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# Anxiety disorders and obsessive compulsive disorder 9 months after perinatal loss

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ABSTRACT

*Objective:* Perinatal loss (stillbirth after 20 weeks of gestational age or infant death in the first month) impacts one to two infants per hundred live births in the United States and can be a devastating experience for parents. We assessed prevalence of anxiety disorders and obsessive compulsive disorder (OCD) among bereaved and live-birth mothers.

*Methods:* We collaborated with the Michigan Department of Community Health to survey Michigan mothers with perinatal death or live birth. We measured symptoms of generalized anxiety disorder, social phobia, panic disorder and OCD using validated written self-report screens and collected data on maternal demographics, psychiatric history, social support and intimate partner violence.

*Results:* A total 609/1400 mothers (44%) participated, returning surveys 9 months postdelivery. Two hundred thirty-two mothers had live birth, and 377 had perinatal loss. In unadjusted analyses, bereaved mothers had higher odds of all four disorders. In logistic regression adjusted for covariates, bereaved mothers still had higher odds of moderate–severe generalized anxiety disorder [odds ratio (OR): 2.39, confidence interval (CI): 1.10–5.18, $P = .028$] and social phobia (OR: 2.32, CI: 1.52–3.54, $P < .0005$) but not panic disorder or OCD.

*Conclusion:* Bereaved mothers struggle with clinically significant anxiety disorders in the first year after perinatal loss; improved identification and treatment are essential to improve mental health for this vulnerable population.



## 1. Introduction

In the United States, for every 100 live births, roughly one to two infants die during the perinatal period — the last half of pregnancy and first month after delivery [1]. These losses often are sudden and unanticipated, and may have powerful psychological effects on the surviving parents. Perinatal death strikes many parents as incomprehensible — they may have spent months anticipating birth, and a baby's death is out of order of usual life experiences and a shock to parental expectations [2,3]. Parents may experience the world as no longer feeling safe and predictable, and they may realize they are vulnerable in ways they did not previously recognize [4].

Although grief itself is a normal human reaction, some individuals suffer from complicated grieving experiences, and mental health disorders can be comorbid with normal grief [5,6]. Most parents weather the storm of perinatal loss, but some families struggle to recover from this event [7–9]. Similarly, while anxiety is a normal thread through grief for most parents, for some, it can become severe or persistent [4,10]. Such symptoms may impact current functioning, employment and parenting of other children and can be carried over into a subsequent pregnancy [11–13].

Prior research on perinatal bereavement has focused primarily on depression and posttraumatic stress as well as the general construct of "anxiety," without narrowing to specific anxiety disorders [10,12,14]. Much of the previous work also has suffered from convenience sampling, small sample size and lack of control groups, limiting the generalizability of the results.

To address the limitations in prior research we measured the prevalence of generalized anxiety disorder (GAD), social phobia, panic disorder and obsessive compulsive disorder (OCD) in a large epidemiologically based sample of bereaved and live birth mothers. We utilized written questionnaires which screened for these disorders using the criteria of the American Psychiatric Association. We also evaluated whether mothers who were currently pregnant after their loss would have higher levels of anxiety since this has been previously described in small studies [4,10,15].

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## 2. Methods

As part of a broader study of maternal health outcomes for bereaved and live birth mothers, we conducted a longitudinal survey of mothers in Michigan with a perinatal death — either a stillbirth (above 20 weeks of gestational age and at least 400 g) or an early infant death in the first 28 days of life. We also surveyed control mothers who had a live birth with a surviving infant. The goal of the larger study was to document maternal mental and physical well-being, reproductive health, hospital care during loss and subsequent pregnancy outcomes over time. This manuscript reports on results from the first wave of the survey sent at 6 months postdelivery.

### 2.1. Recruitment

We collaborated with the Michigan Department of Community Health (MDCH) to survey a representative sample of mothers in Michigan. Using information from birth certificates as well as fetal and infant death certificates, MDCH sent mailings to 900 consecutive mothers bereaved by perinatal death and 500 control mothers who had a live birth in the same time period. Inclusion criteria were age 18 or above, able to complete an English-language questionnaire, residents of Michigan and mothers with a baby not given up for adoption (for mothers with a live birth). To preserve confidentiality of mothers, we provided MDCH with blank survey packets, and they used vital records data to mail the first package at approximately 6 months after delivery without providing any maternal identifiers to the study team. Nonresponders were sent up to three identical mailings and a reminder postcard over several months to encourage response. The first mailing included a $10 cash incentive.

The top page of the survey was a written consent form providing informed consent to participate in the study and permission to view variables from the baby's birth, fetal death or infant death certificate from MDCH. Participating mothers returned the consent form, a completed survey, and name and contact information to the study team in a prestamped envelope. Mothers who did not wish to participate could simply not respond or could return a card with an anonymous study ID; MDCH then removed that mother from their mailing list. Since all participating mothers provided contact information to the study team, mailings for subsequent waves of the broader study at 14 and 24 months after delivery were sent directly by the team without involving MDCH and were only sent to those mothers who had responded to the 6-month mailing. At the conclusion of the study, MDCH provided the team with aggregate, deidentified demographic information about nonresponders. The study was approved by the Institutional Review Board (IRB) at the University of Michigan and the IRB at the Michigan Department of Community Health.

### 2.2. Measures

To measure mental health disorders, we selected brief, validated self-report instruments. To assess GAD, we used the GAD-7 and used a score of 10 or higher to indicate moderate or severe anxiety, which gives 89% sensitivity and 82% specificity [16]. For social phobia, we used the Mini Social Phobia Inventory (MINI-SPIN) and coded the test as positive for a score of 6 or above, which has been shown to give a sensitivity of 89% and specificity of 90% [17]. Panic disorder was measured with the Primary Care Evaluation of Mental Disorders (PRIME-MD) Patient Health Questionnaire Panic Module [18]. We evaluated OCD using the revised version of the Obsessive Compulsive Inventory and used a cutoff of 21 and above for positive screen [19].

Women were provided a list of specific mental health disorders and asked if they had "ever been told by a doctor, therapist, counselor, or medical professional" that they had each condition and also asked about current symptoms and past and current treatment. This format mirrors questions on the National Health and Nutrition Examination Survey for medical conditions which ask if a "doctor or other health professional has ever told you that you have" specific diseases and then asks about current symptoms and treatment [20]. In our survey, a diagnosis or treatment for any of these conditions (depression, bipolar disorder, anxiety, panic disorder, phobias, posttraumatic stress disorder, OCD, hallucinations or eating disorders) was considered past medical history of a psychiatric disorder. We asked control mothers if the problem started before the birth of their baby and asked bereaved mothers if the problem started before their baby's death. The Patient Health Questionnaire-8 was utilized to evaluate depressive symptoms, and a score of 10 or greater was considered a positive screen [21]. We adapted questions from the national Pregnancy Risk Assessment Monitoring System to evaluate intimate partner violence (IPV) from the woman's husband or partner during the pregnancy [22]. Social support was measured using the Medical Outcomes Study Social Support Survey (MOS-SSS) brief version which gives a score of 5–20, with higher numbers indicating greater support [23].

### 2.3. Data analysis

We compared the mental health outcome for bereaved versus nonbereaved mothers in an unadjusted $\chi^2$ analysis as well as via logistic regression controlling for demographic factors which included maternal age, race, insurance type, level of education, and days between the birth/loss and completion of the survey. We also added additional covariates associated with each disorder based on prior findings from the literature. For example, for all disorders, we included a measure of current depression and a variable for prior psychiatric disorder since these have been shown to be predictive of anxiety disorders and OCD [24–27]. We also included variables to measure current social support and intimate partner violence during pregnancy [28–30]. Finally, since mothers with a loss have been noted to have increased anxiety during subsequent pregnancies, we conducted unadjusted analysis of the relationship between current pregnancy status (yes/no) and each of the mental health outcomes; these analyses were limited to bereaved mothers.

Because of the possibility of response bias between women who consented to participate in the study and those who did not, we performed an additional sensitivity analysis. We first identified demographic variables that discriminated between the two groups based on a logistic regression in which being a survey respondent was the outcome variable. A weight was calculated from this logistic regression that equaled the reciprocal of the predicted probability of being a respondent. Subsequently, a weighted logistic regression was run with each of the four mental health outcomes.

We evaluated racial differences in rates of positive screens using $\chi^2$ test. Women were asked if they were currently being treated for any of a variety of mental health conditions; the question defined treatment as "with medication, counseling, group therapy, or other treatments." We compared treatment rates among different subgroups using both $\chi^2$ test and Fisher's Exact tests due to small cell size for some outcomes.

Level of significance for all analyses was set at $P = .05$. We used the Hosmer–Lemeshow test to test goodness of fit. We calculated the area under the receiver operating characteristic (AUROC) for each logistic regression analysis to assess the predictive discrimination of the model.

## 3. Results

Of 1400 initial mailings, we received a total of 609 completed and eligible surveys (44% overall response rate); 232 (46%) were returned by mothers with a live birth and surviving child and 377 (42%) by mothers with a perinatal death.

Respondents were on average 29 years old at the time of their delivery and completed their survey a median of 9 months after the index birth or loss; these variables did not differ between bereaved and nonbereaved mothers. Four hundred eighty-three mothers (79%) were Caucasian race; 92 (15%) were African–American (Table 1), More than half of women had private health insurance at the time of