

## OBSTETRICS

# Provision of specific preconception care messages and associated maternal health behaviors before and during pregnancy

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**OBJECTIVE:** The purpose of this study was to examine the associations between receipt of specific preconception care messages before pregnancy and maternal behaviors before and during pregnancy.

**STUDY DESIGN:** Data were from the Pregnancy Risk Assessment Monitoring System 2009-2010. Only women who reported receiving general preconception care were asked questions about specific health messages that they received before pregnancy (32.2% of the total sample;  $N = 10,267$ ). Preconception care messages that were received and corresponding behaviors that were examined included taking vitamins with folic acid before pregnancy, dieting to lose weight or exercising before pregnancy (for women who were overweight or obese before pregnancy), and smoking and drinking alcohol during pregnancy (for women who reported smoking or alcohol use in the past 2 years). Separate weighted multivariable logistic regression models were used to assess the association between receipt of specific preconception care messages and maternal behaviors before and during pregnancy.

**RESULTS:** Women who reported receiving the message about taking vitamins with folic acid before pregnancy reported taking vitamins more often in the month before pregnancy compared with women who

did not receive the message (77% vs 40%;  $P < .01$ ; adjusted odds ratio [aOR], 2.99; 95% confidence interval [CI], 2.24–4.00). Among overweight and obese women, there was no difference in dieting or exercising between those who received the message about maintaining a healthy weight before pregnancy and those who did not (dieting: 41% vs 39% [ $P = .58$ ; aOR, 1.06; 95% CI, 0.77–1.47]; exercising: 43% vs 40% [ $P = .42$ ; aOR, 1.10; 95% CI, 0.81–1.51]). Among smokers, women who received the message regarding smoking during pregnancy smoked more often during the last 3 months of pregnancy than women who did not receive the message (47% vs 27%;  $P < .01$ ; aOR, 2.22; 95% CI, 1.21–4.09). Among drinkers, the same percentage of women who did and did not receive the message about alcohol use during pregnancy drank in the last 3 months of pregnancy (13% vs 13%;  $P = .86$ ; aOR, 0.95; 95% CI, 0.65–1.38).

**CONCLUSION:** Our study found that counseling on folic acid was associated with greater vitamin use, although counseling on dieting, exercising, drinking, and smoking among women who were at high risk was not associated with behaviors before or during pregnancy.

**Key words:** PRAMS, preconception care, pregnancy

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**P**rovision of health messages during the preconception period is critical, considering that the interventions that are initiated at the first prenatal care visit are often too late for primary prevention and that many of the factors that contribute to adverse birth outcomes can be managed before conception.<sup>1-3</sup> Preconception behavior changes (adequate

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folic acid consumption to prevent birth defects<sup>4-7</sup>; smoking cessation to reduce preterm delivery, restricted fetal growth, and sudden infant death syndrome<sup>8-11</sup>; cutting alcohol use to reduce the risk of spontaneous abortion, preterm delivery, fetal alcohol syndrome, and developmental disorders<sup>12-17</sup>; and reaching a healthy weight before pregnancy to reduce the risk of neural tube defects, preterm delivery, diabetes mellitus, cesarean delivery, and hypertensive and thromboembolic disease<sup>18,19</sup>) can improve pregnancy and infant outcomes.

Although clinical practice guidelines and recommendations on the frequency and timing of preconception care (PCC) have been released by professional associations and expert groups,<sup>1,2,20</sup> only approximately 30% of women report receiving general PCC, which is defined as a general conversation about entering into pregnancy healthy that has remained constant since 2006.<sup>21</sup> Rates of specific PCC messages, defined as counseling about specific behaviors that result in a healthy pregnancy, also remain approximately 30%.<sup>22</sup> Experimental evidence indicates that the receipt of pregnancy-related preventive health messages before pregnancy results in better maternal and infant outcomes.<sup>23,24</sup> Additionally, previous observational studies have found a positive association between general PCC on specific health behaviors.<sup>12,25</sup> However, no studies have examined the association between the provision of specific health messages and behaviors before and during pregnancy. Therefore, the purpose of this study was to examine the associations between receipt of specific PCC messages and maternal behaviors before and during pregnancy in a large, diverse US population.

## MATERIALS AND METHODS

### Data source

Data were from the Pregnancy Risk Assessment Monitoring System (PRAMS) for 2009-2010. PRAMS provides population-based data on self-reported maternal behaviors and experiences before, during, and after pregnancy among women who have

had a recent live birth.<sup>26,27</sup> Women are sampled from a frame of states' birth certificate files 2-6 months after delivery. A stratified systematic sampling method is used to over-sample mothers with adverse birth outcomes and racial/ethnic minority groups. The PRAMS questionnaire was a combination of core questions that are asked by all states and standard questions that states can choose to include; thus, each state has a unique PRAMS questionnaire. Four states (MD, MI, NJ, OH) chose to include the questions on reported receipt of PCC and the questions on receipt of specific pregnancy-related preventive health messages and maternal behaviors before and during pregnancy. PRAMS required a minimum response rate of 65% to release the 2009-2010 data. Further details of PRAMS methods (which includes sampling, stratification, weighting, questionnaire, data collection, and data management) are described elsewhere.<sup>26,27</sup>

### Data analysis

Only women who answered "yes" to the question, "Before you got pregnant with your new baby, did you talk with a doctor, nurse, or other health care worker to prepare for a healthy pregnancy and baby?" were asked to answer the questions on specific health messages received before pregnancy (32.2% of the total sample; n = 10,267 women). PCC messages received and corresponding behaviors that were examined included taking vitamins with folic acid before pregnancy, dieting to lose weight or exercising before pregnancy, smoking during pregnancy, and drinking alcohol during pregnancy (Table 1).

Vitamin use was assessed with the question, "During the *month before* you got pregnant with your new baby, how many times a week did you take a multivitamin, a prenatal vitamin, or a folic acid vitamin?" Responses were coded as yes (range, 1-7 times each week; 76% of women reported daily use) vs no.

TABLE 1

### Survey questions about preconception care messages and corresponding behaviors<sup>a</sup>

Before you got pregnant with your new baby, did a doctor, nurse, or other health care worker talk with you about any of the things listed below?	Corresponding behavior/characteristic
Taking vitamins with folic acid before pregnancy	During the month before you got pregnant with your new baby, how many times per week did you take a multivitamin, a prenatal vitamin, or a folic acid vitamin? <sup>b</sup>
Being a healthy weight before pregnancy <sup>c</sup>	At any time during the 12 months before you got pregnant with your new baby, did you do any of the following things? Option a: I was dieting (changing my eating habits) to lose weight Option b: I was exercising $\geq 3$ days per week <sup>d</sup>
How smoking during pregnancy can affect a baby	During the last 3 months of pregnancy, did you smoke cigarettes?
How drinking alcohol during pregnancy can affect a baby	During the last 3 months of pregnancy, did you drink any alcohol?

<sup>a</sup> Pregnancy Risk Assessment Monitoring System 2009-2010; <sup>b</sup> Took vitamins at least once weekly or did not take a vitamin at all; <sup>c</sup> Respondents could check all items that applied among a list of 8 items, and each choice listed here was coded as a separate dichotomous variable (yes/no); <sup>d</sup> Did or did not exercise  $\geq 3$  days per week.

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