

Pregnancy Planning Status and Health Behaviors Among Nonpregnant Women in a California Managed Health Care Organization

CONTEXT: Women's behaviors before and during pregnancy can affect their infants' health. Particularly because many births in the United States are unintended, it is important to understand women's health behaviors and pregnancy planning status before they become pregnant.

METHODS: A telephone survey of nonpregnant women of childbearing age who belonged to a Southern California managed care plan was conducted from 1998 through 2000. Survey data were analyzed in logistic regression models assessing differences in selected behaviors between women planning pregnancy and others.

RESULTS: Compared with women not planning pregnancy, those planning pregnancy within the next year ("soon") were less likely to report smoking (odds ratio, 0.6), and more likely to report taking a multivitamin regularly (1.4) and having had a health care visit in the past year (1.6). Women planning a pregnancy more than one year in the future had elevated odds of reporting alcohol use (1.4); they were similar to women not planning pregnancy with respect to multivitamin use and smoking behavior. Women planning pregnancy soon were more likely than women not planning pregnancy to report that a health care professional had talked to them about taking a vitamin or mineral supplement (1.6).

CONCLUSIONS: All women of childbearing age need information about the importance of engaging in healthy behaviors. Health care providers who have regular contact with such women should send clear messages about the adverse effects of alcohol and smoking during pregnancy and the importance of taking a multivitamin regularly, regardless of women's pregnancy plans, before they become pregnant.

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A number of health behaviors, including alcohol use,¹ cigarette smoking,² late initiation of prenatal care³ and inadequate folic acid consumption,⁴ are associated with adverse pregnancy outcomes and can have lasting effects on the health of infants. For example, maternal alcohol use can lead to fetal alcohol syndrome disorder⁵ and increased aggressive behavior in children;⁶ no safe level of alcohol consumption has been determined, and the effects of light or moderate alcohol use are unclear.⁷ Women who smoke while pregnant or seek prenatal care late have an increased risk of having a miscarriage or a low-birth-weight infant.⁸ Women who do not have an adequate intake of folic acid before conception and during the first trimester have an elevated risk of bearing an infant affected by a neural tube defect.⁹

About half of all pregnancies in the United States are unintended—that is, either mistimed or unwanted.¹⁰ Pregnancy intention might be a predictor of maternal behaviors that could affect pregnancy and infant outcomes.¹¹ Women whose pregnancies were unintended are less likely than those whose pregnancies were planned to receive prenatal care early, and more likely to smoke cigarettes and use alcohol during pregnancy.¹² In addition, women whose pregnancies were intended are more likely to have taken folic acid before conception than are women whose pregnancies were unintended.¹³

Studies of pregnancy intention have commonly examined both intention and behaviors retrospectively.¹⁴ Understanding women's pregnancy intention and behaviors before conception

could inform the design of interventions to promote healthy behaviors among all women of childbearing age, and thereby increase the chances of healthy outcomes for mothers and their infants. Therefore, the purpose of our study was to examine the associations between pregnancy planning status among nonpregnant women of childbearing age who believed that they could become pregnant and a variety of health behaviors that are known to affect pregnancy and birth outcomes. We hypothesized that women planning to become pregnant would be more likely than others to engage in behaviors that might contribute to healthy outcomes for themselves and their infants. Further, we examined differences by pregnancy planning status in women's reported discussions with health care professionals about these behaviors. We hypothesized that women planning to become pregnant would be more likely than women not planning pregnancy to report that a health care professional had talked with them about certain health behaviors.

METHODS Study Design

We analyzed data from an evaluation study of two interventions developed to increase the use of multivitamins containing folic acid among women of childbearing age enrolled in the Kaiser Foundation Health Plan in Southern California. The study was approved by the institutional review boards of Kaiser Permanente Southern California and the Centers for Disease

TABLE 1. Percentage distribution of participants in a study examining health behaviors among nonpregnant women in a managed health care plan, by selected characteristics, according to pregnancy planning status, Southern California, 1998–2000

Characteristic	Total (N=2,886)	Planning pregnancy soon (N=376)	Planning pregnancy later (N=1,163)	Not planning pregnancy (N=1,347)
Age				
18–24	27.7	13.6	52.1*	10.5
25–34	47.5	63.8*	43.5	46.3
35–40	24.8	22.6*	4.4*	43.1
Race/ethnicity				
White, non-				
Hispanic	48.4	47.3	49.9	47.4
Hispanic	28.6	29.8	25.4*	31.0
Asian/Pacific Islander	10.1	11.4	11.6*	8.5
Black, non-				
Hispanic	6.3	5.3	6.1	6.8
Other/multi- racial	5.8	6.1	6.4	5.5
Don't know, refused	0.8	6.1	0.7	0.8
Marital status				
Never-married	31.1	5.6*	57.0*	15.9
Married	51.7	83.5*	25.5*	65.4
Living with partner	9.4	7.7	12.1*	7.5
Divorced/ separated/ widowed	7.7	2.9	5.3*	11.1
Don't know, refused	0.1	0.3	0.1	0.1
Education				
<H.S.	7.6	7.2	5.3*	9.7
H.S. graduate	24.6	21.5*	21.6*	28.1
Some college	37.3	31.1	42.4*	34.8
≥college graduate	30.2	40.2*	30.7*	27.0
Don't know, refused	0.2	0.0	0.1	0.5
Smoke				
Yes	14.6	8.2*	16.3	14.9
No	85.3	91.2*	83.7	85.1
Missing	0.2	0.5	0.0	0.2
Use alcohol				
Yes	59.1	55.3	64.6*	55.4
No	40.3	43.9	34.7*	44.1
Missing	0.7	0.8	0.7	0.5
Use multivitamin				
Yes	40.6	51.3*	36.4*	41.4
No	59.2	48.7*	63.6*	58.6
Missing	0.1	0.0	0.1	0.2
Health care visit in past year				
Yes	87.7	90.2*	88.9*	86.1
No	11.9	9.3*	10.8*	13.4
Missing	0.4	0.5	0.3	0.5
Total	100.0	100.0	100.0	100.0

*Significantly different from the proportion not planning pregnancy at $p < .05$.
 Note: Women were categorized as planning pregnancy soon if they reported wanting to become pregnant within the next year; they were categorized as planning pregnancy later if they reported wanting to become pregnant, but not within the next year.

Control and Prevention; a full description of the methods and results of the evaluation have been published elsewhere.¹⁵ Briefly, between June 1998 and May 2000, we conducted a

series of surveys among random samples of females aged 18–40 selected from the plan's membership database. This age range includes 97% of women who gave birth in Kaiser Permanente Southern California hospitals at the time of the study. The samples were representative of Southern California women aged 18–40 in terms of race and ethnicity, education and income.

The surveys were conducted monthly for six months and then every other month for 18 months. The sample size was 390 women for each of the first 11 surveys, 540 for each of the next three and 390 for the final one. This sampling method was chosen to ensure that the number of women in each intervention group in the evaluation was sufficient to achieve 90% power to detect a difference of 10% in increased regular multivitamin use.

Women were sent an introductory letter in English and Spanish explaining the purpose of the study. Trained interviewers contacted the women by telephone one week later and asked them to complete the survey in either English or Spanish. Among 6,300 women selected, 300 (5%) were excluded because they did not have a telephone number in the plan's membership file. Of the 6,000 women reached by the interviewers, 202 were pregnant and therefore ineligible for the study. We excluded this group because their vitamin-taking behavior could have been affected by their pregnancy. Of the remaining 5,798 women, 3,438 (59%) completed the survey. The most frequent reasons for nonresponse were that telephone numbers were invalid (27%), women refused to participate (21%) and the interviewer reached only an answering machine (19%). Our final sample consisted of 2,886 women who reported that they were capable of conceiving and reported their pregnancy planning status.

The survey instrument adapted questions from the Behavioral Risk Factor Surveillance System survey¹⁶ and the March of Dimes/Gallup survey of folic acid and multivitamins.¹⁷

Variables

Our measure of pregnancy planning status reflected both whether and when women intended to become pregnant. We categorized women who reported planning to get pregnant as pregnancy planners. Among this group, we considered women who were planning to become pregnant in the next year as planning soon, and those not planning pregnancy in the next year as planning later.

The health behaviors we examined were cigarette smoking, alcohol consumption, multivitamin use and seeing a health care provider. We defined as smokers those who responded "every day" or "some days" to the question "Do you now smoke cigarettes every day, some days, or not at all?" We defined as nonsmokers those who reported that they were not currently smoking.

Given that the effects of light or moderate alcohol use are uncertain, we dichotomized alcohol use as any use and no use, on the basis of responses to the question "During the past month, how many alcoholic beverages (beer, wine, wine coolers or liquor) did you drink per week or per month, on the average?"

The protective effect of folic acid, either alone or in a multivitamin supplement, depends on regular use during the peri-

TABLE 2. Unadjusted and adjusted odds ratios (and 95% confidence intervals) from logistic regression analysis assessing associations between women's health behaviors and pregnancy planning status

Behavior	Unadjusted	Adjusted†
Smoking		
Not planning pregnancy	ref	ref
Planning pregnancy soon	0.69 (0.54–0.90)*	0.64 (0.42–0.96)*
Planning pregnancy later	0.76 (0.64–0.91)*	0.92 (0.71–1.20)
Alcohol use		
Not planning pregnancy	ref	ref
Planning pregnancy soon	1.00 (0.80–1.26)	1.07 (0.84–1.37)
Planning pregnancy later	1.00 (0.80–1.26)	1.39 (1.14–1.69)*
Multivitamin use		
Not planning pregnancy	ref	ref
Planning pregnancy soon	1.29 (1.02–1.62)*	1.41 (1.11–1.80)*
Planning pregnancy later	0.91 (0.78–1.07)	0.95 (0.79–1.15)
Health care use		
Not planning pregnancy	ref	ref
Planning pregnancy soon	1.50 (1.03–2.21)*	1.64 (1.10–2.44)*
Planning pregnancy later	1.30 (1.00–1.63)	1.13 (0.85–1.50)

* $p < .05$. †All analyses are adjusted for age, education, race and marital status. Analysis of alcohol use is also adjusted for smoking, and analysis of smoking is also adjusted for alcohol use. Notes: ref=reference group. Women were categorized as planning pregnancy soon if they reported wanting to become pregnant within the next year; they were categorized as planning pregnancy later if they reported wanting to become pregnant, but not within the next year.

conceptional period (i.e., from 1–3 months before conception through 12 weeks' gestation).¹⁸ Therefore, we compared regular users with irregular users or nonusers of both multivitamin and folic acid supplements. In addition, because fewer than one-third of women of childbearing age take folic acid daily,¹⁹ we wanted to identify women who took a multivitamin or folic acid alone on most days or every day. We first asked, "How often do you take these multivitamins, every day, 4–6 times per week, 2–3 times a week, once a week, or less frequently?" Those who responded every day or 4–6 times a week were categorized as regular users; those who gave other answers were considered nonusers. Women were asked the same series of questions about using folic acid alone; the few women who used folic acid alone were combined with multivitamin users within the same categories.

Health care users were defined as those who responded yes to the question "In the past 12 months, have you seen a Kaiser Permanente physician or other health care professional?" In addition, we asked, "During the past 12 months, has a Kaiser Permanente physician or other health care professional ever talked with you about (a) taking vitamin or mineral supplements, (b) smoking and (c) alcohol consumption?" We examined how women's responses to this question differed by pregnancy planning status.

Statistical Analyses

We used chi-square analysis and logistic regression analysis to assess differences in health behaviors between pregnancy planners and other women. We calculated crude odds ratios and 95% confidence intervals to assess potential associations, and then adjusted the analysis for age, race and ethnicity, ed-

ucation and marital status. In addition, analysis of alcohol use was adjusted for smoking, and analysis of smoking was adjusted for alcohol consumption. We also used logistic regression analysis to examine differences by pregnancy planning status in women's report that a health care provider had talked to them about smoking, alcohol use and taking vitamin or mineral supplements. We used SAS version 8.02 for all analyses.

RESULTS

Sample Characteristics

Thirteen percent of the women reported planning pregnancy in the next year, 40% reported planning pregnancy later and 47% reported not planning pregnancy. Nearly half of respondents were 25–34 years of age (Table 1). Forty-eight percent identified themselves as white non-Hispanic, 29% as Hispanic, 10% as Asian or Pacific Islander and 6% as black; 7% were of other, unknown or multiple races. Whereas 52% were married, 31% were never-married; 25% had a high school diploma, and 30% at least a college degree. Women planning pregnancy soon tended to be 25–34 years of age (64%) and married (84%); 40% had at least a college degree. Women planning pregnancy later tended to be younger than 25 (52%) and never-married (57%); 42% had some college education.

Health Behaviors

Overall, 15% of the women reported smoking cigarettes, 59% reported any alcohol use, 41% reported taking a multivitamin regularly and 88% reported having visited a health care provider in the past year. A smaller proportion of women planning pregnancy soon than of those not planning pregnancy reported smoking cigarettes (8% vs. 15%). The proportion reporting alcohol use was higher among women planning pregnancy later than those women not planning a pregnancy (65% vs. 55%). Women planning a pregnancy soon more frequently reported taking multivitamins regularly than did women not planning pregnancy (51% vs. 41%). Although the majority of all women in our sample had seen a health care provider within the past 12 months (86–90%), the proportions were significantly higher among pregnancy planners than among those not planning pregnancy.

In the adjusted analyses, women planning pregnancy soon were significantly less likely than those not planning pregnancy to report smoking (odds ratio, 0.6—Table 2), and they were significantly more likely to report taking a multivitamin regularly (1.4) and to have had a health care visit in the past year (1.6); their reported alcohol use did not differ from that of women not planning pregnancy. By contrast, women planning pregnancy later differed from those not planning pregnancy only in that they were more likely to report alcohol use (1.4).

Advice from Health Care Providers

Among women who reported having seen a health care provider in the past year, roughly three in 10 in each planning status group reported that the provider had discussed smoking or multivitamin use with them; two in 10 reported having received advice about alcohol use (Table 3). In the multivariate analysis, women planning pregnancy soon were significantly more like-

TABLE 3. Among women who made a health care visit in the past year, percentage who reported that a provider had talked to them about health behaviors, by pregnancy planning status; and unadjusted and adjusted odds ratios (and 95% confidence intervals) from logistic regression analysis assessing associations between such reports and pregnancy planning status

Behavior	% receiving advice	Unadjusted odds ratio	Adjusted odds ratio†
Smoking			
Not planning pregnancy	32	ref	ref
Planning pregnancy soon	25	0.71 (0.54–0.94)	0.66 (0.44–1.01)
Planning pregnancy later	34	1.09 (0.91–1.30)	1.18 (0.92–1.53)
Alcohol use			
Not planning pregnancy	20	ref	ref
Planning pregnancy soon	18	0.93 (0.68–1.26)	1.00 (0.66–1.50)
Planning pregnancy later	19	0.98 (0.79–1.21)	0.98 (0.74–1.28)
Multivitamin use			
Not planning pregnancy	28	ref	ref
Planning pregnancy soon	38	1.66 (1.21–2.00)*	1.64 (1.24–2.19)*
Planning pregnancy later	26	0.98 (0.78–1.07)	0.91 (0.73–1.22)

* $p < .05$. †All analyses are adjusted for age, education, race and marital status. Analysis of alcohol use is also adjusted for smoking, and analysis of smoking is also adjusted for alcohol use. Notes: ref=reference group. Women were categorized as planning pregnancy soon if they reported wanting to become pregnant within the next year; they were categorized as planning pregnancy later if they reported wanting to become pregnant, but not within the next year.

ly than women not planning pregnancy to have reported that a physician or health care professional had talked with them about taking vitamin or mineral supplements (odds ratio, 1.6); their reports on advice about the other health behaviors did not differ from those of women not planning pregnancy. Women planning pregnancy later and women not planning pregnancy did not differ in reported advice on any of the behaviors.

DISCUSSION

Our findings suggest that the timing of pregnancy plans is associated with the likelihood of avoiding and engaging in certain health behaviors. In our sample, women planning pregnancy in the next year avoided some potentially risky behaviors and engaged in potentially beneficial ones. Women planning pregnancy later, by contrast, were largely similar to women not planning pregnancy, although they were more likely to have consumed alcohol. The value of adopting healthy behaviors might not be readily apparent to women who are planning pregnancy sometime later. Increased efforts are needed to educate all women about the benefits that healthy behaviors before and during pregnancy may have for their overall health and well-being and, should they become pregnant, for the health of their babies.

Women planning pregnancy soon who had made a health care visit in the past year had an increased likelihood of reporting that a provider had talked with them about vitamin or mineral supplements. We were unable to discern whether this difference was because these women asked for information, they were more likely than others to remember these messages or these messages were being targeted to this group. The finding that about nine in 10 women had seen a health care provider in the past year suggests that physicians and other health care professionals had an opportunity to educate them on the importance of engaging in positive preconceptional health behaviors to improve pregnancy and infant outcomes.

Our study differed from others examining health behaviors among women of childbearing age because pregnancy planning and health behaviors were reported independent of a recent pregnancy, rather than retrospectively after pregnancy. Further research focusing on women's behaviors and pregnancy plans is needed. In particular, it is important to explore differences in contraceptive use and health behaviors when examining women's pregnancy planning because half of unintended pregnancies are among women who say that they are using contraceptives.²⁰

Our null findings have implications for public health education and intervention efforts. The finding that women planning to become pregnant later did not differ from women not planning pregnancy in smoking and multivitamin use raises important issues for the development of educational campaigns. Fifteen percent of women in our study reported smoking. In 2002, 11% of women who gave birth in the United States reported smoking during their pregnancy; in addition, it is estimated that only 25% of women who smoke quit when they become pregnant.²¹ More educational efforts are needed to encourage all women of childbearing age who smoke, regardless of pregnancy plans, to quit smoking in an effort to reduce possible health risks for both themselves and their fetus, should they become pregnant. Furthermore, while it is encouraging that women planning a pregnancy within the next year were more likely than those not planning a pregnancy to report taking multivitamins regularly, focused and sustained efforts are warranted to educate all women of childbearing age about the importance of regular multivitamin use and to urge health care professionals who see women of childbearing age to incorporate the folic acid message into routine counseling, regardless of women's pregnancy plans.

In our sample, women who were planning to become pregnant later were more likely to report alcohol use than women not planning pregnancy. While many women might reduce their alcohol consumption once they realize they are pregnant, a large proportion of pregnant women are unaware they are pregnant until late in the first trimester, after a critical period in fetal development. Past public health initiatives focused on advising pregnant women to refrain from drinking, but the federal government now advises women who might become pregnant to abstain from alcohol consumption.²² It is important to identify women who might not perceive themselves as being at risk for pregnancy and intervene before they become pregnant to avoid an alcohol-exposed pregnancy. Many physicians do not routinely discuss the effects of drinking during pregnancy with women.²³ More efforts are needed to educate health care professionals about the effects of drinking during pregnancy, and to provide them with effective methods for screening patients for prenatal alcohol use.

Our study had several limitations. The overall response rate for the larger evaluation study was 59%, which could have biased the results. In addition, our study was based on self-reported data, and respondents might have reported socially desirable behaviors (e.g., vitamin consumption and not smoking) that were not consistent with their practices. However, the reported rates of health behaviors were similar to those

reported in the literature.²⁴ Within the group planning pregnancy soon, we were unable to distinguish women who were trying to become pregnant at the time of the interview from those who were not. Also, the survey did not ask about contraceptive use, which is associated with pregnancy planning and timing.²⁵ Finally, this sample was limited to women who were members of a managed health care plan, the majority of whom had seen a physician or health care provider in the past year. These findings might not be generalizable to women without insurance or without access to health care.

In conclusion, our findings point to a need for public health and health care professionals to educate all women of childbearing age, including women who might not be planning pregnancy, about the importance of engaging in healthy behaviors. Finally, because the risk of unintended pregnancy is high in the United States, women of childbearing age who might be planning pregnancy later and women who are not planning pregnancy at any time should be targeted for messages about the health benefits of avoiding smoking, reducing alcohol consumption, taking a multivitamin and seeing a health care provider annually.

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