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Preconception Health Among Women with Frequent Mental Distress: A Population-Based Study

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Abstract

Purpose: We examined the extent to which mental distress may be associated with a woman's preconception health.

Methods: We analyzed population-based, self-reported data from the 2005, 2007, and 2009 Behavioral Risk Factor Surveillance System (BRFSS) and limited analyses to 213,137 women aged 18–44 years. Women whose mental health was not good for 14 days during the past month were categorized as having frequent mental distress. For 15 preconception health indicators, we used chi-square tests to measure differences in prevalence by mental distress and the average marginal predictions approach to logistic regression to assess associations between mental distress and each preconception health indicator in separate models, adjusted for demographic characteristics. We conducted analyses using SUDAAN software to account for the complex sampling design and used weights to produce unbiased estimates.

Results: The prevalence of good preconception health for each indicator was higher for women reporting infrequent mental distress (chi-square p value < 0.001 for all). The greatest disparities in preconception health between women with infrequent and frequent mental distress, respectively, were adequate social and emotional support (adjusted prevalence ratio [aPR] = 1.4, prevalence = 83.7% and 54.8%), not smoking (aPR = 1.2, 82.3% and 62.4%), adequate fruit and vegetable consumption (aPR = 1.2, 26.1% and 21.5%), normal weight (aPR = 1.2, 50.4% and 39.0%), and good general health (aPR = 1.2, 91.7% and 71.5%).

Conclusions: Interventions tailored for women with poor mental health may be needed to target specific preconception health indicators, such as social support, smoking, weight, and nutrition.

Introduction

Women who have psychiatric disorders make up 30% of the population of women of reproductive age.¹ Psychiatric conditions that occur during pregnancy may be associated independently with adverse birth outcomes of low birth weight and preterm birth, as well as maternal psychiatric conditions postpartum.² In a study among insured women, half of the women with postpartum depression had depression before or during their pregnancies.³

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Disclosure Statement

The authors have no conflicts of interest to report.

Treatment is available for many psychiatric conditions that occur among women, which could improve immediate, long-term, and pregnancy-related outcomes.⁴ For these reasons, mental health has been identified as a preconception health indicator.⁵

Poor mental health in the population^{6–9} and depression among women of reproductive age¹⁰ are associated with risk factors for cardiovascular disease (CVD), such as hypertension, diabetes, smoking, overweight and obesity, physical inactivity, and excessive alcohol consumption. Many of these conditions have been identified as measurable indicators of preconception health.⁴ The prevalence of other preconception health indicators (e.g., health insurance, receipt of an annual routine checkup, annual influenza vaccination, adequate social support, recommended daily fruit and vegetable consumption, asthma), however, has not been examined among women with poor mental health.

Improving a woman's mental health before, during, and after pregnancy may decrease risks of maternal and infant morbidity, but these women may have other conditions, or they may exhibit modifiable behaviors that further increase their risk of adverse pregnancy outcomes. If so, tailored interventions may be needed to improve overall preconception health among these women. However, which preconception health indicators show the greatest disparities between women with good or poor mental health are unknown. Therefore, we examined the preconception health of nonpregnant women aged 18–44 years, stratified by their self-reported mental health status.

Materials and Methods

We analyzed data from the 2005, 2007, and 2009 Behavioral Risk Factor Surveillance System (BRFSS), a state, population-based, random-digit dialed survey of the U.S. population aged 18 years. Self-reported data were collected from all 50 states, the District of Columbia, Puerto Rico, Guam, and the U.S. Virgin Islands. For the 2005, 2007, and 2009 BRFSS surveys, the response rate (i.e., percentage of sampled households that could be contacted and agreed to participate) ranged from 50.6% to 52.5%; of contacted households, the cooperation rate (i.e., percentage that agreed to participate) ranged from 72.1% to 75.1%.

To monitor the health of women of reproductive age, a voluntary committee of program, policy, and epidemiology leaders from seven states developed and published a comprehensive list of 45 preconception health indicators.⁵ The BRFSS captures data on 17 of the 45 preconception health indicators, 1 of which is mental distress. Of these 17 indicators, 16, including mental distress, are captured in odd survey years, and only 1, receipt of a Papanicolaou test in the past 3 years, is captured in even years. Therefore, we limited our analysis to currently nonpregnant women aged 18–44 years, the population for whom these preconception health indicators were created, and used BRFSS data from 2005, 2007, and 2009 to examine the 16 preconception health indicators captured by BRFSS in these years.

Mental distress was our main exposure of interest. The BRFSS assesses frequent mental distress by asking participants: Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days

was your mental health not good? We considered women who answered ≥ 14 days as having frequent mental distress and women who answered < 14 days as having infrequent mental distress. This measure of mental health is a valid indicator of the perceived burden of mental distress among individuals with common mental disorders, and this measure correlates well with two other validated screens for mental health and depression: the Medical Outcomes Study Short Form 36¹¹ and the Center for Epidemiologic Studies of Depression Scale.¹²

In addition to mental distress, the 15 other preconception health indicators assessed in BRFSS and examined as dichotomous outcomes in this analysis are defined in Table 1 and include the following: general health, education, health-care coverage, routine checkup, smoking status, heavy drinking status, binge drinking status, fruit and vegetable consumption, weight, physical activity, social and emotional support (a subjective measure based on the question: How often do you get the social and emotional support you need?), diabetes status, hypertension status, current asthma status, and influenza vaccination. We examined the categories of each dichotomous preconception health variable associated with better preconception health as dependent variables in univariate and multivariable analyses, as defined in Table 1. For example, for the BRFSS variable, general health, we created a dichotomous variable and examined prevalence of a self-report of good, very good, or excellent general health, as opposed to fair or poor general health. The expert panel that created the preconception health indicators dichotomized body mass index (BMI) into not overweight or obese ($\text{BMI} < 25 \text{ kg/m}^2$) and overweight or obese ($\text{BMI} \geq 25 \text{ kg/m}^2$).⁵ However, because being underweight (i.e., $\text{BMI} < 18.5 \text{ kg/m}^2$) may be associated with adverse prenatal outcomes,¹³ we excluded underweight women ($n = 5,213$) from analyses of BMI, and we compared normal weight women to overweight and obese women.

We examined demographic characteristics (i.e., age, race/ethnicity, marital status, employment status, household income) of women and year of survey by women's mental health status. We estimated prevalence of good preconception health for each indicator by mental health status and compared estimates between groups by using chi-square tests. By using the average marginal predictions approach to logistic regression developed by Bieler et al.,¹⁴ we examined independent associations between mental distress (the exposure) and each preconception health indicator (the outcome) in 15 separate models. Prevalence ratio (PR) estimates were estimated because of the cross-sectional nature of the data and adjusted for demographic characteristics and year of survey completion, as these characteristics may confound associations between mental distress and preconception health indicators, on the basis of previous literature. We adjusted for education and having health insurance, preconception health indicators themselves, in all models except those where each indicator was the outcome, respectively.

To assess the influence of access to healthcare on the associations between mental distress and preconception health in sensitivity analyses, we limited logistic regression models to women with health insurance and, separately, to women who had received a checkup in the past year. Then, we compared those adjusted PRs (aPR) with aPRs from the original models. We conducted all analyses by using SUDAAN software to account for the complex sampling design, and we used weights to produce unbiased PR and aPR estimates.

For 2005 ($n = 74,793$), 2007 ($n = 76,206$), and 2009 ($n = 64,446$), a total of 215,445 currently nonpregnant women aged 18–44 years participated in BRFSS. Of those, 213,137 (98.9%) had information on mental distress and were included in the analyses. Of the included women, 97 (0.1%) to 12,608 (6.0%) were missing information on individual preconception health indicators and were excluded from analyses for the specific preconception health indicator. In addition, we excluded from multivariable models 22,067 (10.4%) women who were missing information on demographic characteristics adjusted for in the model, 94% of whom were missing data on income. Therefore, we ran sensitivity analyses, including women missing data on income in the multivariable models by creating a 5-level income variable, with one category for women with missing data. Sample sizes for the multivariable models for the 15 preconception health indicators ranged from 177,024 (84% of nonpregnant women aged 18–44 years with BMI ≥ 18.5 kg/m²) for normal weight to 190,754 (89% of all nonpregnant women aged 18–44 years) for education and health insurance.

Results

Among women of reproductive age, 13.1% reported frequent mental distress. Women with frequent mental distress, compared to those without, were more often 18–24 years of age (24.2% and 22.1%), non-Hispanic black (12.6% and 11.4%), unmarried (7.7% and 5.8%) or divorced, widowed, or separated (18.2% and 9.2%), unable to work (11.8% and 2.1%) or unemployed (12.2% and 6.4%), and had annual household incomes $< \$15,000$ (12.3% and 5.3%) or $\$15,000$ – $24,999$ (31.7% and 19.5%) ($p = 0.005$ for all) (Table 2).

In unadjusted analyses, the prevalence of good preconception health for each indicator was higher among women reporting infrequent mental distress compared with women reporting frequent mental distress ($p < 0.001$ for all) (Table 3). For example, 90.7% of women without frequent mental distress reported excellent, very good, or good general health compared to 70.5% of women with frequent mental distress. Among women with infrequent and frequent mental distress, respectively, the preconception health indicators with the highest prevalence were the same, no diabetes (97.6% and 94.7%) and no heavy drinking (95.4% and 92.9%). Likewise, the preconception health indicators with the lowest prevalence for women with infrequent and frequent mental distress, respectively, were influenza vaccination (23.2% and 20.6%) and adequate fruit and vegetable consumption (26.1% and 21.5%). After adjusting for covariates, women with infrequent mental distress, compared with those with frequent mental distress, respectively, had a higher prevalence of all indicators of good preconception health, except for receiving an influenza vaccination (aPR = 1.0, 23.2% and 20.6%). The greatest disparities in preconception health between women with infrequent and frequent mental distress, respectively, were having adequate social and emotional support (aPR = 1.4, 83.7% and 54.8%), not smoking (aPR = 1.2, 82.3% and 62.4%), adequate fruit and vegetable consumption (aPR = 1.2, 26.1% and 21.5%), normal weight (aPR = 1.2, 50.4% and 39.0%), and excellent, very good, or good general health (aPR = 1.2, 91.7% and 71.5%). Including women with missing values for income in the models did not change the associations.

Access to care differed only slightly among groups. Women with infrequent mental distress were as likely to have health insurance as women with frequent mental distress (aPR = 1.0),

although women with infrequent mental distress were slightly more likely to have received a checkup in the previous year (aPR = 1.1) (Table 3). Associations between mental distress and preconception health indicators were not modified by having health insurance or receiving a checkup in the past year.

Discussion

More than 13% of currently nonpregnant women of reproductive age reported frequent mental distress, which may have implications for future pregnancy outcomes.² Compared with women who had infrequent mental distress, women with frequent mental distress had worse preconception health. The greatest disparities among groups existed in social and emotional support, smoking, fruit and vegetable consumption, BMI, and general health, with women with infrequent mental distress faring better. Some of these findings are not surprising because women with depression have been shown to have more risk factors for CVD¹⁰; however, other preconception health indicators, such as fruit and vegetable consumption, social and emotional support, asthma, and influenza vaccination, have not been examined before among women with frequent mental distress. Disparities in preconception health are a concern because past research has shown that sexually active women with frequent mental distress are less likely to use any contraceptive method¹⁵ or highly effective forms of contraception,¹⁶ which may place them at increased risk of unintended pregnancy.

We found that access to healthcare services, including having health insurance and receiving a routine checkup, did not explain differences in preconception health between women with and without frequent mental distress. However, we were unable to assess differences in frequency, quality, or content of the healthcare services received. These findings suggest that other factors related to mental health, including biologic and lifestyle factors, may, at least partially, contribute to disparities seen in preconception health.

Past research shows that over 75% of nonpregnant women of reproductive age who screened positive for depression received a routine checkup or Pap test during the previous year,¹⁷ and 61% of women with frequent mental distress in our sample reported a routine checkup during the past year. These findings suggest that the majority of nonpregnant women of reproductive age with mental health conditions have contact with a primary care or reproductive health provider. Brief counseling on preconception health indicators, such as smoking^{18,19} and diet and weight²⁰—some of the preconception health indicators with the largest disparities between women with frequent and infrequent mental distress—may improve a woman's preconception health and should be encouraged among all providers who come in contact with women of reproductive age.

Effective treatments for women with mental health issues include counseling, medication, and exercise.⁴ However, half of women who screen positive for depression and serious psychologic distress never receive a clinical diagnosis of depression or treatment.¹⁷ Clinicians caring for women of reproductive age should ask them about their mental health or screen them for depression when services are available for appropriate treatment or referral.²¹ Prompt identification and treatment of mental health problems may improve a

woman's mental health and may affect preconception health indicators directly, such as emotional and social support, as well as indirectly by increasing women's self-efficacy to change other behaviors, such as quitting smoking, eating recommended servings of fruits and vegetables, and exercising regularly. In addition, women who screen positive for a mental health condition should be asked about other behaviors related to preconception health and referred to appropriate services as needed.

Compared with individuals who have good mental health, those with mental health conditions may be just as motivated to quit smoking²² and to lose weight.²³ Whether women with poor mental health are as motivated to change other unhealthy behaviors is unknown. For successful behavior change, however, women with poor mental health may need counseling and interventions adapted to focus on behavior change and mental health.^{24,25} More research is needed to understand the effects of behavior change interventions that are specifically modified for use among women with poor mental health. These types of interventions are especially needed among women with low incomes, among whom 20%–25% have self-reported frequent mental distress (data not shown).

This study has some limitations. BRFSS data are cross-sectional and self-reported. Therefore, temporal relationships between mental health and preconception health are unknown. There is a small chance that a woman may have been sampled in different years of BRFSS; however, annual data are not linked, and we cannot assess the extent of multiple observations per woman. Of women with frequent mental distress, 44% had annual household incomes < \$25,000, and 15% did not have a high school education. Associations between mental distress and preconception health were adjusted for income and education; however, residual confounding by these variables cannot be entirely ruled out. Additionally, BRFSS does not capture information on previous births, and we are unable to assess whether associations between mental distress and preconception health differ by parity.

Frequent mental distress is based on a self-reported question rather than a validated screening instrument or clinical diagnosis, although the measure correlates well with other validated mental health screening tools.^{11,12} Therefore, there is likely some misclassification of mental health status. In addition, unhealthy behaviors and adverse conditions are likely underreported. Misclassification of exposure and outcomes may underestimate associations between mental distress and preconception health. We excluded 11%–16% of women from the multivariable models because of missing data; however, sensitivity analyses, including a large majority of these women with missing data on income, did not affect our interpretation of data. There are several other preconception health indicators not captured by BRFSS, such as poverty status and dental care, which we could not examine in this analysis. Therefore, we could not assess the entire preconception health profile of women, and disparities likely exist with other preconception health indicators.

Conclusions

Our findings show that nonpregnant women of reproductive age with frequent mental distress have poorer preconception health than those with infrequent mental distress, with the greatest disparities observed in smoking, social and emotional support, BMI, fruit and

vegetable consumption, and general health. Increased screening and treatment for depression and other mental health conditions, counseling women with poor mental health about other unhealthy behaviors, and adapting behavior change interventions to address a woman's mental and physical health may help improve the preconception health of women with poor mental health and, ultimately, lead to improved immediate, long-term, and pregnancy health outcomes.

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Table 1. Self-Reported, Dichotomous Preconception Health Indicators Captured in the 2005, 2007, and 2009 Behavioral Risk Factor Surveillance System

Preconception health indicator	Category associated with better preconception health
General health	Good, very good, or excellent health
Education	High school education/GED or more education
Healthcare coverage	Currently has some type of healthcare coverage
Routine checkup	Receipt of a routine checkup in past year
Smoking status	No current smoking
Heavy drinking status	No heavy drinking: not consuming > 1 drink per day in previous month
Binge drinking status	No binge drinking: not consuming 4 drinks per setting in previous month
Fruit and vegetable consumption	Consuming 5 fruits and vegetables per day
Weight ^a	Normal weight: 18.5kg/m ² BMI<25kg/m ²
Physical activity	Participating in 30 minutes per day of moderate physical activity for > 5 days per week, or 20 minutes per day of vigorous physical activity on 3 days per week
Social and emotional support	Always or usually getting the social and emotional support needed
Diabetes status	Never being told by a healthcare provider that you have diabetes, not including gestational diabetes
Hypertension status	Never being told by a healthcare provider that you have hypertension, not including hypertension during pregnancy
Asthma status	No current asthma
Influenza vaccination	Receipt of an influenza vaccination within the past year

^aDoes not include women with body mass index (BMI) < 18.5.

Table 2. Demographic Characteristics by Mental Distress Among Nonpregnant U.S. Women 18–44 Years of Age, Behavioral Risk Factor Surveillance System, 2005, 2007, and 2009

	Infrequent mental distress n = 184,512 Weighted % (95% CI)	Frequent mental distress n = 28,625 Weighted % (95% CI)	Chi-square p value
Age			0.0005
18–24	22.1 (21.7–22.6)	24.2 (23.1–25.4)	
25–29	15.3 (15.0–15.6)	15.7 (14.9–16.5)	
30–34	20.7 (20.4–21.1)	19.0 (18.2–19.8)	
35–39	19.4 (19.1–19.7)	18.9 (18.1–19.7)	
40–44	22.4 (22.1–22.7)	22.2 (21.4–23.0)	
Race/ethnicity			0.005
White	62.5 (62.1–63.0)	62.3 (61.1–63.5)	
Black	11.4 (11.1–11.7)	12.6 (11.9–13.3)	
Hispanic	19.1 (18.7–19.5)	17.7 (16.7–18.8)	
Other	7.0 (6.8–7.3)	7.4 (6.7–8.2)	
Marital status			<0.0001
Unmarried	5.8 (5.5–6.0)	7.7 (7.0–8.4)	
Divorced, widowed or separated	9.2 (9.0–9.4)	18.2 (17.4–19.0)	
Never married	27.5 (27.0–27.9)	29.5 (28.4–30.6)	
Married	57.6 (57.2–58.0)	44.7 (43.6–45.8)	
Employment			<0.0001
Unable to work	2.1 (2.0–2.2)	11.8 (11.1–12.5)	
Unemployed	6.4 (6.2–6.7)	12.2 (11.4–13.0)	
Student/retired	9.6 (9.3–9.9)	10.0 (9.2–10.9)	
Homemaker	17.8 (17.5–18.1)	14.3 (13.5–15.0)	
Employed	64.2 (63.7–64.6)	51.8 (50.6–52.9)	
Annual household Income			<0.0001
< \$15,000	5.3 (5.1–5.6)	12.3 (11.4–13.2)	
\$15,000–\$24,999	19.5 (19.2–19.9)	31.7 (30.6–32.8)	
\$25,000–\$49,999	26.7 (26.3–27.1)	27.2 (26.1–28.3)	

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	Infrequent mental distress <i>n</i> = 184,512 Weighted % (95% CI)	Frequent mental distress <i>n</i> = 28,625 Weighted % (95% CI)	Chi-square <i>p</i> value
\$50,000	48.5 (48.0–48.9)	28.8 (27.8–29.9)	
Year			0.31
2005	33.2 (32.9–33.6)	33.8 (32.8–34.8)	
2007	33.5 (33.1–33.9)	32.6 (31.6–33.7)	
2009	33.3 (32.9–33.7)	33.6 (32.5–34.6)	

CI, confidence interval.

Table 3. Prevalence and Adjusted Prevalence Ratios for Preconception Health Indicators by Mental Distress, Behavioral Risk Factor Surveillance System, 2005, 2007 and 2009

Preconception health indicator	requent mental distress <i>n</i> = 184,512 Weighted %	Frequent Mental Distress <i>n</i> = 28,625 Weighted %	aPR (95% CI)
Excellent, very good, or good general health	91.7	70.5	1.16 (1.15–1.18)
High school education	90.4	84.3	1.02 (1.01–1.03)
Has healthcare coverage	81.3	73.4	1.02 (1.01–1.03)
Had checkup in past year	67.3	61.4	1.08 (1.05–1.10)
Does not currently smoke	82.3	62.4	1.22 (1.20–1.23)
Did not drink heavily in past month	95.4	92.9	1.03 (1.02–1.04)
Did not binge drink in past month	85.8	81.5	1.06 (1.05–1.08)
Consumed 5 servings of fruits and vegetables per day	26.1	21.5	1.18 (1.12–1.23)
Normal weight ^a	50.4	39.0	1.20 (1.16–1.24)
Physically active	52.2	46.3	1.09 (1.05–1.11)
Adequate social and emotional support	83.7	54.8	1.37 (1.35–1.41)
No diabetes	97.6	94.7	1.02 (1.01–1.02)
No hypertension	91.3	83.6	1.06 (1.05–1.06)
No current asthma	90.7	82.8	1.06 (1.05–1.08)
Had influenza vaccination in past year	23.2	20.6	1.02 (0.98–1.08)

^aExcluding underweight women (BMI < 18.5 kg/m²).

aPR, adjusted prevalence ratio; adjusted for age, race/ethnicity, marital status, employment status, year, annual household income, education, and health insurance status; sample sizes for multivariable models ranged from *n* = 181,409 to *n* = 190,754.