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The prevalence and determinants of antepartum mental health problems among women in the USA: a nationally representative population-based study

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Abstract

Mental health problems disproportionately affect women, particularly during childbearing years. We sought to estimate the prevalence of antepartum mental health problems and determine potential risk factors in a representative USA population. We examined data on 3,051 pregnant women from 11 panels of the 1996–2006 Medical Expenditure Panel Survey. Poor antepartum mental health was defined by self report of mental health conditions or symptoms or a mental health rating of “fair” or “poor.” Multivariate regression analyses modeled the odds of poor

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antepartum mental health; 7.8% of women reported poor antepartum mental health. A history of mental health problems increased the odds of poor antepartum mental health by a factor of 8.45 (95% CI, 6.01–11.88). Multivariate analyses were stratified by history of mental health problems. Significant factors among both groups included never being married and self-reported fair/poor health status. This study identifies key risk factors associated with antepartum mental health problems in a nationally representative sample of pregnant women. Women with low social support, in poor health, or with a history of poor mental health are at an increased risk of having antepartum mental health problems. Understanding these risk factors is critical to improve the long-term health of women and their children.

Keywords

Pregnancy; Mental health; Prevalence; Population-based; Antepartum mental health

Introduction

Serious mental health problems disproportionately affect women (Kessler 2003) and are particularly prevalent during childbearing years (Kornstein 2001; Weissman and Jensen 2002; Weissman and Olfson 1995). Among mothers, these disorders can have a profound negative impact on the long-term health (Davidson et al. 2000; Eaton 2002; Jonas and Lando 2000), quality of life (Gaynes et al. 2002; Hays et al. 1995; Wells et al. 1992), and well-being of their children (Billings and Moos 1983; Jaenicke et al. 1987; Lee and Gotlib 1989; Schwartz et al. 1990; Weissman et al. 1987; Zuckerman and Beardslee 1987). Moreover, pregnant women with poor mental health may be at increased risk for poor birth outcomes such as having a small for gestational age (Mutale et al. 1991), preterm, or low birth weight baby (Copper et al. 1996).

The frequency of mental health problems among pregnant and non-pregnant women is roughly the same (Kessler et al. 1994; Williams et al. 1995), although capturing the extent of the problem is challenging because experiences of pregnancy often mirror symptoms of depression and anxiety (Kelly et al. 2001; Klein and Essex 1994). Estimates of antepartum mental health problems range from 8.5% to 23%, reflecting substantial heterogeneity in study populations, research questions, and methods (Andersson et al. 2003; Evans et al. 2001; Holcomb et al. 1996; Johanson et al. 2000; Kelly et al. 2001; Vesga-Lopez et al. 2008). The prevalence of and risk factors for poor antepartum mental health have been investigated using a variety of: (1) mental health outcomes, including depression, anxiety, substance use disorders, or a combination thereof; and (2) potential risk factors and confounders including demographic, social, behavioral, or health factors. Furthermore, these studies' methodologies varied in: (1) the measurement of mental health, utilization of diagnostic interviews, screeners, and/or self-reported symptoms; (2) measurement of risk factors and confounders; (3) the time during pregnancy when data were collected; and (4) the sample selection.

Most of the current literature on the correlates of poor mental health during pregnancy is from clinic-based studies of pregnant women. While these studies may have limited generalizability to the entire population (Bolton et al. 1998), they provide a valuable enumeration of evidence regarding which pregnant women are more likely to experience poor mental health. One of the most salient risk factors for poor antepartum mental health is having a prior history of such problems (Bilszta et al. 2008; Borjesson et al. 2005; Buesching et al. 1986; Marcus et al. 2003; Mora et al. 2009; Lancaster et al. 2010; Rich-Edwards et al. 2006). Women who are younger (Borjesson et al. 2005; Kearns et al. 1997; Paarlberg et al. 1996), African-American (Jesse and Swanson 2007; Orr et al. 2006), in poor

physical health (Marcus et al. 2003), unemployed (Bolton et al. 1998; Borjesson et al. 2005; Marcus et al. 2003), or having their first baby (Kearns et al. 1997; Records and Rice 2007) may also be at greater a risk. In addition, women with limited or no social support (Demyttenaere et al. 1995; Jesse and Swanson 2007; Kearns et al. 1997; Lancaster et al. 2010; Lee et al. 2007; Leigh and Milgrom 2008; Rudnicki et al. 2001; Seguin et al. 1995; Westdahl et al. 2007), low socioeconomic status (Bolton et al. 1998; Holzman et al. 2006; Kearns et al. 1997; Marcus et al. 2003), public insurance (Canady et al. 2008; Jesse 2003; Jesse et al. 2005; Kermode et al. 2000; Lancaster et al. 2010), poor coping skills or sense of control (Bernazzani et al. 1997; Da Costa et al. 2000; Demyttenaere et al. 1995; Rudnicki et al. 2001), low self-esteem (Jesse and Swanson 2007; Jesse et al. 2005; Lee et al. 2007; Leigh and Milgrom 2008; Ritter et al. 2000), chronic stress (Jesse and Swanson 2007; Monk et al. 2008; Mora et al. 2009; Paarlberg et al. 1996; Seguin et al. 1995), alcohol or substance abuse problems (Marcus et al. 2003; Mora et al. 2009; Pajulo et al. 2001), or a history of childhood or adult abuse (Benedict et al. 1999; Holzman et al. 2006; Jesse and Swanson 2007; Lancaster et al. 2010; Leigh and Milgrom 2008; Nayak and Al-Yattama 1999) are more susceptible to having antepartum mental health problems. Pregnant women are also at an increased risk if they are unmarried (Bolton et al. 1998; Marcus et al. 2003; Orr et al. 2006; Westdahl et al. 2007), not living with a partner (Canady et al. 2008; Hobfoll et al. 1995; Lancaster et al. 2010; Marcus et al. 2003; Orr et al. 2006; Rich-Edwards et al. 2006; Seguin et al. 1995), or are unhappy in their marriage (Bilszta et al. 2008; Gotlib et al. 1989; Henry et al. 2004; Lee et al. 2007; Records and Rice 2007). Women who report stressful life events (Lancaster et al. 2010; Leigh and Milgrom 2008; Rubertsson et al. 2003; Seguin et al. 1995) or an unplanned or unwanted pregnancy (Lancaster et al. 2010; Lee et al. 2007; Mora et al. 2009; Rich-Edwards et al. 2006) are also at a greater risk according to previous research. A history of obstetrical problems, such as complications, miscarriage, abortion, or stillbirth also has been reported to elevate the risk of antepartum mental health problems (Larsson et al. 2004; Rubertsson et al. 2003). Job-related variables, such as the number of hours worked per week, may be associated with antepartum mental health status (Paarlberg et al. 1996); however, the importance of this variable is not well understood. As noted previously, these studies varied greatly in the specific outcomes, correlates, and confounders that were included in analyses, as well as the measurement and sampling methods that were used.

Importantly, many of the existing studies are based on convenience samples; in fact, we are aware of only one study on the prevalence and risk factors of antepartum psychological problems in a sample representative of the USA population (Vesga-Lopez et al. 2008). This study had several strengths, including the use of diagnostic interviews and a comparison group of non-pregnant women. However, the definition of psychopathology used in this study was a composite of many specific disorders, which reduces its ability to predict specific mental health problems. In addition to depression, anxiety, and other more severe mood disorders, the authors' definition of psychopathology included any alcohol use disorder, any drug use disorder, and nicotine dependence. While nicotine dependence and mood disorders may have similar risk factors, these conditions are very distinct from one another. Moreover, the mechanisms by which these factors impact both poor birth outcomes and maternal and child postpartum outcomes (proximate and throughout the life course) are likely quite different. In order to understand the factors associated with poor mental health during pregnancy, a more narrow definition is important. The only other population-based studies to date are from Sweden (Borjesson et al. 2005; Larsson et al. 2004; Rubertsson et al. 2003). However, significant differences in the socio-environmental stresses and health care resources experienced by pregnant women in the USA may preclude the generalization of Swedish reports to USA populations.

In summary, additional research is needed to: (1) estimate the national prevalence in the USA of antepartum mental health problems across the pregnancy period; and (2) identify risk factors associated with antepartum mental health problems while controlling for confounders. The current study provides nationally representative prevalence estimates and investigates the independent associations of a wide variety of risk factors with poor antepartum mental health, while examining the effects of mental health before pregnancy.

Our research draws upon a framework of perinatal health developed by Misra and colleagues (2003) that integrates the life course developmental perspective (Halfon and Hochstein 2002) with a model of health determinants (Evans and Stoddart 1990). This model posits that perinatal health is influenced by both cumulative effects of events across the lifespan and intergenerational effects. In addition, multiple determinants and their interactions likely influence women's health during pregnancy. Central to this framework is the idea that key health determinants prior to and during pregnancy have an important impact on having poor antepartum mental health.

Methods

Data

Medical Expenditure Panel Survey—Data are from the household component of the 1996–2006 Medical Expenditure Panel Survey (MEPS). The household component of the MEPS collects information about medical conditions, health status, healthcare use, and expenditures. The survey has an overlapping panel design, gathering information through five rounds of data collection over a 2.5 year period. Each year, a new panel begins with a sample selected from the households who participated in the previous year's National Health Interview Survey, which yields a nationally representative sample of the civilian, non-institutionalized population of the USA, with oversampling for blacks and Hispanics. Data are available from 11 panels of the 1996–2006 MEPS. Detailed methodology and a description of data available in MEPS are available at http://www.meps.ahrq.gov.meps.web.

Pregnancy detail files—At each round of data collection, if a woman in the household was pregnant, additional data specific to pregnancy were obtained. Because the pregnancy data are not publicly available, the Agency for Healthcare Research and Quality Data Center created a custom dataset incorporating pregnancy data from each of the 11 panels that was linked to the household component dataset.

Sample

Women included in the 11 panels of the pregnancy detail files who had pre-pregnancy and antepartum data were eligible for this analysis (n=3,552). Subjects were excluded from the dataset if they had missing information on age, race/ethnicity, education, marital/partner status, poverty threshold categories, or physical health status during pregnancy (n=76) or a zero person weight (n=313). Furthermore, women who reported other mental health conditions, besides depression or anxiety, and/or did not report depression, anxiety, or poor self-reported mental health (n=112), were excluded from the analysis. The final sample thus includes 3,051 pregnant women. Only one pregnancy per woman was included in the analysis. If a woman had more than one eligible pregnancy based on the previous exclusion criteria (n=309), a single pregnancy was randomly selected for inclusion in the analysis. A flag was subsequently created to document the number of pregnancies during the MEPS period.

Variable definitions

Dependent variable: antepartum mental health status—A woman was categorized as having poor antepartum mental health if she reported any of the following during an interview round when she was pregnant: (1) having a mental health condition; (2) "feeling sad, blue, or anxious about something"; or (3) being in "fair" or "poor" mental health when asked, "In general, would you say that your mental health is excellent, very good, good, fair, or poor?" (Cohen et al. 1996). A woman was categorized as having poor antepartum mental health if she met any of these conditions for poor mental health during a round that she also reported being pregnant. Self-reported conditions were assigned truncated 3-digit *International Classification of Diseases, Ninth Revision* (ICD-9) codes. ICD-9 codes 296 (episodic mood disorders), 300 (anxiety state, unspecified), and 311 (depression, unspecified), were considered indicators of poor mental health. While code 296 includes major depressive disorder and other episodic mood disorders, over 96% of women with depression in the sample were identified using code 311 (depression, unspecified).

Independent variables—Maternal and family sociodemographic variables included age, race/ethnicity (white non-Hispanic, Black non-Hispanic, other non-Hispanic, and Hispanic), education (no or some high school, high school graduate, some college, and college graduate or beyond), marital/partner status (married/living with partner, never married, and divorced, separated or widowed), region of the USA (West, Northeast, Midwest, and South), and metropolitan statistical area. Health insurance status was grouped into the following mutually exclusive categories: no health insurance, any publicly funded health insurance (Medicaid and/or Medicare), and private health insurance only. Socioeconomic status was measured using federal poverty thresholds, which adjusts income for family size. Family incomes were classified as below 100% of the federal poverty threshold, 100—199%, 200—399%, and 400% or more of the federal poverty threshold. Number of hours worked per week was dichotomized as less than 35 or 35 or more. Household composition was evaluated by the number of children under 5 years of age, number of children 5–17 years of age, and number of additional adults in the household or family unit (other than the pregnant woman and her partner).

Health-related risk factors—Smoking status while pregnant, substance abuse, the presence of a chronic medical condition, and the presence of sexually transmitted diseases or other urogenital infections, were each evaluated as dichotomous variables. Chronic conditions included: diabetes (ICD-9 code 250), chronic bronchitis (ICD-9 code 491), high cholesterol (ICD-9 code 272), primary hypertensive disease (ICD-9 codes 401–404), asthma (ICD-9 code 493), renal disease (ICD-9 codes 403, 404, 582, 583, 585–588), or hepatitis (ICD-9 code 070). Sexually transmitted diseases and other urogenital infections included: Herpes simplex (ICD-9 code 054), "other disorders of urethra and urinary tract" (ICD-9 code 599; includes urinary tract infection), pelvic inflammatory disease (ICD-9 codes 614–616), "other venereal diseases" (ICD-9 code 099), gonorrhea (ICD-9 code 098), HIV/AIDS (ICD-9 code 042), syphilis (ICD-9 codes 091–097), and trichomonas vaginalis (ICD-9 code 131).

Women who reported "fair" or "poor" health in response to the question, "In general, would you say that your health is excellent, very good, good, fair, or poor?" during any round of the MEPS while pregnant were considered to be in poor physical health during pregnancy. Pre-pregnancy BMI was divided into four categories: <20, 20–24.9, 25–25.9, and≥30. We used pre-pregnancy BMI data reported only in Round 3 of the MEPS, and as such BMI data were not available for all pregnant women during the study period.

Analytic approach

SAS 9.2 (SAS Institute Inc, Gary, NC) was used to construct the analytic files and STATA 10.1 (StataCorp LP, College Station, TX) was used to perform all analyses, accounting for the complex design of the MEPS. The standard errors were corrected due to clustering within strata and the primary sampling unit, and applied survey weights were used to produce estimates that account for the complex survey design, unequal probabilities of selection, and survey non-response.

Due to the high correlation between history of mental health problems and antepartum mental health, all analyses were stratified by history of poor mental health status. Women were categorized as having a history of poor mental health if they met either of the following criteria: (1) self report of anxiety or depression with a date of onset prior to their pregnancy; or (2) self report of “fair” or “poor” mental health during any round preceding the round in which they first reported being pregnant.

Descriptive analysis—Chi-square analyses were used to test for differences in sociodemographic and health characteristics by antepartum mental health status. Each subgroup was tested for statistical significance if differences were found in the overall chi-square tests.

Multivariate analysis—For the logistic regression analysis, models were fit to identify the factors that were associated with the poor antepartum mental health status stratified by history of poor mental health. Based on previous empirical literature, we chose to include the following variables in the models: age (five categories: 14–19, 20–24, 25–29, 30–34, 35+), race/ethnicity (two categories: non-Hispanic white, Hispanic or non-white), marital status (three categories: married/lives with partner, never married, divorced/separated/widowed), education (four categories: no or some high school, high school graduate, some college, and college graduate or beyond), ratio of family income to poverty threshold (four categories: <100%, 100–199%, 200–399%, and ≥400%), and physical health status during pregnancy (two categories: excellent/very good/good, fair/poor). Other variables, described in the Independent Variables section, were considered in the regression analyses; however, some were excluded due to concerns of collinearity or if they did not significantly contribute to the models. Of these other variables, only sexually transmitted diseases or other urogenital infections were significant and were thus included in the final analysis. In addition, we did not include smoking or BMI in the final analysis, since MEPS began collecting data for these variables starting in 2000, leading to inadequate sample size.

The University of Wisconsin—Madison Health Sciences Institutional Review Board considered this study exempt from review because the data were already collected and de-identified.

Results

Overall, 7.8% of women in the USA reported poor mental health during their pregnancies. In our initial analysis, a history of poor mental health was the strongest correlate of poor antepartum mental health (unadjusted odds ratio (OR) [95% CI]: 8.45 [6.01–11.88]; adjusted OR [95% CI]: 6.23 [4.25–9.14]; data not shown). Hereafter, all reported results are stratified by history of pre-pregnancy mental health problems. Among women without pre-pregnancy mental health problems, 5% had poor antepartum mental health, while 31% of women with poor pre-pregnancy mental health had poor antepartum mental health (see Fig. 1).

Women without prior mental health problems

Among women without prior mental health problems, married women were less likely to have antepartum mental health problems and women who were never married were more likely to have antepartum mental health problems. High school graduates and women who rated their physical health status during pregnancy as “fair” or “poor” were more likely to have poor antepartum mental health. Women living below 100% of the poverty threshold and women with publicly funded insurance were also more likely to have poor antepartum mental health (see Table 1).

In the multivariate analysis, women who were never married were more likely than married women to have poor antepartum mental health (OR [95% CI]: 2.12 [1.25–3.60]). Women in “fair” or “poor” self-rated physical health during pregnancy were more likely to have antepartum mental health problems than women in “excellent,” “very good,” or “good” health (OR [95% CI]: 7.50 [4.52–12.43]), and women who were non-white or Hispanic were less likely to report poor antepartum mental health (OR [95% CI]: 0.56 [0.34–0.93]; see Table 2). There was no difference in the adjusted odds of poor antepartum mental health by family income or by health insurance status.

Women with prior mental health problems

Married women were less likely to have antepartum mental health problems while women who are divorced, separated or widowed were more likely to have poor antepartum mental health. “Fair” or “poor” self-rated physical health during pregnancy, current smoking, chronic medical conditions, substance abuse, and the presence of a sexually transmitted disease or urogenital infection were positively associated with antepartum mental health problems in this group (see Table 1).

In the multivariate analysis, those who were 20–24 years old were less likely than those who were 30–34 years old to have mental health problems during pregnancy (OR [95% CI]: 0.24 [0.08–0.70]). Women who were never married or who were divorced, separated, or widowed were more likely to have poor antepartum mental health (OR [95% CI]: 2.69 [1.25–5.80] and OR 3.96 [1.34–11.74], respectively). Those with a sexually transmitted disease (STD) or urogenital infection (OR [95% CI]: 4.48 [1.36–14.77]) or in “fair” or “poor” self-rated physical health during pregnancy (OR [95% CI]:3.90 [1.88–8.11]) were more likely to have mental health problems during pregnancy (see Table 2).

Sensitivity analysis

To generate more confidence in our results, we conducted a series of sensitivity analyses. First, since many of the women with unknown marital status were younger, a sensitivity analysis was conducted assuming all subjects with unknown marital status were “never married.” Results did not substantially change. Further sensitivity analyses were conducted using stricter criteria in the definition of poor mental health. In one analysis, women who self-reported “fair” mental health were not classified as having poor mental health. In another analysis, only those having a self-reported mental health of “fair” or “poor” were classified as having poor mental health. Both of these stricter definitions reduced the number of women categorized as having poor mental health and did not substantially change the estimates in the analysis of the subjects with no previous history of mental health problems. The sensitivity analysis of subjects with a previous history of mental health problems was inconclusive and showed unstable estimates with large confidence intervals due to limited sample size with decreased specificity. Results for these analyses are not shown.

Discussion

This study of a nationally representative sample of pregnant women contributes to our understanding of the prevalence of antepartum mental health problems and its correlates. We found the overall prevalence of poor mental health during pregnancy to be 7.8%, coinciding with previous clinic (Johanson et al. 2000) and population-based (Vesga-Lopez et al. 2008) reports. Specifically, our results are similar to Vesga-Lopez's findings for any mood disorder and for any anxiety disorder (prevalence 8.5% and 12.2%, respectively). A history of mental health problems has been found to greatly increase the risk for poor antepartum mental health (Bilszta et al. 2008; Borjesson et al. 2005; Buesching et al. 1986; Marcus et al. 2003; Mora et al. 2009; Rich-Edwards et al. 2006; Seguin et al. 1995) and confound associations between other risk factors and poor mental health during pregnancy. Importantly, our study highlights the strong association between a history of mental health problems and antepartum mental health problems.

This finding suggests the need for greater focus on mental health screening for all women of reproductive age regardless of pregnancy status, but especially for women before they become pregnant. Primary care, often the first point of contact for health needs, is an ideal setting for screening. Research shows that patient care and services delivered with a primary care orientation is more likely to be efficient, equitable, and effective (Starfield 2008). The primary care setting may be the best means to ensure comprehensive health assessment and long-term, person-focused care (Starfield 2008); however, coordination of care is essential in order to educate all providers who encounter women at risk. Furthermore, mental health screening should not be limited to the primary care setting and could be conducted when women receive treatment for STDs or urogenital infections, upon hospital admittance, or during a routine OBGYN appointment during pregnancy. In an effort to move towards improved quality of care for women, comprehensive, preventive care, and coordination of care should be maintained longitudinally, before and during pregnancy, as opposed to only during pregnancy when women tend to interface with the healthcare system most frequently.

It is important to note that increased preventive mental health screening is necessary, but not sufficient to ameliorate widespread antepartum mental health problems. To help women manage their depression, coordination of care should facilitate referrals to mental health professionals. Accessibility of professional services and provider expertise should guide the recommendation of treatment options such as pharmacotherapy and psychotherapy. Accordingly, it is essential that health insurance policies include coverage for mental health screening and treatment to ensure that these barriers do not prevent women from receiving proper care.

Our study found that reporting an STD or urogenital infection was an important risk factor for antepartum mental health problems among those with a history of mental health problems. Given these findings, STD screenings may be a promising setting for health care providers to also screen for co-morbid mental health problems. It will be important for providers to become aware of the increased risk of mental health problems in their patients with STDs so as to facilitate the identification of such problems. This may be particularly important in order to ensure that mental health problems are identified in women before they become pregnant, allowing interventions to improve mental health before, during, and following pregnancy.

Our study found that not being married, a proxy for lack of social support, was an important correlate of poor antepartum mental health. Previous studies have shown that those who are married have better psychological well-being than those who are never married, divorced, or separated (Brown 2000), and that the emotional support of a spouse or partner elicits

feelings of comfort and reinforces mutual feelings of love and respect, in addition to generating a sense of security (Jacobson 1986; Orr 2004). Other research has shown that the benefits of a supportive relationship, such as enhanced feelings of well-being, personal control, and positive effects, may help moderate the effects of antepartum mental health by making changes associated with pregnancy seem less stressful (Collins et al. 1993). Spousal support may be considered doubly important since it affects the health and well-being of the mothers and the birth outcomes of the unborn children (Feldman et al. 2000; Rubertsson et al. 2003). In the interest of improving maternal psychological well-being and birth outcomes, it is essential to identify women with prior mental health problems who exhibit depression-like symptoms during pregnancy, especially among un-partnered women who may lack social support (Rubertsson et al. 2003).

Our results show that non-white and Hispanic women without a history of mental health problems were less likely than white women to report poor antepartum mental health. This may be the result of underreporting due to patient beliefs and attitudes regarding mental illness, consistent with Cooper et al. (2003), who found that both African-Americans and Hispanics were more likely than whites to have negative beliefs about antidepressants and the effectiveness of treatment. It is also possible that the lack of association in our study stems from preferential diagnosis among white patients compared with African-American and Hispanic patients, as suggested by Borowsky et al. (2000), who reported that physician recognition of mental illness varies by race and ethnicity. Among pregnant women, missed diagnoses or negative views of treatment for depression may delay care or result in many women remaining untreated. This is of particular concern among African-American and Hispanic women, as studies indicate that underutilization of specialty mental health care is highest among these groups (Miranda and Cooper 2004).

Our results also suggest that age affects the likelihood of reporting poor antepartum mental health; specifically, those aged 20–24 years with a history of mental health problems were less likely to report poor mental health during pregnancy. Prior studies indicate that the median age of onset for major depressive disorder, any mood disorder and generalized anxiety disorder is just over 30 years, while the median age for any anxiety disorder is approximately 20 years earlier (Kessler et al. 2005). It is possible that the younger women with a history of poor mental health have a different etiologic profile compared to older women, based on median age of onset for the mental health conditions under study, which could partially explain the lower odds of reporting poor antepartum mental health. As such, younger women may be less likely to experience mood or depressive disorders associated with pregnancy due to the timing associated with psychological sequelae. However, because of the later onset of mood disorders, younger women have a significantly higher lifetime risk of developing mood disorders compared to older women (Kessler et al. 2005); thus, it will be especially important to monitor these women as they age and consider additional pregnancies.

It has been suggested that pregnancy may serve as a barometer for women's overall health and mental and physical health problems during pregnancy may be predictive of long-term health outcomes (Lykke et al. 2009, 2010). With this in mind, it will be especially important for physicians to monitor women who have maternal depression and provide treatment that will be valuable for women's health, both in the present and in the future.

Limitations

This study has some potential limitations. First, self-reported mental health items included in MEPS are not parallel to diagnostic criteria used in clinical settings. Given that self-reported global mental health status is not diagnostic, it may not adequately detect women who experience symptoms of depression. However, there is ample evidence that poor mental

health is a robust phenomenon and self-reported measures are correlated with major depressive disorder (Hoff et al. 1997).

Due to the lack of data on lifetime mental health status in the MEPS, we had a limited ability to identify women with a history of poor mental health. It is possible that women who have experienced poor mental health to varying degrees throughout their lives may have been coded as not having any history of poor mental health.

Given current data availability, it is challenging to tease apart how various social factors interplay and impact antepartum mental health. Specifically, although it is commonly used in the existing literature as a proxy for social support (Orr 2004; Siegel and Kuykendall 1990), marital status and household composition may be limited in the ability to adequately capture the full impact of this important social factor and likely determinant of mental health. It is also difficult to distinguish genuine depressive episodes from the stresses common during pregnancy. Future research will need better measurement of the connections between antepartum mental health and across the life course risk factors such as life stress, social support and prior mental health problems.

Strengths

This study has some important strengths. Firstly, the results are based on national, population-based data, providing policy-makers and practitioners with a picture of the women at risk for antepartum mental health problems. Additionally, due to the large sample size and rich data set that 11 years of the MEPS provided, several key correlates of poor antepartum mental health could be investigated together in one model, allowing for adjusted estimates of the contributing effect of each characteristic.

Conclusions

This study extends previous clinical and population-based research on antepartum mental health problems among a nationally representative population-based sample of women. Regardless of pre-pregnancy mental health status, women who are not married and who are in poor physical health during pregnancy are more likely to be in poor mental health during pregnancy. These results highlight the importance of directing policy efforts toward providing pregnant women with ample social support as well as appropriate health care to deal with their physical and mental health problems. Identifying women who are at risk for mental health problems during pregnancy and providing adequate treatment options is important to ultimately improve the long-term health of women and their children.

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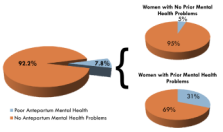

Fig. 1.

Overall prevalence of antepartum mental health problems. The overall prevalence of mental health problems during pregnancy was 7.8%. The prevalence of mental health problems during pregnancy among women with no prior history of mental health problems was 5%. The prevalence of mental health problems during pregnancy among women with a prior history of mental health problems was 31%

Table 1

Sociodemographic characteristics of pregnant women in the USA, by history of and antepartum mental health status

	No history of mental health problems				History of mental health problems			
	Antepartum mental health Problems		Chi-square *P*value	*P* value for category v. others	Antepartum mental health Problems		Chi-square *P* value	*P* value for category v. others
	No[a]	Yes[b]			No[a]	Yes[b]		
Total, weighted[c] (%)	4,275,176 (94.9%)	231,849 (5.1%)			353,276 (68.6%)	161,816 (31.4%)		
Total, unweighted[d] (%)	2,591 (94.8%)	142 (5.2%)			216 (67.9%)	102 (32.1%)		
Maternal characteristics								
Age			0.37				0.27	
14–19	9.1%	11.0%		0.40	14.0%	19.0%		0.25
20–24	26.3%	21.8%		0.38	28.0%	17.8%		0.07
25–29	27.1%	32.9%		0.24	28.8%	27.3%		0.77
30–34	25.9%	19.5%		0.18	15.7%	19.8%		0.31
35+	11.7%	14.8%		0.41	13.5%	16.2%		0.53
Race/Ethnicity			0.38				0.31	
White (non-Hispanic)	60.7%	65.5%			68.6%	62.3%		
Non-white or Hispanic	39.3%	34.5%			31.4%	37.7%		
Race/Ethnicity			0.64				0.34	
White (non-Hispanic)	60.7%	65.5%		0.38	68.6%	62.3%		0.31
Black (non-Hispanic)	13.4%	14.6%		0.75	10.1%	13.9%		0.34
Other (non-Hispanic)	6.5%	4.7%		0.51	5.5%	2.9%		0.34
Hispanic	19.4%	15.3%		0.23	15.8%	20.9%		0.17
Education status			0.08				0.81	
No or some high school	21.0%	22.6%		0.64	32.1%	37.3%		0.43
High school graduate	26.6%	38.3%		0.02	26.8%	23.8%		0.53
Some college	21.6%	17.1%		0.38	24.9%	22.0%		0.66
College or beyond	30.8%	22.0%		0.12	16.2%	17.0%		0.84
Marital status			0.03					0.01
Married, lives with partner	74.2%	62.9%		0.01	63.3%	43.7%		0.005
Never married	22.3%	32.9%		0.01	28.0%	36.7%		0.18

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	No history of mental health problems				History of mental health problems			
	Antepartum mental health Problems		Chi-square *P*value	*P* value for category v. others	Antepartum mental health Problems		Chi-square *P* value	*P* value for category v. others
	No[a]	Yes[b]			No[a]	Yes[b]		
Divorced, separated, widowed	3.4%	4.2%		0.64	8.7%	19.6%		0.02
Current smoker while pregnant[e]	*n*=1,020	*n*=65	0.35		*n*=82	*n*=26	0.0003	
Yes	10.4%	14.6%			14.3%	44.0%		
No	89.6%	85.4%			85.7%	56.0%		
Pre-pregnancy BMI[f]	*n*=676	*n*=32	0.36		*n*=81	*n*=34	0.74	
<20	2.2%	0.0%		na	3.5%	0.0%		na
20–24.9	56.9%	53.7%		0.71	46.7%	48.5%		0.86
25–29.9	24.8%	21.5%		0.63	27.2%	23.6%		0.63
30 or more	16.0%	24.8%		0.11	22.5%	27.9%		0.36
Chronic medical conditions			0.08				0.04	
Yes	6.5%	11.1%			8.6%	17.9%		
No	93.5%	88.9%			91.4%	82.1%		
Physical health status during pregnancy			<0.0001				<0.0001	
Excellent, very good, or good	95.0%	71.3%			87.8%	64.8%		
Fair or poor	5.0%	28.7%			12.2%	35.2%		
Substance abuse			0.50				0.04	
Yes	0.5%	1.0%			0.7%	5.4%		
No	99.5%	90.0%			99.3%	94.6%		
STD or urogenital infection			0.67				0.003	
Yes	5.1%	4.3%			3.7%	14.8%		
No	94.9%	95.7%			96.3%	85.2%		
Antepartum rounds			0.01				0.09	
1	69.7%	55.9%			71.6%	80.3%		
2	30.3%	44.4%			28.4%	19.7%		
Number of pregnancies during MEPS period			0.001				0.20	
1	89.1%	96.7%			90.5%	85.6%		
2 or more	10.9%	3.3%			9.5%	14.4%		
Number of hours worked per week			0.40				0.16	

	No history of mental health problems				History of mental health problems			
	Antepartum mental health Problems		Chi-square *P*value	*P* value for category v. others	Antepartum mental health Problems		Chi-square *P* value	*P* value for category v. others
	No[a]	Yes[b]			No[a]	Yes[b]		
0–34	51.8%	56.6%			62.4%	72.6%		
35+	48.2%	43.4%			37.6%	27.4%		
Family characteristics								
Number of adults in household/family			0.71				0.70	
0	75.1%	76.5%			71.5%	69.4%		
1 or more	24.9%	23.5%			28.5%	30.6%		
Number of children (<5 years old)			0.97				0.24	
0	54.8%	55.8%		0.85	58.9%	55.3%		0.58
1	34.6%	33.4%		0.80	33.3%	30.2%		0.56
2 or more	10.6%	10.8%		0.93	7.8%	14.6%		0.13
Number of children (5–17 years old)			0.24				0.68	
0	67.3%	60.2%		0.19	55.9%	52.6%		0.61
1	19.8%	27.8%		0.06	24.9%	28.0%		0.58
2	8.9%	8.9%		0.99	14.4%	16.8%		0.59
3 or more	4.0%	3.2%		0.61	4.7%	2.5%		0.30
Number of infants born from pregnancy			0.57				0.12	
0 or missing	35.0%	32.1%			51.7%	42.1%		
1 or more	65.0%	67.9%			48.3%	57.9%		
Ratio of family income to poverty threshold			0.15				0.21	
<100%	18.7%	27.4%		0.03	28.0%	30.6%		0.64
100–199%	20.0%	21.4%		0.76	22.4%	32.5%		0.08
200–399%	28.3%	21.4%		0.11	26.3%	21.9%		0.55
≥400%	33.0%	29.8%		0.54	23.3%	14.9%		0.06
Health insurance status			0.01				0.64	
Private insurance only	70.8%	61.3%		0.05	60.4%	54.4%		0.42
Any publicly funded insurance	16.4%	27.5%		0.01	25.6%	30.9%		0.32
No insurance	12.8%	11.2%		0.56	14.0%	14.7%		0.89
Region of USA			0.58				0.86	

	No history of mental health problems				History of mental health problems			
	Antepartum mental health Problems		Chi-square *P*value	*P* value for category v. others	Antepartum mental health Problems		Chi-square *P* value	*P* value for category v. others
	No[a]	Yes[b]			No[a]	Yes[b]		
Northeast	16.7%	20.7%		0.37	10.1%	9.4%		0.75
Midwest	21.9%	23.6%		0.73	25.9%	28.3%		0.65
South	36.5%	36.8%		0.96	38.9%	35.2%		0.53
West	25.0%	18.9%		0.19	25.1%	27.1%		0.61
MSA status			0.18				0.70	
Urban	84.8%	79.2%			83.5%	85.4%		
Rural	15.2%	20.8%			16.5%	14.6%		
Survey respondent			0.34				0.13	
Self	73.3%	77.3%			68.9%	77.8%		
Other	26.7%	22.7%			31.1%	22.2%		

BMI body mass index, *STD* sexually transmitted disease, *MEPS* Medical Expenditure Panel Survey, *MSA* Metropolitan statistical area

[a] Self-reported “excellent,” “very good,” or “good,” and no mental health conditions or symptoms reported

[b] Self-reported “fair” or “poor,” or mental health conditions or symptoms reported

[c] Weighted total for no history of mental health problems = 4,507,025; weighted total for history of mental health problems = 515,092

[d] Unweighted total for no history of mental health problems = 2,733; unweighted total for history of mental health problems = 318

[e] Data from 2000–2006 only

[f] Data from 2000–2005 only

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Table 2

Multivariate analyses[a] of the odds of poor antepartum mental health, Stratified by history of mental health problems

	No history of mental health problems		History of mental health problems	
	Odds of poor/fair mental health during pregnancy		Odds of poor/fair mental health during pregnancy	
	OR	95% CI	OR	95% CI
Maternal characteristics				
Age				
14–19	0.73	0.32–1.65	0.51	0.16–1.63
20–24	0.70	0.34–1.43	0.24	0.08–0.70
25–29	1.41	0.74–2.68	0.49	0.19–1.24
30–34	1.00	Reference	1.00	Reference
35+	1.69	0.76–3.75	0.72	0.22–2.35
Race/Ethnicity				
White (non-Hispanic)	1.00	Reference	1.00	Reference
Non-white or Hispanic	0.56	0.34–0.93	0.87	0.45–1.71
Education status				
No or some high school	0.72	0.39–1.32	0.73	0.28–1.85
High school graduate	1.00	Reference	1.00	Reference
Some college	0.57	0.27–1.23	0.92	0.35–2.41
College or beyond	0.54	0.26–1.11	1.24	0.37–4.17
Marital status				
Married, lives with partner	1.00	Reference	1.00	Reference
Never married	2.12	1.25–3.60	2.69	1.25–5.80
Divorced, separated, widowed	1.19	0.42–3.32	3.96	1.34–11.74
Sexually transmitted disease or urogenital infection				
Yes	0.67	0.28–1.62	4.48	1.36–14.77
No	1.00	Reference	1.00	Reference
Physical health status during pregnancy				
Excellent, very good, or good	1.00	Reference	1.00	Reference
Fair or poor	7.50	4.52–12.43	3.90	1.88–8.11
Family characteristics				
Ratio of family income to poverty threshold				
<100%	1.00	Reference	1.00	Reference
100–199%	0.80	0.43–1.49	1.59	0.72–3.51
200–399%	0.67	0.34–1.32	0.72	0.24–2.17
≥400%	0.97	0.47–1.99	0.81	0.29–2.26

OR odds ratio, *CI* confidence interval

[a]Stratified logistic regression models are only adjusted for age, race/ethnicity, education status, marital status, sexually transmitted disease or urogenital infection, physical health status during pregnancy, and ratio of family income to poverty threshold