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Similarities in affect, perceived stress, and weight concerns between Black and White women who quit smoking during pregnancy

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Abstract

Mood and weight concerns may relate to postpartum smoking, and racial differences in these concerns may be important in developing interventions to prevent postpartum relapse. We compared differences in the smoking patterns, mood, and weight concerns of Black and White women who quit smoking during pregnancy ($N=174$). In univariate comparisons, there were no consistent differences in nicotine dependence, smoking history, or motivation to remain abstinent postpartum. Moreover, although there were univariate differences in negative affect, smoking for weight control, and eating disinhibition, after controlling for differences in income and educational background between Black and White women, these differences in mood and weight concerns were no longer significant. In our sample of pregnant women who had quit smoking, Black and White women did not differ in mood and weight concerns, two potentially modifiable variables that may affect smoking postpartum relapse.

Introduction

Although women are more likely to quit smoking during pregnancy than at other times in their lives (Ebrahim, Floyd, Merritt, Decoufle, & Holtzman, 2000), more than two-thirds of women who quit during pregnancy relapse to smoking within 6 months postpartum (Fingerhut, Kleinman, & Kendrick, 1990; McBride & Pirie, 1990; Mullen, Richardson, Quinn, & Ershoff, 1997). Several predictors of postpartum relapse have been identified, including having a partner who smokes (McBride & Pirie, 1990; McBride, Pirie, & Curry, 1992; Ratner, Johnson, Bottorff, Dahinten, & Hall, 2000; Severson, Andrews, Lichtenstein, Wall, & Akers, 1997; Severson, Andrews, Lichtenstein, Wall, & Zoref, 1995; Stotts, DiClemente, Carbonari, & Mullen, 2000), using alcohol (Severson et al., 1995), having a high level of nicotine dependence (Carmichael, Ahluwalia, & Group, 2000; McBride et al., 1992; Ratner et al., 2000), and lacking intent to remain quit after delivery (Mullen et al., 1997). Membership in a minority group also has been associated with postpartum relapse (Carmichael et al., 2000).

Nevertheless, Black women are equally or even more likely to quit smoking during pregnancy than are White women, despite differences in education, income, parity, and intention to breastfeed (Arnold et al., 2001; Morasco, Dornelas, Fischer, Oncken, & Lando, 2006; Ruggiero & de Groot, 1998; Ward, Vander Weg, Sell, Scarinci, & Read, 2006). Previous research also

has documented other racial differences in smoking behaviors. For example, Black smokers smoke fewer cigarettes per day (Daza et al., 2006; Murray, Connett, Buist, Gerald, & Eichenhorn, 2001; Sanchez-Johnsen, Spring, Sommerfeld, & Fitzgibbon, 2005), are less likely to be nicotine dependent (Kandel & Chen, 2000; Murray et al., 2001), metabolize nicotine more slowly (Perez-Stable, Herrera, Jacob, & Benowitz, 1998), and have more confidence in their ability to quit smoking than do White smokers (Daza et al., 2006). Thus, evidence suggests that the smoking patterns of Black and White women may differ, and it is therefore important to identify factors that may be uniquely related to postpartum smoking relapse in Black and White women.

We have documented that mood and weight concerns may be distinctly associated with postpartum relapse because of the particular psychosocial changes that accompany the postpartum period (Levine & Marcus, 2004). Moreover, we have found that smoking-related weight concerns at the end of pregnancy predict decreased motivation to remain abstinent from smoking postpartum (Levine, Marcus, Kalarchian, Weissfeld, & Qin, 2006). However, Black and White women differ in their attitudes toward body shape and weight, with Black women reporting higher levels of body satisfaction than White women (Wildes, Emery, & Simons, 2001; Roberts, Cash, Feingold, & Johnson, 2006). Given that racial differences in women's attitudes toward their bodies, shapes, and weights are greatest during the period of the early twenties (Roberts et al., 2006) when many women may become pregnant, racial differences in smoking-related weight concerns may be important to consider in developing efficacious interventions for pregnant and postpartum women smokers. For example, if Black and White women who have quit smoking as a result of pregnancy do not differ at the end of pregnancy on factors that may be addressed in a postpartum relapse prevention program, the postpartum relapse prevention intervention may reasonably be applied to women from different racial backgrounds.

Thus, we sought to compare Black and White women who had quit smoking during pregnancy on factors conceptually related to postpartum smoking relapse. We hypothesized that, relative to White women, Black women would have fewer general and smoking-related weight concerns, but that depressive symptoms, negative affect, and stress during pregnancy would not differ by race. In an effort to evaluate the role of race among pregnant women, we also sought to study racial differences in weight concerns and mood after controlling for potential demographic differences in education and income between Black and White women.

Methods

Participants

Subjects were pregnant women who had quit smoking ($N=174$) and were participating in a study concerned with the predictors of postpartum relapse, completed interviews and paper-and-pencil assessments during the third trimester of pregnancy, and identified their race as either White or Black. Pregnant women were recruited through advertisements in community magazines geared toward pregnant women, and posters advertising the study distributed to outpatient obstetric and gynecologic clinics and agencies serving women and children. Women were eligible to participate if they (1) reported having smoked at least eight cigarettes per day for at least 1 month prior to becoming pregnant, (2) were currently not smoking, as verified by an expired-air carbon monoxide (CO) reading of 8 parts per million (ppm) or less, (3) were more than 14 years of age, and (4) were at least 28 weeks pregnant. Potential participants between the ages of 14 and 18 were required to obtain the consent of a parent or guardian to participate.

Procedure

This study was conducted at a large, urban medical center, and was reviewed and approved annually by the local Institutional Review Board. Women who responded to advertisements about the study were contacted by telephone to assess eligibility. Because eligibility was assessed during the third trimester of pregnancy, women who were interested but not currently in the third trimester of pregnancy were contacted again during the third trimester to check eligibility criteria. Women who were currently at least 28 weeks pregnant, had quit smoking, and reported smoking for at least 1 month prior to quitting were assessed during the third trimester of pregnancy.

At this assessment, women met with a member of the research team, provided informed consent, completed a brief interview about their previous smoking habits, and provided an expired air sample to measure carbon monoxide content. All women had CO readings of less than 8ppm at the time of assessment. Participants were compensated (US\$15) for completing assessments.

Assessments

Pregnancy-related and demographic information—Participants completed questions to assess the smoking status of their partners, intention to breastfeed, and current alcohol use. Information on whether the pregnancy was intentional and demographic information (e.g., age, race, income) was collected and women self-reported their pregnancy weight. Staff collected participants' current weight using a scale. Estimated gestational weight gain was computed as the difference between pre-pregnancy weight and current weight at the time of assessment. Body Mass Index (BMI) prior to pregnancy was calculated as weight in kilograms divided by height in meters squared.

Smoking behavior—Because women were required to be abstinent at the time of entry into the study, we asked women to “think back to the last time you smoked every day for at least one month” and complete the Fagerström Test of Nicotine Dependence (FTND), a widely used six-item self-report measure of nicotine dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991). Women also provided information on the number of cigarettes smoked prior to quitting, number of years they had been smoking, and when and how they quit smoking during the current pregnancy.

Motivation and confidence to remain abstinent—Women were asked, “How motivated do you feel to stay quit after your baby is born?” Answers were rated on a four-point scale from “Not at all” (0) to “A lot” (3). Using a similar scale, women also were asked, “How confident are you that you will stay quit after your baby is born?”

General weight concerns—Participants completed the Three-Factor Eating Questionnaire (TFEQ), which contains three empirically derived factors with good internal consistency in community samples (Stunkard & Messick, 1985). The restraint factor reflects conscious thoughts and purposeful behaviors to control food intake. The disinhibition factor reflects a tendency to relinquish control over food intake in response to environmental or emotional stimuli, and the hunger factor reflects the behavioral consequences of subjective hunger.

Smoking-specific weight concerns—Women also completed a six-item questionnaire designed to assess cessation-specific weight concerns (Borrelli & Mermelstein, 1998) and a six-item questionnaire assessing self-efficacy for weight management after quitting smoking (Borrelli & Mermelstein, 1998). Finally, participants completed a three-item scale designed to assess the use of smoking as a weight control strategy (Pomerleau et al., 1993). This scale ranges from 0–9 with higher numbers indicative of greater use of smoking for weight control.

Mood—Depressive symptoms, perceived stress, and positive and negative affect were assessed. Participants completed the Center for Epidemiological Studies-Depression Scale (CES-D) (Radloff, 1977) to assess current depressive symptomatology. The CES-D was selected because it appears to be less sensitive than other depression scales to somatic symptoms that may be common during the postpartum period (Coyle & Roberge, 1992). Women also completed the Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983), designed to assess the degree to which an individual appraises situations as stressful. Women completed the Positive and Negative Affect Scales (PANAS) (Watson, Clark, & Tellegen, 1988) to assess negative (e.g., hostility, fear) and positive (e.g., happiness, excitement) affectivity.

Data analysis

Means, variances and frequencies were computed to describe the sample. Responses of Black and White women were then compared using *t*-tests for continuous and χ^2 for categorical data. In these univariate models, race was the independent variable; pregnancy-related information, smoking behavior, motivation and confidence to remain abstinent, mood, and general and smoking-specific weight concerns served as dependent variables. Collinearity was assessed by computing the variance inflation factor (VIF). All VIF coefficients were less than 1.33. To further test the effect of the colinearity of income and education on our results, a series of robust regressions were run. Results of robust regressions did not differ from those of the simple linear regressions. Thus, using separate analyses of covariance, we controlled for income and education levels, and compared the dependent variables of smoking behavior, motivation and confidence to remain abstinent, general weight concerns, smoking-specific weight concerns, and mood by race. We also evaluated the correlations between income and the weight-related variables and between education and these variables.

Questions about income and education were not asked of the first 53 women enrolled in the study. Thus, analyses controlling for income and education were conducted on a subsample of 121 women. We therefore compared the sample of 53 women among whom questions about income and education were not assessed to the 121 women on whom complete data were available. Although women on whom income and education data were available were older (24.8 ± 5.3 vs. 22.9 ± 5.7 years, $p=.04$), there were no other differences in demographic, smoking, mood or weight concerns variables between the subsample with complete data and the women without it.

Results

Demographic and smoking behavior

As shown in Table 1, there were demographic differences between White and Black women. Black women reported lower household incomes and less education than did White women. In addition, although Black women reported smoking fewer cigarettes per day prior to pregnancy than White women (11.8 ± 9.0 vs. 14.7 ± 7.4 , $p=.02$), there were no consistent differences in nicotine dependence or smoking histories prior to pregnancy between Black and White women.

Pregnancy-related characteristics

Black women were less likely to endorse an intention to breastfeed their infant and quit smoking later in pregnancy than did White women. However, White and Black women were similar in motivation for and intention to remain abstinent from smoking postpartum, and the number of women living with smoking partners also was similar. Although gestational weight gain did not differ between Black and White women, Black women reported significantly higher BMIs prior to pregnancy than did White women.

Mood and weight concerns

As shown in Table 2, reports of depressive symptoms and perceived stress did not differ between White and Black women. However, Black women were less likely to endorse smoking to control weight and reported higher levels of eating disinhibition. Black women also had more general negative affect than did White women. However, after adjusting for differences in education and household income, there were no significant differences in mood, smoking-related and general weight concerns (p 's > .07; see Table 2). In addition, there were no significant relationships between income and weight-related variables, but there was a significant association between weight control smoking and education ($r = .20$, $p = .03$).

Discussion

Although previous work has found racial differences in young women's attitudes toward their bodies, shapes, and weights (Roberts et al., 2006; Wildes et al., 2001), we did not identify consistent differences between Black and White women who quit smoking during pregnancy in weight concerns. In our sample, Black women had lower household incomes, fewer years of education, and were heavier prior to pregnancy. Black women also had a greater tendency toward disinhibited eating, more negative affect, and were less likely to endorse the use of cigarettes as a tool to control weight. However, after we controlled for differences in education and income, the observed differences in mood and weight concerns were no longer significant. Thus, after controlling for demographic differences, the mood, general weight concerns and smoking-specific weight concerns that may be relevant to postpartum smoking were similar for Black and White women.

There were other differences in smoking behavior and pregnancy-related behaviors that may be associated with postpartum smoking. Specifically, Black women quit later in their pregnancy and were less likely to intend to breastfeed their infant than were White women. In some studies breastfeeding has been found to decrease the risk of relapse (McBride et al., 1990; Ratner et al., 1999, 2000), although others have found no relationship between breastfeeding and rate of postpartum relapse (Kahn, et al., 2002; Severson et al., 1997; Stotts et al., 2000). It also is possible that quitting later in pregnancy may increase the risk of postpartum relapse. However, given the lack of racial differences in pre-pregnancy nicotine dependence, the timing of cessation during pregnancy may not be a robust predictor of postpartum smoking.

With few exceptions (Higgins et al., 2004; Valanis et al., 2001), the majority of postpartum relapse prevention interventions have been only modestly successful in delaying relapse to smoking. It is therefore important to identify factors that might be relevant to postpartum smoking that could be modified (Mullen, 2004). Depressive symptoms, stress, and concerns about weight are potentially modifiable factors that have been related to postpartum smoking (Levine & Marcus, 2004). Importantly, we did not find consistent differences in these modifiable psychosocial correlates that may be targeted in postpartum relapse prevention programs, thus race is not likely to be a factor in the design of a postpartum relapse prevention intervention to address mood and weight concerns. Nonetheless, women with lower levels of education and fewer financial resources will likely require different strategies for engaging and remaining in postpartum interventions.

There are several limitations in these cross-sectional data. First, it is possible that the lack of differences between Black and White women reflects the limited power of our sample size. Second, it may be that racial differences in the correlates of postpartum relapse that are apparent during pregnancy are not related to actual smoking behavior postpartum. These data are cross-sectional, collected from women who are pregnant at the time of assessment. It is possible that women's mood and weight concerns will change between pregnancy and postpartum, and it

will be important to determine if there are differential changes between pregnancy and postpartum for Black and White women. It also is possible that differences in weight or weight gain affect women's reports about smoking behavior and general or smoking-specific weight concerns. In addition, this report is focused on two potentially modifiable risk factors—mood and weight concerns. It is possible that there are other race-related modifiable factors that may be important in postpartum relapse prevention programs. Finally, this study was limited to urban Black and White women, and women of other racial, ethnic, or geographic backgrounds may be different from those in this sample. Moreover, the specific demographics of our sample, particularly the low-income status and high rate of unintentional pregnancy, also limit potential comparisons between our sample and other groups of women who quit smoking during pregnancy.

In summary, there are demographic differences between Black and White pregnant women who have quit smoking. However, in our sample of pregnant women who had quit smoking, differences in mood and weight concerns (two potentially modifiable variables that may affect women's vulnerability to resume smoking postpartum) did not differ between Black and White women. Thus it appears that programs targeting mood and weight concerns during times of reproductive transition can be designed to address the concerns of both Black and White women using similar approaches, particularly if these programs are designed to be sensitive to the needs and concerns of lower-income women and those with less education.

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Table 1Demographic and smoking behaviors in Black and White pregnant women who have quit smoking ($N=174$).

Characteristic	White	Black	<i>p</i> value
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
	(<i>n</i> =107)	(<i>n</i> =67)	
Age	24.4 (5.1)	23.9 (6.1)	.58
Prepregnancy cigarettes/day	14.7 (7.4)	11.8 (9.0)	.02
Years smoking	9.4 (5.3)	8.4 (6.4)	.28
Number previous quit attempts	3.6 (5.3)	3.6 (3.6)	.92
Prepregnancy FTND (0–10)	3.4 (2.1)	3.8 (2.2)	.30
Prepregnancy BMI (<i>n</i> =121)	25.7 (0.7)	28.1 (1.0)	.05
Self-reported gestational weight gain in lb (<i>n</i> =121)	32.8 (1.9)	34.0 (3.7)	.76
% Intend to remain abstinent postpartum	69.2	68.7	.94
% Pregnancy intentional	40.2	27.3	.08
% Intend to breast feed	78.1	47.7	<.001
% Household income ≤\$10,000 (<i>n</i> =121)	27.1	75.0	<.001
% High school graduate or higher (<i>n</i> =121)	89.4	62.2	<.001
% Quit by end of first trimester	83.0	63.6	.004
% Spouse/partner smokes ^a (<i>n</i> =150)	61.2	55.8	.52

Note.

^aExcludes women who do not have a partner.

Table 2

Differences in mood and weight concerns between Black and White pregnant women who have quit smoking.

Characteristic	White	Black	<i>p</i> value	<i>p</i> value, adjusted ^a
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		
	(<i>n</i> =107)	(<i>n</i> =67)		
<i>Smoking-specific weight concerns</i>				
Weight concerns (0–10)	4.6 (2.2)	4.3 (2.2)	.29	.80
Weight self-efficacy (0–10)	6.3 (2.2)	5.8 (2.3)	.09	.32
Weight control smoking (0–9)	2.6 (2.6)	1.7 (2.4)	.02	.73
% High motivation for postpartum abstinence	66.4	58.2	.28	.11
<i>General weight concerns</i>				
Restraint	10.6 (2.0)	10.2 (2.1)	.19	.08
Disinhibition	8.3 (2.8)	9.1 (2.4)	.05	.16
Hunger	7.2 (2.3)	7.5 (2.8)	.55	.07
<i>Mood</i>				
Perceived stress	25.8 (7.7)	26.1 (7.1)	.75	.26
CES-D	16.4 (8.5)	18.9 (9.7)	.08	.85
Positive affect	21.0 (8.0)	20.5 (9.5)	.76	.81
Negative affect	6.5 (6.2)	9.2 (6.9)	.01	.98

Note.

^a Adjusted for income and education level.