Review article

Long-term influences of parental divorce on offspring affective disorders: A systematic review and meta-analysis

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ABSTRACT

Background: The prevalence of divorce in Western countries has increased in recent decades. However, there is no recent systematic review and/or meta-analysis of studies testing for long-term effects of parental divorce on offspring affective disorders. The present study conducted a systematic review and meta-analysis of studies published since 1980 testing for the association between parental divorce and offspring depression and anxiety in adulthood.
Method: PUBMED, Science Direct, Medline, PsychInfo, and PsychArticles databases were searched for eligible studies. Random-effect meta-analyses were used to synthesize effect sizes and to test whether associations of parental divorce with offspring affective disorders differed among three publication periods (i.e., before 1996, 1996–2005, 2006–2015).
Results: In total, 29 studies were eligible for the systematic review, and 18 studies were included in the meta-analyses (depression: $n=21{,}581$; anxiety: $n=2472$). There was significant association between parental divorce and offspring depression (OR=1.56; 95%CI [1.31, 1.86]), but not anxiety (OR=1.16; 95%CI [0.98, 1.38]). The effect of parental divorce on offspring depression was not weaker in the reports published in more recent decades.
Limitations: There is limited research in relation to offspring anxiety in adulthood.
Conclusions: Parental divorce is associated with an increased risk of adult offspring depression, with no indication of the effect being weaker in recent publications.

1. Introduction

Affective disorders, such as depression and anxiety, are the most prevalent mental health problems in both children and adults (Beaumont and Lofts, 2013; Merikangas et al., 2011). A multitude of research suggests that adverse childhood experiences are a major risk factor for the development of affective disorders (Chapman et al., 2004). Parental divorce is the most common type of childhood adversity, second only to family socio-economic disadvantage (Sacks et al., 2014). Indeed, divorce prevalence rates have dramatically increased in recent decades. For example, in the UK, the estimated prevalence rate of divorce was 22% in 1972, but by 2012, it had increased to 42% (Office for National Statistics, 2012). In other Western countries, such as the USA, the estimated prevalence rate of divorce is similarly very high (43%) (National Center for Health Statistics, 2012). This means that a large number of children are at increased risk of negative consequences associated with parental divorce. Indeed, previous research (for example, see: Amato and Keith, 1991; Reid and

Crisafulli, 1990) has demonstrated that children whose parents have divorced have higher levels of emotional and behavioural problems, and lower academic achievement and social functioning than do children whose parents have not divorced (Lansford, 2009).

From a developmental perspective, it is extremely important to determine whether exposure to early adversity, such as parental divorce, shows effects later in life. Two meta-analyses published more than 25 years ago (Amato and Keith, 1991; Reid and Crisafulli, 1990) posit that parental divorce is associated with a variety of negative consequences in adult offspring, including an increased risk of emotional problems. However, as noted above divorce rates have more than doubled in the last decades (Office for National Statistics, 2012). As divorce becomes more commonplace and it is associated with less stigma in a modern society, the negative associations between parental divorce and offspring mental health outcomes should have declined over time. However, few studies have examined whether the associations have remained stable over time (Sigle-Rushton et al., 2005). Moreover, there is some evidence to suggest that although divorce and

separation have become more common than they once were, the impact they have on mental health has not decreased (Lacey et al., 2012). Therefore, as more studies have been published in the last 25 years, it is possible to explore the effect of publication year on the long-term association between parental divorce and offspring mental health.

In addition, study quality is likely to have changed during this time, including study design, sample size and study settings, all of which can influence the association. However, whether these study-related characteristics affect the reported results is yet to be explored.

Finally, it remains unclear whether the effects of parental divorce can differ for males and females. Some studies have shown that whilst male children of divorce demonstrate higher rates of behavioural problems in childhood and adulthood, female children of divorce demonstrate higher rates of emotional problems which usually only emerge in early adulthood (Rodgers, 1994; Wauterickx et al., 2006). Some studies have also suggested that boys are more vulnerable to the short-term effects of childhood parental divorce (Hetherington, 1997), whereas females are more vulnerable to the long-term effects, such as in late adolescence and early adulthood (Rodgers, 1994).

The present study aimed to conduct a systematic review and meta-analysis of studies published between 1980 and 2015. First, we explored the association between parental divorce in childhood and affective disorders, such as depression and anxiety, in adult offspring. Second, we tested whether the association differed for publications at different time periods and for studies of different quality, sample size and settings. Finally, we explored a possible moderation effect of sex of offspring on this association.

2. Method

2.1. Study selection

The review was conducted in accordance with the MOOSE (Meta-analysis Of Observational Studies in Epidemiology) guidelines (Stroup et al., 2000) and was approved by the University of Sussex School of Psychology Research Ethics Committee. Studies examining the relationship between parental separation in childhood and adult affective disorders were identified through searches of five databases: PUBMED, Science Direct, Medline, PsychInfo and PsychArticles. Search terms were as following: (*parent* divorc* OR parent* separation) AND (depress* OR anxi* OR emotion* OR affect* OR disorder*). Pilot searches were conducted in order to test the sensitivity and specificity of the search terms. Reference lists and citations of eligible articles were examined for identification of any eligible study not previously located through the database search.

2.2. Inclusion and exclusion criteria

A number of inclusion and exclusion criteria were identified. First, studies were required to satisfy general inclusion criteria: papers were required to be an original empirical study, published in a peer-reviewed journal, written in English, published between 1980 and 2015 and to use human participants. At this stage, other meta-analyses and reviews, and papers utilising animal models were excluded. Second, studies were required to satisfy design criteria: cross-sectional, case-control or prospective cohort design studies were included. Studies measuring treatment or intervention effects were excluded. Third, studies were required to satisfy outcome variable criteria: those with clinical diagnostic or symptom measurement of affective disorder after the age of 18 years were included. Diagnostic outcomes included: unipolar depressive episode, major depression, generalized anxiety disorder, panic disorder, phobias, social anxiety disorder, post-traumatic stress disorder, obsessive-compulsive disorder, or health anxiety based on Diagnostic and Statistical Manual of Mental Disorders, Research Diagnostic Criteria, International Classification of Diseases, or other psychiatric or psychological evaluations. Dimensional outcomes of

depression or anxiety on standardized scales were also eligible. Studies including any other co-morbid psychiatric disorders or symptoms were excluded. Studies that focused solely on bipolar disorder were also excluded due to the phases of mania characteristic of this disorder which can often include symptoms of psychosis (National Health Service, 2013). Lastly, studies were required to satisfy predictor variable inclusion criteria: parental separation was defined as parental divorce or relationship separation, and studies were required to report on parental separation before the age of 16 years. Studies that focused on parental death, parental incarceration or adoption were excluded.

2.3. Data extraction

Data were extracted from eligible studies collected for the systematic review using a meta-analysis coding frame; author, year, sample information and results were extracted. The quality of each study was assessed using the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines (Elm et al., 2007). For each section of a paper, a score (1 'meets the criteria' or 0 'does not meet the criteria") was given. A total score sum and percentage was calculated for each paper. Using the calculated mean of the STROBE score as a threshold, a binary variable indicating high or low quality of studies was created.

All regression coefficients were converted to odds ratios (ORs) using an online antilogarithm calculator: http://ncalculators.com/number-conversion/anti-log-logarithm-calculator.htm. Logarithms of beta values were calculated to produce the ORs, and logarithms of the beta values +/- (standard error *1.96) were calculated to produce 95% confidence intervals. The values reflected the probability of presenting affective disorder adulthood, with odds ratios over 1 reflecting a greater likelihood. When available, effect sizes for total sample, and males and females separately, were recorded. Effect sizes for depression and anxiety outcomes were analysed separately. Since significance testing requires that effect sizes are independent, only one effect size per sample for each affective disorder type was included. Effect sizes were synthesised using the log odd ratios (LORs), and were weighted using the inverse of their variance. LORs were then exponentiated (*re*-converted to odd ratios) for ease of interpretation. In studies that reported effect sizes for both unadjusted and adjusted (for covariates) models, results from adjusted models were included in the meta-analysis.

2.4. Statistical analysis

The meta-analyses were conducted in R Studio version 3.2, 2015 (R Core Team, 2015). Random-effects models were fitted using the Metaphor package (Viechtbauer, 2010); random effects models assume that effect size variance can be explained by both systematic and random components (Lipsey and Wilson, 2001). Analyses were conducted for depression or anxiety separately.

Random-effects models meta-regressions were conducted to investigate effects of potential moderators. Gender (males versus females), sample size (small versus large), study quality (low versus high), study setting (community versus school), and publication year (before 1996, 1996–2005, 2006–2015) were investigated as potential moderators for the association between parental divorce and adult affective problems in offspring. For analysis examining the effect of study quality, a binary variable was created using the mean STROBE score in order to differentiate high and low quality studies. Similarly, for testing the effect of sample size, a binary variable using the mean sample size as a threshold to differentiate small and large sample sizes was created.

Regression analyses to test funnel plot asymmetry by Egger et al. (1997) were conducted, and trim fill funnel plots were created in order to test for publication bias.