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Nicotine replacement therapy and other interventions for pregnant smokers: Pregnancy Risk Assessment Monitoring System, 2009–2010

Martha Kapaya [a,*], Van Tong [b], Helen Ding [a]

[a] DB Consulting Group Inc., Silver Spring, MD, United States
[b] Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA, United States

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ABSTRACT

Background. Current U.S. guidelines recommend consideration of nicotine replacement therapy (NRT) for pregnant smokers if behavioral therapies fail, only under close supervision of a provider, and after discussion of known risks of continued smoking and possible risks of NRT. The percentage of pregnant smokers offered NRT by their prenatal care providers is unknown.

Purpose. The study aims to calculate the percentage of pregnant smokers offered cessation intervention and NRT and assess independent associations between selected maternal characteristics and being offered NRT.

Methods. Data were analyzed from the 2009–2010 Pregnancy Risk Assessment Monitoring System from four states that asked about provider practices for prenatal smoking cessation. Adjusted prevalence ratios were calculated to examine associations between being offered NRT, selected maternal characteristics, and smoking level. Variables used in adjusted models were based on factors associated with smoking cessation during pregnancy from prior literature and included race, age, education, insurance type, and stress.

Results. Of 3559 women who smoked 3 months before pregnancy, 77.4% (95% CI: 74.2, 80.3) of 3rd trimester smokers and 42% (95% CI: 38.5, 46.4) of women who quit smoking during pregnancy were offered at least one cessation method. Among smokers, 19.1% (95% CI: 16.5, 22.1) were offered NRT and of these, almost all (94%) were offered another cessation method.

Conclusions. One in five pregnant smokers was offered NRT. About a quarter of pregnant smokers did not receive any interventions to stop smoking. There may still be reluctance to provide NRT to pregnant women, despite known harms of continued smoking during pregnancy.

Introduction

Tobacco use during pregnancy is the most prevalent cause of poor infant outcomes for which effective interventions exist (US Department of Health and Human Services [USDHHS] 2014). Prenatal smoking causes adverse outcomes including placental abruption, preterm delivery, fetal growth restriction, and Sudden Infant Death Syndrome (USDHHS 2014). The last decade has seen modest declines in prevalence of prenatal smoking; however, data from the 2010 Pregnancy Risk Assessment Monitoring System (PRAMS) show that 23% of women with live births smoked cigarettes before pregnancy and 11% of women smoked in the 3rd trimester of pregnancy (Tong et al., 2013).These numbers fall short of targets set by the *Healthy People 2020* initiative to reduce to 14.6% the percentage of women entering pregnancy smoking and reduce to 1.4% the percentage of women smoking prenatally ((USDHHS), 2013).

The 2008 U.S. Public Health Services Guidelines recommend that clinicians ask all pregnant women about tobacco use and that pregnant smokers be offered augmented pregnancy-tailored counseling (Fiore et al. 2008). The American College of Obstetricians and Gynecologists [ACOG] (2010) recommends that providers assess smoking status of their pregnant patients and deliver a brief counseling session, such as the 5A's (ask, advise, assess, assist, and arrange), to patients who are willing to quit smoking, and refer them to a smoking cessation quit line if additional support is needed. In meta-analysis, counseling interventions have been shown to improve smoking cessation during pregnancy compared to usual care (Chamberlain et al. 2013). Because safety and efficacy of nicotine replacement therapy (NRT) during pregnancy have not been established, ACOG (2010) states that NRT only be used under the close supervision of a provider after all known risks of continued smoking and possible risks of NRT have been discussed, and only after behavioral therapy fails to achieve cessation in patients with a "clear resolve to quit smoking". Bupropion and varenicline are U.S. Food and Drug Administration (FDA)-approved medications for smoking cessation in general populations; however, no trials have assessed their safety and use for cessation during pregnancy. Given

* Corresponding author at: 4770 Buford Hwy, NE, MS F74, Atlanta, Georgia 30341, United States. Fax: +1 770 488 6291.
E-mail address: MKapaya@cdc.gov (M. Kapaya).

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that both drugs carry federally mandated product warnings about the risk of psychiatric symptoms and suicide associated with their use, ACOG (2010) recommends that pregnant patients who choose to use these medications be closely supervised.

Several studies have summarized providers' self-reported practices of delivering smoking cessation interventions (Hartmann et al. 2007, Oncken et al. 2000, Jordan, Dake & Price 2006, Association of American Medical Colleges 2012), but fewer studies exist on pregnant women's report of being offered interventions by their provider, including NRT. In a trial using telephone counseling, researchers found that 29% of pregnant smokers reported discussing a cessation medication, including NRT, with their obstetric providers, and 10% reported using a medication during pregnancy (Rigotti et al. 2008). Using data from a representative sample of women with a live birth in New Jersey during 2004 to 2005, another study found that almost all women reported being asked by their provider if they smoked, 57% reported their provider had spent time with them discussing how to quit, 12% reported using some type of cessation method (such as self-help materials, counseling, medications, classes, or quit lines), and 4% reported using medications (Tong et al. 2008). However, that study did not assess whether the provider had offered cessation medications such as NRT, bupropion, or varenicline to women, nor did it ask if the women were referred to a smoking cessation quit line.

Also, disparities in providing smoking cessation have been documented for the general population of smokers. Non-Hispanic Black smokers are less likely to utilize evidence-based cessation treatments (CDC 2011). Though scant, there has been mixed evidence regarding disparities in the receipt of smoking cessation interventions in prenatal care among pregnant smokers. Some studies have noted that Black pregnant women were more likely to receive provider counseling on interventions for smoking cessation (Petitti et al. 1991, Tran et al. 2010) while another noted that Black women were less likely to receive provider advice about smoking cessation (Kogan et al., 1994). Thus, exploring associations between provider assistance and maternal characteristics among pregnant smokers may help to information cessation efforts.

The objectives of this study were to determine the types of smoking cessation methods being offered by prenatal care providers in a population-based sample of pregnant smokers and to examine associations between maternal characteristics and providers' recommendation of NRT.

Methods

Study population and data source

PRAMS is a population-based surveillance system which collects data on selected maternal behaviors and experiences before, during, and after pregnancy among women with a recent live delivery. In 2013, PRAMS included data for 41 sites: 40 states and New York City. This study analyzed 2009–2010 data from the four states (Illinois, Missouri, Oregon, and West Virginia) that collected information on prenatal care provider assistance for smoking cessation and achieved a weighted annual response rate of at least 65%. Responses are weighted to account for non-response, non-coverage and oversampling, to be representative of each state's entire population of women delivering a live infant. Detailed methodology is described elsewhere (Shulman, Gilbert & Lansky, 2006). The Centers for Disease Control and Prevention Institutional Review Board approved the PRAMS protocol; all sites approved the study plan.

In the four states during 2009–2010, a total of 10,958 women participated in the survey. Women who had no prenatal care (n = 80) were excluded, as it was assumed providers would not have had an opportunity to offer them smoking cessation services (Fig. 1). Women with missing information on entry into prenatal care (n = 12), smoking status before and during pregnancy (n = 189), and those who were nonsmokers (n = 7118) were also excluded. The final sample included 2069 (13.9%) pregnant women who reported smoking in the last 3 months of pregnancy. Women who quit smoking by the last trimester (n = 1490) were analyzed separately from women who smoked in the last 3 months of pregnancy to examine differences in receipt of provider assistance with smoking cessation between the two groups.

Measures

Smoking status was defined using three questions from the PRAMS survey. First, all respondents were asked if they had smoked *any* cigarettes in the past 2 years. Women who responded 'Yes' were asked to specify how many cigarettes they smoked per day on average in the three months before pregnancy, and in the last 3 months of pregnancy. The response categories for both time periods included: no cigarettes, less than 1, 1 to 5, 6 to 10, 11 to 20 and 41 or more cigarettes. Smokers were categorized as women who reported smoking any cigarettes in the 3 months before pregnancy *and* reported smoking any (includes <1 cigarette/day) cigarettes during the last 3 months of pregnancy. Quitters were defined as women who reported smoking in the 3 months before pregnancy and did not smoke any cigarettes in the last 3 months of pregnancy. As the study is descriptive, the use of cessation interventions should be interpreted with caution. Some quitters may have quit upon learning of pregnancy and/or prior to prenatal care.

Respondents who reported smoking in the 3 months before pregnancy were asked about smoking cessation methods or services offered during prenatal care by their provider (Table 2). Cessation methods were further grouped into any cessation method (a, b, c, d, e, f, g, h, i, j, or k), provider counseling (a, b, c, or f); self-help materials only (d), referral to counseling or quit line (e or g), and recommended or prescribed any NRT (h, i, or j). Timing of offer of any cessation method is not reported in PRAMS.

Maternal demographics derived from the birth certificate data included maternal race/ethnicity, age, parity, education, state of residence, and infant year of delivery. Insurance coverage during prenatal care, enrollment in the Special Supplemental Nutrition Program for Women Infants and Children (WIC) (United States Department of Agriculture [USDA] 2013), and maternal stress were derived from the PRAMS survey. Timing of entry into prenatal care was based on birth certificate data, or if missing on the birth certificate, was taken from the PRAMS survey. Maternal stress, which has known associations with smoking and decreased likelihood of cessation (Hauge, Torgersen & Vollrath 2012), was based on responses to a list of 13 negative life events included in PRAMS, such as, 'I had a lot of bills I couldn't pay,' and 'I lost my job even though I wanted to go on working,' and was categorized into no, 1 to 2, or 3 or more stressors.

Analytic approach

PRAMS data used in this analysis were weighted to adjust for survey design and non-response, and estimates are representative of women with live births in each participating state. SUDAAN (version 11) was used for analyses to account for the complex survey design.

Prevalence estimates and 95% confidence intervals (CIs) of receipt of any or specific types of prenatal care provider assistance with smoking cessation and offer of NRT for smoking cessation were calculated overall and by demographic characteristics. Chi-square tests ($p < 0.05$) were used to test for differences in percentages by maternal characteristics. Multivariable analyses were performed to examine demographic and service use variables associated with receipt of provider assistance for smoking cessation and offer of NRT. Adjustments in the analyses were made for race, age, parity, marital status, education, insurance type, WIC status, smoking intensity, and maternal stress. Covariates were included in the multivariable models based on factors associated with smoking cessation during pregnancy from prior literature. (Tong et al. 2008; Vaz et al. 2014; Tran et al. 2010; Adams et al. 2008; Kogan et al. 1994; Adams et al. 1992). Infant year of birth was included in the models to control for differences over time. As PRAMS is a cross-sectional survey, unadjusted and adjusted prevalence ratios (PR) and 95% CIs were calculated using logistic regression, as described by Bieler and colleagues (2010).