 18$  years). Eligible studies must have used DSM or ICD diagnostic criteria to define their outcome, and report measures of association separately for women and men. We excluded studies that evaluated institutionalized children or specific minorities (e.g. children with special needs, and juvenile offenders, among others).

Study screening was performed independently by two reviewers (EAG and TNM). Initially, duplicate records were excluded, titles were screened and abstracts reviewed. Finally, full-text articles were examined (see Fig. 1). When an article met all inclusion criteria but did not report results stratified by gender, we sent an e-mail to the authors asking for this information.

Discrepancies between the two reviewers conducting the screening were reviewed and discussed to reach a consensus. When necessary, a third author was consulted (JM). Subsequently, the methodological quality of included articles was evaluated (by EAG and TNM) with an adapted version of the checklist developed by Downs & Black (1998). Of the 27 questions in the original version, we used 19 for our review, excluding the items referring to clinical trials. This checklist assesses the quality of study reporting, and its external validity and internal validity.

To evaluate the association between maltreatment and depression/anxiety, we conducted independent meta-analyses for each of the maltreatment exposures in the included studies (physical abuse and sexual abuse) and separately for each outcome (depression and anxiety). All analyses were stratified by gender. The heterogeneity of the models was evaluated using the  $I^2$  statistic. To estimate combined effects we calculated pooled odds ratios (OR), using fixed effects models when the  $I^2$  was  $< 30\%$  and random effects models when otherwise. A random effects model was used in most of the analysis because of the observed heterogeneity. Meta-regression using a Chi-square test (modified by Knapp-Hartung) was conducted to evaluate whether the pooled associations were different for women and men. A single study which was eligible for the review, but for which no other studies examined the same

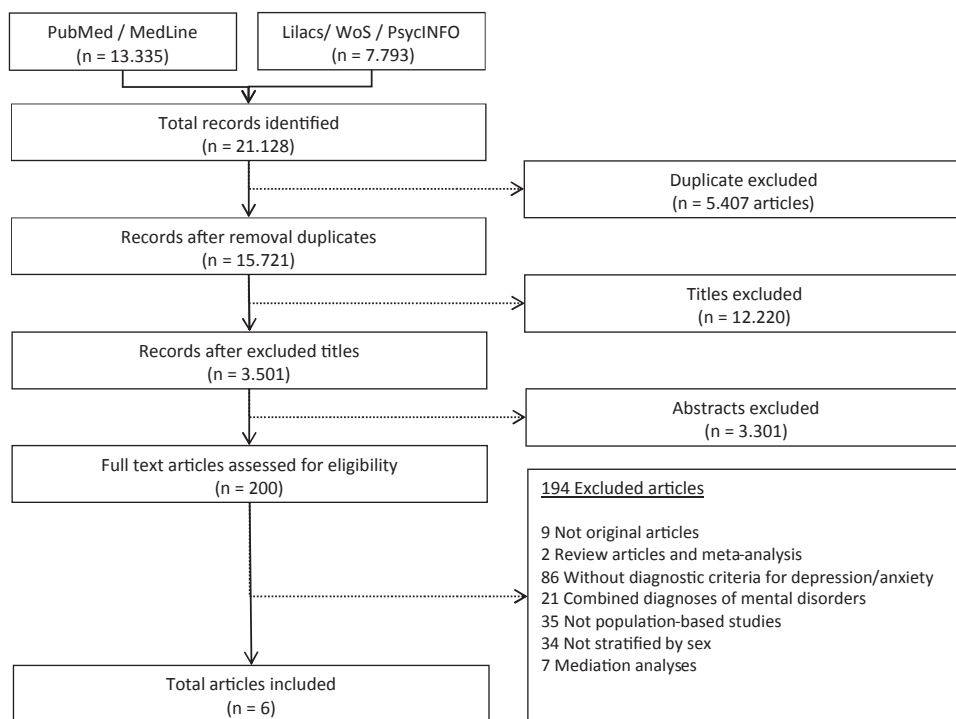


Fig. 1. Flow diagram of search and screening process.

exposure variable (abuse-neglect) was reported in the text but not included in meta-analyses.

Although in individual primary studies it is common to consider an interaction test significant if  $p < 0.20$ , in a meta-analysis, with greater statistical power, we considered interaction tests comparing effects for women and men significant if  $p < 0.05$ . All analyses were conducted using Stata version 12.0.

### 3. Results

We identified 21,128 records across all electronic databases (13,335 were located in MedLine/Lilacs and 7793 in WoS and PsycInfo). After removing 5407 duplicates, we screened 15,721 titles and abstracts; of these, we selected 200 articles for reading in full and finally six articles met our inclusion criteria, five of which were included in meta-analyses (results from the sixth study are reported in the text below because it did not examine the same type of maltreatment as the other studies). Overall, nearly half of the retrieved studies were excluded because they did not use diagnostic criteria (DSM/ICD) for measuring depression/anxiety. Detailed information on inclusion/exclusion is shown in Fig. 1.

Details of the six included studies are presented in Table 1. They were published between 1996 and 2011. Two were cohort studies (Silverman, Reinherz, & Giaconia, 1996; Widom et al., 2007), one used a case-control design (Arnou, Blasey, Hunkeler, Lee, & Hayward, 2011), and three were cross-sectional studies (Cogle et al., 2010; MacMillan et al., 2001; Molnar, Buka, & Kessler, 2001). Sample sizes ranged from 375 (Silverman et al., 1996) to 7016 (MacMillan et al., 2001). All studies were from North America, five from US and one from Canada. Three studies (Arnou, Blasey, Hunkeler, Lee, & Hayward, 2011; MacMillan et al., 2001; Silverman et al., 1996) evaluated maltreatment using confidential questionnaires and two studies (Cogle et al., 2010; Molnar et al., 2001) conducted a standardized interview by trained personnel using a structured interview; one study identified maltreatment via court records (Widom et al., 2007). In all studies, depression and anxiety were assessed by structured diagnostic interviews conducted by trained interviewers. The ages of the participants at the time of assessment of depression/anxiety varied between 21 and 54 years. Based on the checklist of Downs & Black (1998), the average methodological quality score for the included studies was 14.5 out of a maximum score of 19, indicating good methodological quality (Supplementary Table S1).

Of the six included studies, five examined physical/sexual abuse as a possible cause of depression/anxiety, and were meta-analysed (Arnou et al., 2011; Cogle et al., 2010; MacMillan et al., 2001; Molnar et al., 2001; Silverman et al., 1996). We extracted 22 estimates (11 for men, 11 for women) of the association between child physical/sexual abuse and adult depression/anxiety from these five studies. Six estimates were for the association between physical abuse and depression (Arnou et al., 2011; MacMillan et al., 2001; Silverman et al., 1996), six for the association between sexual abuse and depression (Arnou et al., 2011; MacMillan et al., 2001; Molnar et al., 2001), two for physical abuse and anxiety (Cogle et al., 2010; MacMillan et al., 2001) and three for sexual abuse and anxiety (Cogle et al., 2010; MacMillan et al., 2001; Arnou et al., 2011). All 12 estimates evaluating the association between physical and sexual abuse on depression, and nine out of ten estimates for anxiety, were positive, indicating that exposure to abuse in

**Table 1**  
Methodological characteristics of studies included in the systematic review and meta-analysis.

| Author Year Country                 | Design          | Study   | N participants % Response      | Average age in years | Exposure                    | Exposure Measure  | Outcome | Diagnostic Criteria | Adjusted for  |
|-------------------------------------|-----------------|---|--------------------------------|----------------------|-----------------------------|---|---------|---------------------|---|
| Amow et al. (2011) US               | Case - Control  | N.A. 2002   | Men 2402<br>Women 3271<br>58%  | 53.3                 | Physical abuse Sexual abuse | Childhood Trauma Questionnaire (Self-report)  | MDD     | PRIME-MD, DSM-IV    | Age, marital status, education level and ethnicity.   |
| Cougle et al. (2010) US             | Cross-Sectional | National Comorbidity Survey-Replication 2001–2003 | Men 1822<br>Women 2319<br>N.I. | 49.9                 | Physical abuse Sexual abuse | Study questionnaire + Post-traumatic stress disorder screening (Interview)          | GAD     | WMH-CIDI, DSM-IV    | Age, ethnicity, marital status, childhood divorce/loss of parent, and income.   |
| MacMillan et al. (2001) Canada      | Cross-Sectional | Ontario Health Survey 1990 - 1991                 | Men 3338<br>Women 3678<br>67%  | 36.1                 | Physical abuse Sexual abuse | Child maltreatment history (Self-report)  | MDD GAD | CIDI, DSM-III-R     | Sex, age, and socioeconomic status (current family income and parental education).  |
| Molnar et al. (2001) US             | Cross-Sectional | National Comorbidity Survey 1990–1992             | Men 2945<br>Women 2921<br>82%  | 33.2                 | Sexual abuse                | Post-traumatic stress disorder assessment + The conflict tactics scales (Interview) | MDD GAD | CIDI, DSM-III       | Age cohort, race, divorced parents, parental psychopathology, parental verbal and physical abuse, parental substance use problems and dependence, and the log odds of the outcome for each year at risk |
| Silverman et al. (1996) US          | Cohort          | N.A Started 1977                                  | Men 188<br>Women 187<br>N.I.   | 21.0                 | Physical abuse              | Childhood Trauma Questionnaire (Self-report)  | MDD     | DSM-III R           | None  |
| Widom et al. (2007) <sup>a</sup> US | Cohort          | N.A Started 1967                                  | Men 613<br>Women 582<br>75.9%  | 28.7                 | Abuse/neglect               | Court records   | MDD     | DIS-III-R           | None  |

<sup>a</sup> This study was not included in the meta-analyses because no other study examined the same exposure variable (Abuse/neglect). N.A.: Not applicable. N.I.: Not informed. PRIME-MD: self-administered version of the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire. WMH-CIDI: World mental health survey initiative version of the World Health Organization composite international diagnostic interview. CIDI: The World Health Organization composite international diagnostic interview. DIS-III-R: NIMH Diagnostic Interview Schedule, Version III-R.

**Table 2**

Meta-analysis and meta-regression of associations between abuse and depression and anxiety, stratified by sex.

| Study             | Women                   | Men                     | p-value                 |
|-------------------|-------------------------|-------------------------|-------------------------|
|                   | OR (95%CI)              | OR (95%CI)              |                         |
| <b>Depression</b> |                         |                         |                         |
| Physical Abuse    | Arnow et al. (2011)     | 1.49 (1.03–2.16)        | 1.46 (1.23–1.73)        |
|                   | MacMillan et al. (2001) | 3.24 (2.47–4.25)        | 1.61 (1.39–1.86)        |
|                   | Silverman et al. (1996) | 6.20 (1.16–33.08)       | 6.16 (0.99–38.41)       |
|                   | <b>Pooled OR</b>        | <b>2.53 (1.26–5.09)</b> | <b>1.55 (1.33–1.81)</b> |
|                   | <b>I-squared</b>        | <b>83,60%</b>           | <b>31,40%</b>           |
| Sexual Abuse      | Arnow et al. (2011)     | 1.33 (0.88–2.02)        | 1.46 (1.20–1.77)        |
|                   | MacMillan et al. (2001) | 3.88 (3.31–4.55)        | 1.78 (0.80–3.96)        |
|                   | Molnar et al. (2001)    | 1.80 (1.40–2.31)        | 1.80 (0.89–3.65)        |
|                   | <b>Pooled OR</b>        | <b>2.14 (1.11–4.15)</b> | <b>1.50 (1.25–1.80)</b> |
|                   | <b>I-squared</b>        | <b>95,10%</b>           | <b>0%</b>               |
| <b>Anxiety</b>    |                         |                         |                         |
| Physical Abuse    | Cogle et al. (2010)     | 1.63 (1.22–2.18)        | 1.35 (0.90–2.03)        |
|                   | MacMillan et al. (2001) | 2.17 (1.32–3.57)        | 1.65 (1.14–2.40)        |
|                   | <b>Pooled OR</b>        | <b>1.75 (1.36–2.25)</b> | <b>1.51 (1.14–1.98)</b> |
|                   | <b>I-squared</b>        | <b>0%</b>               | <b>0%</b>               |
| Sexual Abuse      | Cogle et al. (2010)     | 1.47 (1.13–1.92)        | 2.42 (0.97–6.03)        |
|                   | MacMillan et al. (2001) | 2.36 (1.73–3.22)        | 1.07 (0.67–1.71)        |
|                   | Molnar et al. (2001)    | 1.40 (0.94–2.09)        | 0.90 (0.50–1.61)        |
|                   | <b>Pooled OR</b>        | <b>1.70 (1.23–2.37)</b> | <b>1.18 (0.74–1.87)</b> |
|                   | <b>I-squared</b>        | <b>68,50%</b>           | <b>39,70%</b>           |

OR = Odds Ratio; 95%CI = 95%Confidence Interval; p value = p value for meta-regression test of gender differences in pooled ORs.

childhood/adolescence increased risk for depression/anxiety in adulthood (Table 2).

The results of the meta-analysis showed that, in general, the odds of depression and anxiety associated with childhood abuse were higher for women than for men. For women, the pooled association (OR) between physical abuse and depression was 2.53 (95% CI = 1.26–5.09), while for men it was 1.55 (95% CI = 1.33–1.81). Similarly, the pooled OR for sexual abuse and depression was 2.14 (95% CI = 1.11–4.15) for women but 1.50 (95% CI 1.25–1.80) for men. Considering sexual abuse, the pooled OR for the occurrence of generalized anxiety disorder for women was 1.70 (95% CI = 1.23–2.37) and 1.18 (95% CI = 0.74–1.87) for men. However, for each of these associations, the gender difference between the pooled ORs was not significant (Table 2).

The sixth study that was eligible for this review but that could not be meta-analysed, because it was the only study that examined exposure to abuse-neglect, was conducted by Widom et al. (2007). Based on a sample of 613 boys and 582 girls, the association between overall maltreatment and the diagnosis of depression was higher in women (OR = 1.58, 95% CI 1.01–2.48;  $p = 0.04$ ) when compared to men (OR = 1.31 95% CI = 0.74–2.33;  $p = 0.63$ ), although, again, this difference was not statistically significant (information provided by the author).

#### 4. Discussion

This meta-analysis synthesized evidence from population-based studies on possible gender differences in the effects of physical and sexual abuse in childhood/adolescence on major depression and generalized anxiety in adulthood. Among the six included studies, 23 of 24 effect sizes were positive, and meta-analysis of 22 effect sizes clearly showed that exposure to physical abuse and sexual abuse in childhood or adolescence increases risk for depression and anxiety in adulthood. Meta-analysis showed that associations between physical abuse and sexual abuse with depression and anxiety were larger for women than men; however, these differences were not statistically significant.

The results of this review concerning gender differences should be treated with caution due to the small number of eligible studies, resulting in low statistical power for comparing between genders, and the high heterogeneity observed between studies. Comparing the effects of maltreatment between genders essentially involves testing an interaction effect of gender\*maltreatment in predicting adult mental health. The limited power to detect interaction effects, even in quite large samples, is well documented, and some researchers even suggest lowering the threshold of statistical significance when testing for interactions (Marshall, 2007). In this meta-analytic review, we maintained the traditional, more conservative level of statistical significance ( $p < 0.05$ ), and conclude that further studies are required to confirm or reject the hypothesis of gender differences in effects of maltreatment on depression/anxiety. Many studies were not included in the current review because they did not report results stratified by gender or did not use diagnostic criteria to assess depression/anxiety. Hence, the use of diagnostic assessment criteria and stratification of results by gender in future studies would help build a stronger evidence base to draw firmer conclusions about whether effects of maltreatment are similar or different for females and males.

While emphasising that the current evidence base on gender differences is inconclusive, we briefly consider potential biological and psychosocial explanations for a possible increased vulnerability to depression and anxiety among women compared to men following abuse. According to the classical proposal of [Cutler and Nolen-Hoeksema \(1991\)](#), girls are more likely to blame themselves for the occurrence of stressful life events, including maltreatment, thus causing greater vulnerability to low self-esteem and other symptoms related to depression. Another explanation for possible gender differences focuses on the range of consequences maltreatment can have for children - while girls are at particular risk of internalizing problems, including depression and anxiety, boys are more likely to develop externalizing problems following abuse ([Hanson et al., 2008](#)). According to this explanation, both genders are likely to be adversely affected by maltreatment, but manifestations of the trauma may take different forms. Differences in the reactions of girls and boys in relation to stressful events could be related to genetic predispositions that influence hormonal systems ([Goldstein, Holsen, Handa, & Tobet, 2014](#)). For example, men have higher concentrations of testosterone, while women have higher concentrations of oestrogens ([Gillies, & McArthur, 2010](#)), and these differences may moderate how females and males respond to stress, with higher levels of oestrogens putting women at greater risk of mood disorders following stressful life events ([Steiner et al., Steiner, Dunn, & Born, 2003](#), [Chaney et al., 2014](#); [Fink, Sumner, Rosie, Grace, & Quinn, 1996](#)). It is also possible that gender inequalities in social expectations and behavioural norms cause greater risk for depression/anxiety after maltreatment for females compared with males ([Bebbington, 1996](#); [Diaz-Granados et al., 2011](#)).

#### 4.1. Strengths and limitations

To our knowledge this is the only systematic review and meta-analysis on this topic. The main limitation of the review was the small number of eligible primary studies, reducing statistical power for detecting significant gender differences in meta-analysis. Another possible limitation is publication bias – studies that found no gender differences might have been less likely to publish results stratified by gender, which was required to be included in this review. Because of the small number of studies, we did not test this using the Egger test or funnel plots. However, to probe the possibility of publication bias for this reason, we examined again 11 studies that had met all inclusion criteria except that they failed to stratify results by gender (they were not included in the review). Among those 11 studies, four tested for an interaction between child gender and abuse in predicting depression or anxiety, and all interaction tests were reported as non-significant. This could mean that excluded studies without stratified results failed to find gender differences, or it could mean that studies had low statistical power to detect such interactions.

Of the six studies included in this review, three adjusted their estimates for other variables, mainly socioeconomic factors, when estimating effects of maltreatment separately for females and males, and only one study ([Molnar et al., 2001](#)) adjusted for other forms of violence – domestic violence between parents. Another limitation was that other forms of maltreatment, apart from physical and sexual abuse, could not be meta-analysed. It would have been desirable to meta-analyse possible gender differences in the effects of other kinds of abuse, such as neglect or emotional abuse, but insufficient data were available to do this. Finally, another important consideration is that all included studies were conducted in high-income countries in North America, where gender inequalities are generally lower than in low- and middle-income countries ([Piccinelli, & Wilkinson, 2000](#)). Therefore, future research in other world regions is needed to confirm the lifelong effects of abuse for both sexes across different cultural and socioeconomic contexts.

#### 4.2. Implications and conclusion

The current study emphasises the importance of reporting results on associations between maltreatment and psychopathology stratified by gender, given the low statistical power in individual studies, and even in meta-analysis, to detect significant gender differences. Future systematic reviews that include more primary studies could examine whether there are differences in effects also according to the developmental period in which maltreatment takes place, and methodological characteristics of the included studies, such as which confounding factors were adjusted for in analyses.

The results of this review support the idea that physical abuse and sexual abuse in childhood and adolescence are predictors of the occurrence of depression and anxiety in adulthood, and indicate that the impact of these exposures are serious for both genders. However, currently, there is insufficient evidence to definitively answer the question of whether there are gender differences in the effects of physical and sexual abuse on depression and anxiety.

#### Authors' contributions

EAG and JM designed the study and data collection tools. EAG and TNM conducted the data collection. EAG and CLMZ wrote the statistical analysis plan, cleaned and analysed the data. EAG and JM drafted the paper. All authors revised the paper.

#### Competing interests

All authors declare no conflict of interest.

#### Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.chiabu.2018.01.003>.

## References

- Arnou, B. A., Blasey, C. M., Hunkeler, E. M., Lee, J., & Hayward, C. (2011). Does gender moderate the relationship between childhood maltreatment and adult depression? *Child Maltreatment*, 16(3), 175–183.
- Bebbington, P. (1996). The origins of sex differences in depressive disorder: Bridging the gap. *International Review of Psychiatry*, 8(4), 295–332.
- Brensilver, M., Negri, S., Mennen, F. E., & Trickett, P. K. (2011). Longitudinal relations between depressive symptoms and externalizing behavior in adolescence: Moderating effects of maltreatment experience and gender. *Journal of Clinical Child Adolescent Psychology*, 40(4), 607–617.
- Butchart, A., & Kahane, T. (2006). *Preventing child maltreatment: A guide to taking action and generating evidence* (accessed 13.06.2016) Retrieved from Geneva: World Health Organization and International Society for Prevention of Child Abuse and Neglect. [www.who.int/violence\\_injury\\_prevention/publications/violence/child\\_maltreatment/en/](http://www.who.int/violence_injury_prevention/publications/violence/child_maltreatment/en/).
- Chaffin, M., Silovsky, J. F., & Vaughn, C. (2005). Temporal concordance of anxiety disorders and child sexual abuse: Implications for direct versus artifactual effects of sexual abuse. *Journal Clinical Child Adolescent Psychology*, 34(2), 210–222 Epub 2005/05/20.
- Chaney, A., Carballedo, A., Amico, F., Fagan, A., Skokauskas, N., Meaney, J., et al. (2014). Effect of childhood maltreatment on brain structure in adult patients with major depressive disorder and healthy participants. *Journal of Psychiatry & Neuroscience: JPN*, 39(1), 50–59 Epub 2013/08/01.
- Chen, L. P., Murad, M. H., Paras, M. L., Colbenson, K. M., Sattler, A. L., Goranson, E. N., et al. (2010). Sexual abuse and lifetime diagnosis of psychiatric disorders: Systematic review and meta-analysis. *Mayo Clinic Proceedings*, 85(7), 618–629 Epub 2010/05/12.
- Comijs, H. C., Beekman, A. T., Smit, F., Bremmer, M., van Tilburg, T., & Deeg, D. J. (2007). Childhood adversity, recent life events and depression in late life. *Journal of Affective Disorders*, 103(1–3), 243–246 Epub 2007/02/13.
- Comijs, H. C., van Exel, E., van der Mast, R. C., Paauw, A., Oude Voshaar, R., & Stek, M. L. (2013). Childhood abuse in late-life depression. *Journal of Affective Disorders*, 147(1–3), 241–246.
- Cougle, J. R., Timpano, K. R., Sachs-Ericsson, N., Keough, M. E., & Riccardi, C. J. (2010). Examining the unique relationships between anxiety disorders and childhood physical and sexual abuse in the National Comorbidity Survey-replication. *Psychiatry Research*, 177(1–2), 150–155.
- Cutler, S. E., & Nolen-Hoeksema, S. (1991). Accounting for sex differences in depression through female victimization: Childhood sexual abuse. *Sex Roles*, 24(7), 425–438.
- Diaz-Granados, N., McDermott, S., Wang, F., Posada-Villa, J., Saavedra, J., Rondon, M. B., et al. (2011). Monitoring gender equity in mental health in a low-, middle-, and high-income country in the Americas. *Psychiatric Services*, 62(5), 516–524 Epub 2011/05/03.
- Dinwiddie, S., Heath, A. C., Dunne, M. P., Bucholz, K. K., Madden, P. A., Slutske, W. S., et al. (2000). Early sexual abuse and lifetime psychopathology: A co-twin-control study. *Psychological Medicine*, 30(1), 41–52 Epub 2000/03/18.
- Downs, S., & Black, N. (1998). The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology and Community Health*, 52, 377–384.
- Dunn, E. C., Gilman, S. E., Willett, J. B., Slopen, N. B., & Molnar, B. E. (2012). The impact of exposure to interpersonal violence on gender differences in adolescent-onset major depression: Results from the National Comorbidity Survey Replication (NCS-R). *Depression and Anxiety*, 29(5), 392–399 Epub 2012/03/27.
- Fink, G., Sumner, B. E., Rosie, R., Grace, O., & Quinn, J. P. (1996). Estrogen control of central neurotransmission: Effect on mood, mental state, and memory. *Cellular and Molecular Neurobiology*, 16(3), 325–344 Epub 1996/06/01.
- Fonzo, G. A., Ramsawh, H. J., Flagan, T. M., Simmons, A. N., Sullivan, S. G., Allard, C. B., et al. (2016). Early life stress and the anxious brain: Evidence for a neural mechanism linking childhood emotional maltreatment to anxiety in adulthood. *Psychological Medicine*, 46(5), 1037–1054.
- Gershon, A., Minor, K., & Hayward, C. (2008). Gender, victimization, and psychiatric outcomes. *Psychological Medicine*, 38(10), 1377–1391 Epub 2008/04/05.
- Gilbert, R., Widom, C. S., Browne, K., Fergusson, D., Webb, E., & Janson, S. (2009). Burden and consequences of child maltreatment in high-income countries. *The Lancet*, 373(9657), 68–81.
- Gillies, G. E., & McArthur, S. (2010). Estrogen actions in the brain and the basis for differential action in men and women: A case for sex-specific medicines. *Pharmacological Reviews*, 62(2), 155–198.
- Goldstein, J. M., Holsen, L., Handa, R., & Tobet, S. (2014). Fetal hormonal programming of sex differences in depression: Linking women's mental health with sex differences in the brain across the lifespan. *Frontiers in Neuroscience*, 8, 247.
- Hanson, R. F., Borntrager, C., Self-Brown, S., Kilpatrick, D. G., Saunders, B. E., Resnick, H. S., et al. (2008). Relations among gender, violence exposure, and mental health: The national survey of adolescents. *The American Journal of Orthopsychiatry*, 78(3), 313–321 Epub 2009/01/07.
- Harkness, K. L., Bruce, A. E., & Lumley, M. N. (2006). The role of childhood abuse and neglect in the sensitization to stressful life events in adolescent depression. *Journal of Abnormal Psychology*, 115(4), 730–741 Epub 2006/11/15.
- Hillberg, T., Hamilton-Giachritsis, C., & Dixon, L. (2011). Review of meta-analyses on the association between child sexual abuse and adult mental health difficulties: A systematic approach. *Trauma, Violence & Abuse*, 12(1), 38–49 Epub 2011/02/04.
- Infurna, M. R., Reichl, C., Parzer, P., Schimmenti, A., Bifulco, A., & Kaess, M. (2016). Associations between depression and specific childhood experiences of abuse and neglect: A meta-analysis. *Journal of Affective Disorders*, 90, 47–55 Epub 2015/10/20.
- Iverson, K. M., McLaughlin, K. A., Gerber, M. R., Dick, A., Smith, B. N., Bell, M. E., et al. (2013). Exposure to interpersonal violence and its associations with psychiatric morbidity in a U.S. national sample: A gender comparison. *Psychology of Violence*, 3(3), 273–287 Epub 2013/07/01.
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey replication. *Archives of General Psychiatry*, 62(6), 593–602.
- Leviton, R. D., Rector, N. A., Sheldon, T., & Goering, P. (2003). Childhood adversities associated with major depression and/or anxiety disorders in a community sample of Ontario: Issues of co-morbidity and specificity. *Depression and Anxiety*, 17(1), 34–42 Epub 2003/02/11.
- Li, M., D'Arcy, C., & Meng, X. (2016). Maltreatment in childhood substantially increases the risk of adult depression and anxiety in prospective cohort studies: Systematic review, meta-analysis, and proportional attributable fractions. *Psychological Medicine*, 46(04), 717–730 Epub 2015/12/29.
- Lindert, J., von Ehrenstein, O. S., Grashow, R., Gal, G., Braehler, E., & Weisskopf, M. G. (2014). Sexual and physical abuse in childhood is associated with depression and anxiety over the life course: Systematic review and meta-analysis. *International Journal of Public Health*, 59(2), 359–372 Epub 2013/10/15.
- MacMillan, H. L., Fleming, J. E., Streiner, D. L., Lin, E., Boyle, M. H., Jamieson, E., et al. (2001). Childhood abuse and lifetime psychopathology in a community sample. *American Journal of Psychiatry*, 158(11), 1878–1883 Epub 2001/11/03.
- Maniglio, R. (2009). The impact of child sexual abuse on health: A systematic review of reviews. *Clinical Psychology Review*, 29(7), 647–657 Epub 2009/09/08.
- Marshall, S. W. (2007). Power for tests of interaction: Effect of raising the type I error rate. *Epidemiologic Perspectives & Innovations*, 4, 4.
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Reprint—preferred reporting items for systematic reviews and meta-analysis: the PRISMA statement. *Physical Therapy*, 89(9), 873–880 Epub 2009/09/03.
- Molnar, B. E., Buka, S. L., & Kessler, R. C. (2001). Child sexual abuse and subsequent psychopathology: Results from the National Comorbidity Survey. *American Journal of Public Health*, 91(5), 753–760 Epub 2001/05/10.
- Moses, A. (1999). Exposure to violence, depression, and hostility in a sample of inner city high school youth. *Journal of Adolescence*, 22(1), 21–32 Epub 1999/03/06.
- Nanni, V., Uher, R., & Danese, A. (2012). Childhood maltreatment predicts unfavorable course of illness and treatment outcome in depression: A meta-analysis. *American Journal of Psychiatry*, 169(2), 141–151.
- Norman, R. E., Byambaa, M., De, R., Butchart, A., Scott, J., & Vos, T. (2012). The long-term health consequences of child physical abuse, emotional abuse, and neglect: A systematic review and meta-analysis. *PLoS Medicine*, 9(11), e1001349 Epub 2012/12/05.
- Paul, E., & Eckenrode, J. (2015). Childhood psychological maltreatment subtypes and adolescent depressive symptoms. *Child Abuse & Neglect*, 47, 38–47.
- Piccinelli, M., & Wilkinson, G. (2000). Gender differences in depression: Critical review. *The British Journal of Psychiatry*, 177(6), 486–492.
- Pimlott-Kubiak, S., & Cortina, L. M. (2003). Gender, victimization, and outcomes: Reconceptualizing risk. *Journal of Consulting and Clinical Psychology*, 71(3), 528.
- Reinherz, H. Z., Paradis, A. D., Giaconia, R. M., Stashwick, C. K., & Fitzmaurice, G. (2003). Childhood and adolescent predictors of major depression in the transition to adulthood. *American Journal of Psychiatry*, 160(12), 2141–2147 Epub 2003/11/26.

- Ribeiro, W. S., Andreoli, S. B., Ferri, C. P., Prince, M., & Mari, J. J. (2009). Exposição à violência e problemas de saúde mental em países em desenvolvimento: Uma revisão da literatura. *Revista Brasileira de Psiquiatria*, *31*, S49–S57.
- Sachs-Ericsson, N., Kendall-Tackett, K., & Hernandez, A. (2007). Childhood abuse, chronic pain, and depression in the National Comorbidity Survey. *Child Abuse & Neglect*, *31*(5), 531–547.
- Safren, S. A., Gershuny, B. S., Marzol, P., Otto, M. W., & Pollack, M. H. (2002). History of childhood abuse in panic disorder, social phobia, and generalized anxiety disorder. *The Journal of Nervous and Mental Disease*, *190*(7), 453–456.
- Shapiro, B. G., Black, S. K., Liu, R. T., Klugman, J., Bender, R. E., Abramson, L. Y., et al. (2014). Stressful life events and depression symptoms: The effect of childhood emotional abuse on stress reactivity. *Journal of Clinical Psychology*, *70*(3), 209–223.
- Silverman, A. B., Reinherz, H. Z., & Giaconia, R. M. (1996). The long-term sequelae of child and adolescent abuse: A longitudinal community study. *Child Abuse & Neglect*, *20*(8), 709–723 Epub 1996/08/01.
- Singer, M. I., Anglin, T. M., Song, L. Y., & Lunghofer, L. (1995). Adolescents' exposure to violence and associated symptoms of psychological trauma. *JAMA : The Journal of the American Medical Association*, *273*(6), 477–482 Epub 1995/02/08.
- Steiner, M., Dunn, E., & Born, L. (2003). Hormones and mood: From menarche to menopause and beyond. *Journal of Affective Disorders*, *74*(1), 67–83 Epub 2003/03/21.
- Stoltenborgh, M., Bakermans-Kranenburg, M. J., Alink, L. R. A., & van Ijzendoorn, M. H. (2015). The prevalence of child maltreatment across the globe: Review of a series of meta-analyses. *Child Abuse Review*, *24*(1), 37–50.
- Trevillion, K., Oram, S., Feder, G., & Howard, L. M. (2012). Experiences of domestic violence and mental disorders: A systematic review and meta-analysis. *PLoS One*, *7*(12), e51740 Epub 2013/01/10.
- United Nations (2015). *The sustainable development objectives. Transforming our world: The 2030 agenda for sustainable development*. (Accessed 14 June 2016) Retrieved from: <http://www.pnud.org.br/ods.aspx>.
- Wainwright, N. W., & Surtees, P. G. (2002). Childhood adversity, gender and depression over the life-course. *Journal of Affective Disorders*, *72*(1), 33–44 Epub 2002/09/03.
- White, C. (2011). Childhood maltreatment is linked to recurrent depression. *British Medical Journal (Clinical Research Ed.)*, *343*, d5246 Epub 2011/08/19.
- WHO. World Health Organization (2014). *Child maltreatment* (Accessed 13 June 2016) Media centre, Fact sheet N°150. December 2014. Retrieved from:<http://www.who.int/mediacentre/factsheets/fs150/en/>.
- Whiteford, H. A., Degenhardt, Louisa, Rehm, Jürgen, Baxter, Amanda J., Ferrari, Alize J., Erskine, Holly E., ... Vos, Theo (2013). Global burden of disease attributable to mental and substance use disorders: Findings from the global burden of disease study 2010. *The Lancet*, *382*(9904), 1575–1586.
- Widom, C. S., DuMont, K., & Czaja, S. J. (2007). A prospective investigation of major depressive disorder and comorbidity in abused and neglected children grown up. *Archives of General Psychiatry*, *64*(1), 49–56 Epub 2007/01/03.