



Preconception Health, MI PRAMS 2009

While the care of women in pregnancy and labor has improved over time, during the past 30 years the rates of infant morbidity and mortality have remained stable.¹ Recent studies suggest that the reason for these poor outcomes even in the midst of optimal care lies in the period known as organogenesis.¹

This formation of the fetal organs takes place between 17 and 56 days after conception, before most women realize they are pregnant.¹

The most well-known preventive measure during the preconception period is folic acid supplementation. Taking folic acid 4 weeks before conception until the 8th week of pregnancy significantly reduces the risk of neural tube defects.²

Other preconception health behaviors measured by the 2009 PRAMS survey are shown in Figure 1 as percentages of all responding moms. Although all are considered preventive and help prepare for a healthy pregnancy and

baby when practiced during the preconception period, some, such as dieting to lose weight and regularly taking prescription medicines, can also become risk factors if continued into pregnancy and/or without medical supervision.

To reduce the risk of adverse pregnancy outcomes, health care providers can offer women contemplating pregnancy and their partners preconception counseling, which provides information about risk factors and preventive measures.¹ Studies have shown that preconception counseling increases the knowledge and healthy behaviors of mothers-to-be around

the time of pregnancy.¹

Since 44.6% of all live births in Michigan resulted from unintended pregnancies (MI PRAMS 2009), reaching this group of women before they conceive may be difficult.

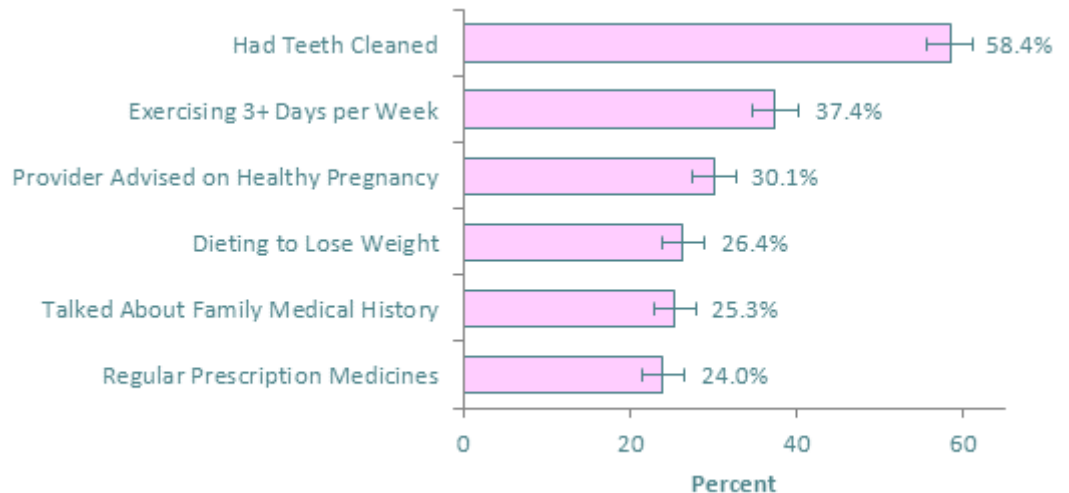
This issue of the MI PRAMS Delivery examines the prevalence of preconception health factors as well as topics covered in preconception counseling discussions with health care providers. It also explores the relationship between dieting to lose weight in the 12 months before conception and multivitamin use in the month before pregnancy. ♦

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Figure 1. Prevalence of Preconception Health Behaviors During the 12 Months Before Conception Among All Responding Women, MI PRAMS 2009



Topics Covered by Health Care Providers During Preconception Counseling

Women who reported receiving preconception counseling (i.e. their health care provider advised on how to prepare for a healthy pregnancy), regardless of health or behavioral history, were asked the following question about the type of counseling provided:

“Before you got pregnant with your new baby, did a doctor, nurse, or other health care worker talk to you about any of the things listed below”? (yes or no for each)

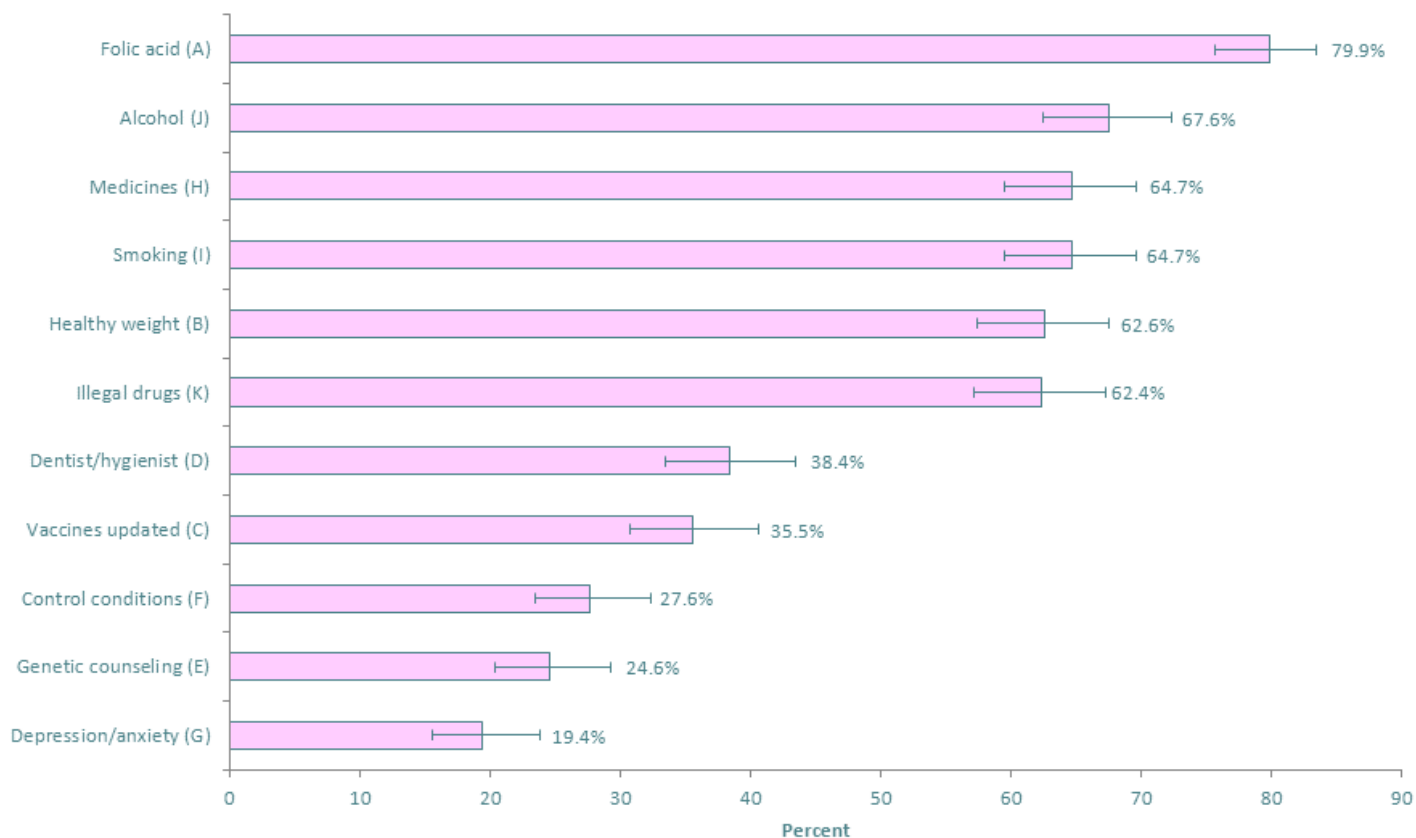
- A. Taking vitamins with folic acid before pregnancy
- B. Being a healthy weight before pregnancy
- C. Getting my vaccines updated before pregnancy
- D. Visiting the dentist or dental hygienist before pregnancy

- E. Getting counseling for any genetic diseases that run in my family
- F. Controlling any medical conditions such as diabetes and high blood pressure
- G. Getting counseling or treatment for depression or anxiety
- H. The safety of using prescription or over-the-counter medicines during pregnancy
- I. How smoking during pregnancy can affect a baby
- J. How drinking alcohol during pregnancy can affect a baby
- K. How using illegal drugs during pregnancy can affect a baby

Figure 2 shows the percentages of women receiving preconception counseling who reported their health care providers talking

about each of the listed topics during their preconception counseling. Of those women who received preconception counseling, the most common topic was taking folic acid before pregnancy (79.9%). The effects of alcohol, medicines, smoking, pre-pregnancy weight, and illegal drugs all had similar prevalence percentages (62.4% to 67.6%). The remaining topics were significantly less prevalent than those previously mentioned (19.4% to 38.4%). Visiting a dentist or dental hygienist was discussed with 38.4% of the respondents, closely followed by updating their vaccines (35.5%). Only about a quarter of health care workers discussed controlling chronic conditions like diabetes and high blood pressure or getting genetic counseling. Getting counseling or treatment for depression or anxiety was discussed by 19.4% of providers. ◊

Figure 2. Prevalence of Topics Covered by Health Care Providers During Preconception Counseling Among All Respondents Who Were Counseled, MI PRAMS 2009



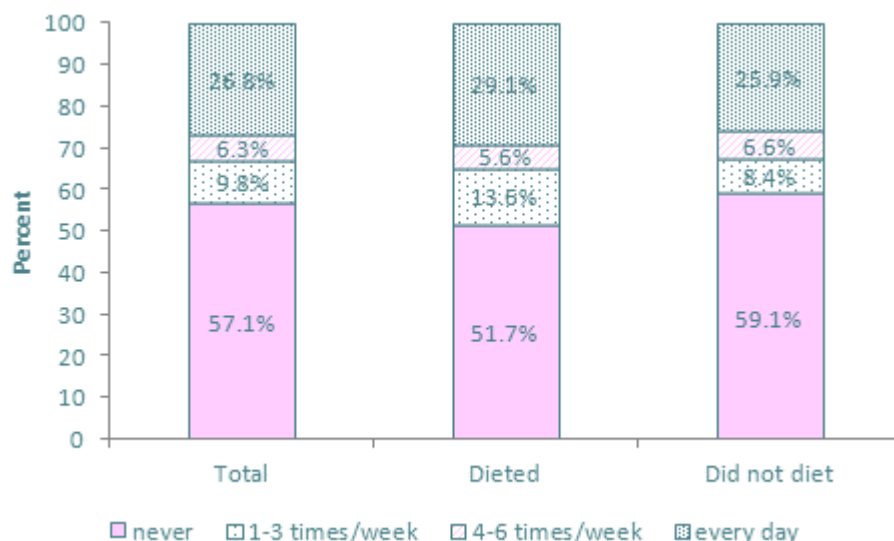
Preconception Dieting and Multivitamin Use

Recent research has found that maternal preconception dieting may be a risk factor for neural tube defects.³ The Multivitamin Research Council has concluded that folic acid supplementation beginning *before* pregnancy is the most effective method in preventing neural tube defects in children since most women do not realize they are pregnant until after the critical period for development of neural tube defects.⁴ However, little is known about the association between pre-pregnancy dieting and multivitamin use among women delivering a live birth.

In order to examine the relationship between preconception dieting and both multivitamin use and multivitamin frequency, two separate logistic regression models were built. We used 2009 MI PRAMS data to measure exposure (dieting to lose weight at any time during the 12 months before pregnancy) and outcomes (use of a multivitamin during the month before pregnancy and multivitamin frequency). Binomial logistic regression was used to estimate prevalence ratios (PR) for multivitamin use among women who were dieting before pregnancy compared to those who were not dieting, and multinomial logistic regression was used to estimate relative prevalence ratios (RPR) for each non-referent category of multivitamin frequency among dieters versus non-dieters. (See the Epi Corner on page 4 for more information on multinomial models.) Potential confounders considered were maternal age, race, education, insurance status, marital status, parity, pregnancy intention, BMI, and number of life stressors. However, none of these had more than a 10% effect on the relationship between dieting and either outcome, so they were not included in the final models.

About 43% of Michigan mothers delivering in 2009 used multivitamins within the month before pregnancy began (Figure 3). Women who were on a diet in the year before pregnancy were 1.18 times more likely to use a multivitamin in the month

Figure 3. Frequency of Multivitamin Use by Dieting Status, MI PRAMS 2009



before pregnancy than those who were not on a diet [95% CI: (1.03, 1.36)]. Multinomial analysis indicated that the association was only present at the lowest frequency of vitamin use: dieters were 63% more likely (95% CI: [1.12, 2.37]) than non-dieters to take multivitamins 1-3 times per week, compared to never. Dieters were not more or less likely than non-dieters to take vitamins 4-6 times per week (RPR: 0.86; 95% CI: [0.51, 1.45]) or every day (RPR: 1.12; 95% CI: [0.91, 1.38]) versus never.

In conclusion, dieting to lose weight before pregnancy was associated with increased preconception multivitamin use, but not at the recommended daily frequency. These findings from MI PRAMS suggest that women of reproductive age, regardless of dieting status, pregnancy intention or demographic characteristics, may benefit from increased public health interventions designed to increase daily multivitamin use before pregnancy, in order to help prevent neural tube defects. ◊

Table 1. Association Between Preconception Dieting and Multivitamin Use, MI PRAMS 2009

Dieting status	Preconception multivitamin use PR* (95% CI**)
Dieting before pregnancy	1.18 (1.03, 1.36)
Not dieting before pregnancy	Reference

*PR = Prevalence Ratio **CI = Confidence Interval

Table 2. Associations Between Preconception Dieting and Preconception Frequency of Multivitamin Use, MI PRAMS 2009

Vitamin frequency	Dieting before pregnancy RPR* (95% CI)	Not dieting before pregnancy RPR** (95% CI)
Every day	1.12 (0.91, 1.38)	Reference
4-6 times/week	0.86 (0.51, 1.45)	Reference
1-3 times/week	1.63 (1.12, 2.37)	Reference
Never	Reference	Reference

*RPR = Relative Prevalence Ratio **CI = Confidence Interval

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Epi Corner: Multinomial Models

When epidemiologists want to test an association, they often fit a regression model to the available data. When the outcome is categorical (i.e. its possibilities fall into a certain number of separate categories), logistic regression is used. The data in Table 1 come from a *binomial* logistic regression model because only two outcome possibilities are examined—taking a multivitamin vs. not taking a multivitamin.

However, a *multinomial* model was used in addition to the original binary model in order to investigate whether or not the increase in multivitamin use found among

dieters corresponded to a higher likelihood of daily multivitamin use, which is one of four response categories for multivitamin frequency.

When building a multinomial regression model, one of the response categories is chosen as the reference group (in this case, “never” is the reference for vitamin frequency). Then for each comparison level of frequency, its prevalence ratio among dieters (versus never) is compared to the respective prevalence ratio for the non-dieting group. This results in a *relative prevalence ratio*, or the ratio of the prevalence ratios between dieters and non-dieters for

each non-referent level of multivitamin frequency.

For example, the likelihood that a dieting mother took a multivitamin every day in the month before conception, versus never, was not greater than the likelihood that a non-dieting mother took a multivitamin every day, versus never, because the relative prevalence ratio of 1.12 was not statistically significant [95% CI: (0.91-1.38), Table 2]. ♦



About MI PRAMS

The Pregnancy Risk Assessment Monitoring System (PRAMS), a population-based survey, is a CDC initiative to provide data about risk factors for infant mortality and low birth weight.

It is a combination mail/telephone survey designed to monitor selected self-reported maternal behaviors and experiences of women who delivered a live infant in Michigan that occur before and during pregnancy, as well as early postpartum periods. Information regarding the health of the infant is also collected for analysis.

Annually, over 2,000 mothers are selected at random to participate from a frame of eligible birth certificates. Women who deliver a low birth weight infant are over-sampled in order to ensure adequate representation. The results are weighted to represent the entire cohort of women who delivered during that time frame. ♦

References

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