Child death and maternal psychosis-like experiences in 44 low- and middle-income countries: The role of depression

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ABSTRACT

Background: Studies on the effect of child death on the mental wellbeing of women in low- and middle-income countries (LMICs) are scarce despite the high child mortality rates. Thus, the aim of the current study was to assess the association between child death and psychosis-like experiences (PLEs), as well as the role of depression in this association.

Methods: Data from 44 LMICs which participated in the World Health Survey (WHS) were analyzed. A total of 59,444 women who ever gave birth, aged 18–49 years, without a self-reported lifetime psychosis diagnosis, were included in the analysis. The World Mental Health Survey version of the Composite International Diagnostic Interview (CIDI) was used to establish the diagnosis of past 12-month DSM-IV depression, and assess four positive psychotic symptoms. Depression was defined as self-reported lifetime depression diagnosis and/or past 12-month depression. Multivariable logistic regression analyses were performed.

Results: After adjustment for potential confounders, women who experienced child death had higher odds for all types of PLEs (when unadjusted for depression) (OR 1.20–1.71; $p < 0.05$) and depression (OR = 1.64; 95%CI = 1.39–1.93). When adjusted for depression, only delusion of control was strongly associated with child death (OR = 1.54; 95%CI = 1.20–1.97).

Conclusions: Child death may be an important determinant of mental wellbeing among women in LMICs. Given the known adverse health outcomes associated with PLEs and depression, as well as the co-occurrence of these symptoms, mental health care may be particularly important for mothers who have experienced child loss in LMICs.

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1. Introduction

Psychotic symptoms such as hallucinations and delusions are known to be highly prevalent in the general population, with a rate of 7.2% being reported from a recent meta-analysis (Linscott and van Os, 2013). This figure is about 10 times higher than that of schizophrenia. Psychotic symptoms that fall beneath standard diagnostic thresholds in terms of persistence, intensity, or associated impairment, are commonly referred to as psychosis-like experiences (PLEs). PLEs indicate modestly increased risk for the future development of psychotic disorders (Werbeloff et al., 2012), and are associated with a myriad of adverse health outcomes, including increased mortality (Sharifi et al., 2015). There is currently growing interest in the etiology of PLEs with recent evidence pointing to an important role of stressful life events or trauma in the emergence of PLEs. For example, population-based studies have shown that childhood adversities (Bentall et al., 2012), bullying (Kelleher et al., 2013), and sexual abuse (Murphy et al., 2014) increase risk for PLEs. It has been postulated that stressful events may lead to the dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis and cause subsequent hyper-responsive subcortical dopamine activity manifesting as PLEs in vulnerable individuals (Corcoran et al., 2003), while affective factors such as depression may also be mediators in this association (Fisher et al., 2013).

In low- and middle-income countries (LMICs) where child mortality rates are much more elevated than in high-income countries, child

death may be an important etiological factor in the emergence of PLEs. The death of a child is considered to be the most stressful and traumatic event that a parent can experience (Rubin and Malkinson, 2001), resulting in long-lasting depression (Rogers et al., 2008), psychiatric hospitalization including those due to schizophrenia and affective disorders (Li et al., 2005), and increased mortality (Li et al., 2003). Yet, there is only one existing study on child death and PLEs that we are aware of. This study used data from the U.S. National Comorbidity Survey-Replication and found that parents who lost a child had a 1.52 times higher odds to report PLEs than parents who did not lose a child (95%CI = 0.98–2.36) (Devylder et al., 2013). However, this study only provided an unadjusted estimate, and may have been underpowered. Further, this study was conducted in a high-income country where child death is rare. Thus, using data on women of childbearing age who ever gave birth from 44 LMICs, the main objectives of the current study were: (a) to examine the association between child death and maternal PLEs, and the extent to which depression explains this association; and (b) to assess how multiple child deaths, time from last child death, and child age at death are associated with PLEs and depression among the subsample of women who experienced child death.

2. Methods

2.1. The survey

The World Health Survey (WHS) was a cross-sectional survey conducted in 70 countries in 2002–2004. The details of the WHS are provided in http://www.who.int/healthinfo/survey/en/. Briefly, 60 countries used stratified multi-stage random cluster sampling, while the remaining 10 conducted single-stage random sampling to obtain the study sample. All adults aged ≥18 years with a valid home address were eligible to participate. Of the eligible participants in a household, one individual was randomly chosen. Standard translation procedures for the survey questionnaire were followed to allow for comparability across countries. Information on participants was collected by interviews conducted by trained interviewers. Individual level response rates were over 82%. Post-stratification corrections were made to sampling weights to adjust for non-response and the population distribution patterns reported by the United Nations Statistical Division. Ethical boards at each study site granted ethical approval for the survey with all participants providing written informed consent.

Data from 69 countries were publically available but we excluded 10 countries as sampling information was not available. Of the remaining countries, 46 countries had information on birth history among women aged 18–49 years. Since the focus of the study was on LMICs, two high-income countries were excluded (Spain and United Arab Emirates) resulting in a total of 44 countries being included in the analysis. Of these countries, the data were nationally representative for all countries with the exception of China, Comoros, the Republic of Congo, Ivory Coast, India, and Russia.

2.2. Variables

2.2.1. Psychotic symptoms

The Composite International Diagnostic Interview (CIDI) 3.0 (Kessler and Ustun, 2004) was used to assess four types of past 12-month psychotic symptoms: delusional mood, delusion of reference and persecution, delusion of control, and hallucination. The exact questions used can be found in eTable 1 (supplementary material). Having any PLEs referred to endorsing at least one of the four above-mentioned psychotic symptoms. A high level of concordance between the psychosis module and clinician ratings has been reported (Cooper et al., 1998).

2.2.2. Child death and other variables on birth history

Women of childbearing age (18–49 years) who had ever given birth were asked to provide information on every birth she had given. Data on

maternal age, interview date, and for each child, data on live status, current age, and date of birth were available in addition to information on the date and age at death if the child had died. These data were used to establish the number of live children and child deaths experienced, maternal age at first childbirth, number of child deaths, time from last child death, and child age at death. If there were two or more child deaths, the minimum age at death was used for the variable on child age at death. The mother was considered to have experienced child death if any of the children had died.

2.2.3. Depression

Depression was defined as either or both: (a) past 12-month depression based on duration and persistence of depressive symptoms using the DSM-IV algorithm; and (b) self-reported lifetime depression diagnosis. The details of the algorithms used to establish past-12 month depression are provided in eTable 2 (Supplementary material).

2.2.4. Other variables

Country-wise wealth quintiles were created using principal component analysis based on 15–20 assets depending on the country. Education was based on the highest level of education attained (no formal education, primary education, secondary or high school completed, and tertiary education completed).

2.3. Statistical analysis

Statistical analyses were performed using Stata 14.1 (Stata Corp LP, College station, Texas). The analytical sample was restricted to women aged 18–49 years who ever gave birth. Since the focus of this study was on psychotic symptoms that do not reach the clinical threshold, women who self-reported a lifetime diagnosis of psychosis were excluded from the analysis. The difference in sample characteristics by the presence of child death was tested by Chi-squared tests and Student's t-tests for categorical and continuous variables respectively.

We used multivariable logistic regression to analyze the pooled sample to assess the association between ever having experienced child death as the exposure variable and PLEs (delusional mood, delusion of reference and persecution, delusion of control, hallucination, and any PLE) or depression as the outcomes. Furthermore, we also conducted multivariable logistic regression analyses to assess whether multiple child deaths, months from last child death (>120, 61–120, 13–60, ≤12), and child age (months) at death (≤1, 2–12, 13–60, >60) were associated with risks for any PLEs or depression among the subsample of women who experienced child death.

All the regression analyses were adjusted for maternal age, wealth, education, number of live children, maternal age (years) at first birth (<20, 20–29, ≥30), and country. The selection of the control variables was based on past literature (DeVylder et al., 2014; Li et al., 2005). For the analysis on the association between child death and PLEs, we also show the results of models adjusted for depression. Country was adjusted for by including dummy variables for each country. With the exception of age and number of live children (continuous variables), all variables were included in the models as categorical variables. We used Taylor linearization methods in all analyses to account for the sample weighting and complex study design. Results from the logistic regression analysis are presented as odds ratios (ORs) with 95% confidence intervals (CIs). The level of statistical significance was $p < 0.05$.

3. Results

After the restriction to women aged 18–49 years who ever gave birth, the sample size was 60,919, which was further reduced to a final sample of 59,444 after exclusion of women with a self-reported lifetime psychosis diagnosis. The sample size for each country is provided in eTable 3 (supplementary material). The percentage of women