Ethnic Differences in Tobacco Use During Pregnancy: Findings From a Primary Care Sample in São Paulo, Brazil

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Abstract

Objective—Tobacco use during pregnancy is a global health concern. To date the majority of research originates in developed countries, thus we have a need to better understand factors related to maternal health in developing countries. We examine the prevalence and correlates of smoking by ethnicity in a sample of pregnant primary care patients in São Paulo, Brazil.

Design—Data were obtained from completed surveys during perinatal care visits in primary care clinics. We examine a sample of 811 pregnant women surveyed during 20 to 30 weeks of pregnancy. Multiple logistic regression was used to obtain odds ratios (OR) and 95% confidence intervals (95% CI).

Results—We found significant ethnic differences in smoking during pregnancy. Compared to White women, Black women were more likely to use tobacco during pregnancy (OR=1.95; 95% CI: 1.16–3.27). In the fully adjusted model, when accounting for common mental disorders, differences in smoking during pregnancy by ethnicity remained (OR=1.96; 95% CI 1.14–3.36).

Conclusions—There are ethnic differences in tobacco use during pregnancy. Clinical implications including universal screening for tobacco use during pregnancy and culturally relevant approaches to smoking cessation are suggested.

Keywords

pregnancy; smoking; tobacco use; disparity; skin colour; Brazil; common mental disorders

Introduction

Ethnic differences in smoking tobacco products during pregnancy are a major public health concern. According to the World Health Organization, smoking related mortality is a global issue and particular emphasis on smoking during pregnancy is needed. Globally, smoking during pregnancy is an established risk factor for adverse health outcomes (Amasha and Jaradeh, 2012; Haskins et al., 2001) such as preterm birth, stillbirth (Wisborg et al., 2001), neonatal mortality, later health complications for infants (Cnattingius, 2004), childhood obesity (Ino, 2010; Ino et al., 2011), and attention deficit hyperactivity disorder (Argawal et al., 2010). Given the tremendous risks of antenatal smoking for mother and infant, there is a need to assess antenatal tobacco use and its associated factors.

Recent studies highlight the need to examine social factors influencing tobacco use. For instance, low maternal education is a predictor for tobacco use during pregnancy. Another salient predictor of reduced tobacco use during the antenatal period is social support such as living with a partner (da Motta Gode et al., 2010; Al-Sahab et al., 2010) and having friends as a support (Heaman and Chalmers, 2005). The risk of mental disorders for smoking is well-documented in prior research (Lasser et al., 2000; Jane-Llopis and Matytsina, 2006, Pinheiro et al., 2007; Malta et al., 2010). Studies show that women who experience common mental disorders are more likely to smoke during pregnancy (Pritchard, 1994; Zhu and Valbo, 2002). However, ethnic differences have yet to be well explored in antenatal smoking research.

Globally, specific ethnic differences in antenatal smoking are found, and are a significant health disparity presenting health risks for infants such as low birth weight (Olds et al., 1994). In the United States, the prevalence of smoking varies by ethnicity and nativity. In fact, significant differences in frequent smoking during pregnancy for Black and Hispanic women are lower when compared to Whites(Perreira and Cortes, 2006). Similarly, using a US nationally representative sample, Gilman and colleagues (2008) report a similar prevalence of antenatal smoking for Black and White women, however, after taking demographic characteristics and psychiatric and substance disorders into account, Black women appear to have a lower risk for antenatal smoking. Canadian studies also reveal racial and ethnic disparities in increased tobacco use during pregnancy between Aboriginal women and non-Aboriginal women (Heaman and Chalmers, 2005). Across all ethnic groups, pregnancy represents a critical time to treat women for smoking in order to reduce harm for mothers and infants. Accordingly, research is needed to document the prevalence of smoking during pregnancy and to identify ethnic differences in a multinational context.

Maternal Smoking in Brazil

The majority of research on social disadvantage and health factors originates in High Income Countries. While emerging evidence from international research points to significant racial and ethnic differences in antenatal smoking, we do not know if the same widespread ethnic disparities exist in Low and Middle Income Countries (LAMICs) countries such as Brazil. A recent national survey estimated approximately 13% of Brazilian women were tobacco users (Giovino, Mirza, Samet, Gupta, Jarvis, Bhala, et al., 2012). Despite the growing recognition of the correlates of smoking during pregnancy (Ribeiro et al., 2007;

Kroeff et al., 2004; Jansen et al., 2010), our understanding of ethnic differences in and factors associated with antenatal tobacco use in LAMICs such as Brazil is limited. To date, there are very few documented ethnic disparities in smoking related risk for birth outcomes in Brazil. Furthermore, these past findings are predominately from the southern end of the country and estimates vary widely by region (Silva et al., 2007; Barros et al. 2001). Lastly, the relationship between smoking and mental health during perinatal period is well documented in high-income countries (Hanna, Fadden, Dufour, 1994; Zhu and Valbo, 2002), there is, however, a general paucity of literature on smoking and mental health in the Brazilian context. Therefore, the purpose of our study is to determine if ethnic differences in antenatal tobacco use exist in a primary care sample in São Paulo Brazil.

Methods

This was a prospective cohort study conducted between May 2005 and January 2006 with pregnant women recruited from public primary care clinics in São Paulo, Brazil. The study area comprised a heterogeneous population of approximately 400,000 inhabitants, with high-, middle- and low-income people living close to each other, located in the western region of the city of São Paulo. Private healthcare is usually only accessible for women from the middle and upper middle classes. Public primary care clinics offer free antenatal care for all women living in their catchment areas. Approximately 400 public health centers in the clinic network provide care for up to 30,000 persons per center. Ten public health primary care clinics were chosen based upon administrative districts.

Sample

Eligible participants were pregnant women obtaining antenatal care in ten selected clinics of the region defined for the study. Study inclusion criteria were low-income, age 16 years or older, and between 20 and 30 weeks of a singleton pregnancy. A detailed description of the study is described elsewhere (Faisal-Cury et al., 2009). All eligible women were invited to participate. A total of 868 women were eligible and invited to participate in the current study. Of these, 33 refused the study and four were excluded because they lived outside of the geographic region. Of the remaining 831 women, 811 women are included in final analysis in this study. The twenty respondents not included in the analysis reported ethnic group membership that was too small for comparison. All procedures were approved by the ethics committees at the University Hospital of the Health Secretariat of the city of São Paulo.

Measures

The outcome measure in this analysis was a dichotomous answer (0=no, 1=yes) to the following question *"Are you currently smoking?"* from the survey while participants were in 20 to 30 weeks of pregnancy. Self-categorized skin colour was used as a proxy for ethnicity. In this study, we used the Brazilian census classification of skin colour for the three largest groups: White, Black, and Brown. Other ethnic groups were excluded because there were too few cases (n=20) for comparisons. Common mental disorders were assessed using the World Health Organization psychiatric screening questionnaire SRQ-20 and an 8 cut point for a positive screen was adopted (Mari and Williams, 1986). Respondents with an

SQR-20 score greater than 8 were classified as having a common mental disorder. Previous psychiatric treatment was measured with the question "Were you ever treated by a psychiatrist?" with a dichotomous answer. Information on sociodemographic characteristics included partner status (i.e., cohabitating with a partner, yes=1, no=0), age (categories 16–19, 20–29, 30–44), educational level (greater than 9 years=1, less than 9 years=0), and income (categories in USD $0–350, $351–705, $706 or greater). The sociodemographic characteristics are critical covariates given that prior studies have reported that partner status (Ribeiro, 2007) and education (Malta, 2010) are significant correlates of smoking among the Brazilian population.

Analysis

A descriptive analysis was followed by, logistic regression analysis to examine ethnic differences in antenatal tobacco use, taking into account potential covariate effects including common mental disorders, psychiatric treatment, age, partner status, education, and income. Differences in prevalence rates were tested using chi-square and F-tests for significance. We used logistic regression and generated odds ratios and 95% confidence intervals to estimate the independent associations between smoking during pregnancy and ethnicity. We report adjusted odds ratios and 95% confidence intervals after (1) adjusting for only the ethnicity of the respondent (baseline model); (2) adding only mental health factors to the baseline model; and (3) adding sociodemographic factors of age, partner status, education, and income. All analysis was conducted using STATA 11 (College Station, TX).

Results

The women in this sample self-categorized as White (47%), Brown (38%), and Black (15%). Most women in the sample were between the ages of 20 and 29, living with a partner, reported having friends in the community, and did not meet the criteria for a common mental disorder (Table 1). The prevalence of antenatal tobacco use was 16% and differences by skin colour were observed, 13% for White women, 23% for Black women, and 18% for Brown women (*Chi-Square*=7.48(2), *p*=.02). Significant differences by skin colour were found for past psychiatric treatments where 16% of White, 5% of Black, and 14% of Brown respondents reported lifetime treatment (*F*=9.6(2), *p*<0.01).

Table 2 presents the unadjusted model (model 1) for ethnic differences in antenatal tobacco use, and two models that include adjustments for common mental disorder and previous psychiatric treatment (model 2) and the fully adjusted model for sociodemographic characteristics (model 3). In model 1, we found that Black women were almost twice as likely as White women (OR: 1.95; 95% CI: 1.16–3.27, *p*<.05) to smoke during pregnancy. In model 2, we found that ethnic differences remained (OR: 1.91; 95% CI: 1.13–3.22, *p*<.05) and common mental disorders were significantly associated with tobacco use (OR: 1.74; 95% CI: 1.18–2.54, *p*<.01). In model 3, the ethnic differences in antenatal tobacco use remained significant (OR: 1.96; 95% CI: 1.14–3.36, *p*<.05) even after fully adjusting for all covariates in the regression analysis. Besides ethnic differences, Common Mental Disorders remained significant amongst women who smoke (OR: 1.67; 95% CI: 1.12–2.48, *p*<.05). Additionally, the included sociodemographic characteristics such as living with partners,

education, and income were found to be associated with pregnant women's tobacco use. Women who lived with a partner were less likely to smoke (OR: 0.59; 95% CI: 0.38–0.90, *p*<.05) compared to women who did not live with a partner. Women with more than nine years of education were less likely to smoke (OR: 0.64; 95% CI: 0.42–0.96, *p*<.05) compared to women with fewer than nine years of education. Lastly, women with some income ($351–705 USD equivalent per month) were less likely to smoke compared to women with little to no income (OR: 0.46; 95% CI: 0.29–0.73, *p*<.05).

Discussion

This study finds that there is an association between ethnicity and tobacco use in pregnancy among low income Brazilian women served in primary care settings. Consistent with prior Brazilian research, we found that a higher proportion of non-White women reported active smoking during pregnancy (Silva et al., 2007; Barros et al., 2001). In this study, Black women were almost twice as likely to smoke tobacco during pregnancy as White women. This finding is consistent with reports of ethnic differences in smoking during pregnancy observed in high-income countries (Ventura et al., 2003; Cnattingius, 2004; Nguyen et al., 2012; Shoff and Yang, 2013). Similar to the findings in the United States in an urban population (Nguyen et al., 2012), we found that Black women were more likely to smoke tobacco during pregnancy. In the same analysis, significant differences in smoking during pregnancy were not found for Brown women when compared to White women. A possible explanation for these findings is the pervasive system of social stratification between ethnic groups in Brazil, which can lead to inequalities in factors that correlate with smoking such as occupation and access to higher education. The study findings that ethnic minority women smoke more than White women might be central to the current discussion on social inequalities found in Brazil. Future studies are warranted to identify casual mechanisms related to the increased risk of smoking during pregnancy for Black women in Brazil. Additionally, there was a significant association between common mental disorders and tobacco use. Therefore maternal health providers must consider the co-occurring nature of smoking during pregnancy and common mental disorders when exploring mental health treatment and cessation options for low-income women who smoke during pregnancy.

Women who live with a partner are less likely to smoke tobacco during the prenatal period. Consistent with the existing literature, we found that women living with a partner and with greater levels of income were less likely to report smoking during pregnancy (Motta et al., 2010). The relationship of smoking to partner status provides insight to an unmeasured factor of social support which has been found to decrease stress among pregnant women (Perreira and Cortes, 2006). As reported in prior literature, we found that antenatal tobacco use to be associated with education and income. In our sample of pregnant women living in São Paulo, women with a moderate level of income were less likely to smoke during pregnancy compared to women with little to no income. This finding may underscore some levels of heterogeneity in health behaviours of low-income women in Brazil.

There are several limitations to be noted. Because ethnicity is difficult to measure in epidemiological studies, we used a self-reported measure of skin colour for women living in a single region of Brazil. Ethnicity varies based on cultural idiosyncrasies and regional

differences, thus our findings are most relevant to women living in São Paulo. A second limitation of this study is that we do not have data on the partner's smoking behaviours. Multiple studies link father's smoking to antenatal tobacco use in mothers (Motta et al 2010; Perreira and Cortes, 2005). Another limitation of our study is that smoking status is from self-report. It is possible that the 16% smoking rate observed in our study is underreported due to socially desirable bias. Nonetheless the trends of self-reported smoking data reflect national declining prevalence levels of tobacco use in a number of countries (Cnattinguis, 2004). While rates of smoking are decreasing in high-income countries on a global scale, smoking prevalence data for women of reproductive age is limited for LAMICs (Giovino, Mirza, Samet, et al., 2012). As a contribution, the high rates of smoking by women of reproductive age found in our study are cause for alarm.

Future studies are needed to gain perspective on how to decrease tobacco use rates during pregnancy across ethnic groups in Brazil. This finding in particular is an area with multiple clinical implications for future studies. Past research shows that culturally tailored intervention strategies can be effective to improve outcomes for ethnic minority women (King, Borrelli, Black, Pinto, & Marcus, 1997; El-Khorazaty, Johnson, Kiely, El-Mohandes, Subramanian, Laryea, Murray, Thronberry, & Joseph, 2007; Lumley, Chamberlain, Dowswell, Oliver, Oakley, & Watson, 2009). Health care providers are suggested to work with pregnant women to identify culturally relevant approaches to incorporate smoking cessation.

Conclusion

This research adds to our understanding of ethnic disparities in maternal health across global contexts. Tobacco use during pregnancy is an important preventable risk factor for adverse pregnancy outcomes that affect mother and infant. Given the high rate of antenatal smoking observed, clinical implications of this work suggest that universal screening for tobacco smoking and timely provision of cessation intervention during pregnancy may be of focus in reducing harmful health behaviours such as tobacco (Lumley et al., 2009) or alcohol use (Nilsen, 2009) in the perinatal period. Tailored approaches to care such as culturally relevant prevention efforts for antenatal smoking cessation, with special attention to low-income populations and marginalized ethnic groups in Brazil, is suggested.

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Key Messages

- Smoking during pregnancy is a major public health concern with implications for mothers and infants.

- In this study we found that common mental disorders are a risk factor for smoking during pregnancy across ethnic groups in a Brazilian sample.

- We found ethnic differences in the prevalence and likelihood of smoking during pregnancy; where Black women were nearly twice as likely (OR=1.96; 95% CI 1.14–3.36) to smoke compared to White women in a Brazilian sample.

- Pregnancy represents a critical time period to clinically address smoking and potential harmful effects for mothers and infants.

Table 1

Sociodemographic characteristics of a prenatal sample in a primary care clinic, by skin colour, São Paulo Brazil 2005 (n=811)

Variables	Total (n=811)	White (n=377)	Black (n=124)	Brown (n=310)	F-statistic or Chi-square test
Smokes tobacco					
Yes	134 (16%)	49 (13%)	28 (23%)	57 (18%)	7.48 (2), p=0.02
Age					
16–19	161 (20%)	83 (22%)	28 (23%)	50 (16%)	5.9 (4), p=0.21
20–29	457 (56%)	200 (53%)	68 (54%)	189 (61%)	
30–44	193 (24%)	94 (25%)	28 (23%)	71 (23%)	
Lives with partner or married					
yes	610 (75%)	277 (73%)	88 (71%)	245 (79%)	4.2 (2), p=0.12
Education (years)					
9 or more	408 (50%)	214 (57%)	59 (48%)	135 (44%)	12.3 (2), p=0.002
Monthly family income (US$) b					
0–350	330 (41%)	144 (38%)	60 (48%)	126 (41%)	10.4 (4), p=0.04
351–705	299 (37%)	132 (35%)	41 (33%)	126 (40%)	
706 or more	182 (22%)	101 (27%)	23 (19%)	58 (19%)	
Common mental disorder					
Yes	262 (32%)	114 (30%)	43 (35%)	105 (34%)	1.4 (2), p=0.50
Past psychiatric treatment					
Yes	109 (13%)	59 (16%)	6 (5%)	44 (14%)	9.6 (2), p=0.008

b Based on 2005 conversion rates between Brazilian Real and U.S. Dollar

[‡] 95% CI=95% confidence interval

Table 2

Logistic regression of antenatal risk factors for tobacco use

Variables	Model 1 OR 95% CI	Model 2 OR 95% CI	Model 3 OR 95% CI
Ethnic Group			
White	1	1	1
Black	1.95[*] 1.16–3.27	1.91[*] 1.13–3.22	1.96[*] 1.14–3.36
Brown	1.50 .99–2.28	1.49 .98–2.24	1.53 0.99–2.37
Common mental disorder Yes		1.74[**] 1.18–2.54	1.67[*] 1.12–2.48
Past psychiatric treatment Yes		1.62 .98–2.70	1.54 .92–2.59
Age 16–19			1
20–29			0.93 0.56–1.55
30–44			1.29 0.72–2.30
Lives with partner or married Yes			0.59[*] 0.38–0.90
Education (years) 9 or more			0.64[*] 0.42–0.96
Monthly family income (US$) 0–350			1
351–705			0.46[*] 0.29–0.73
706 or more			0.96 0.59–1.58

OR: odds ratio, CI: confidence interval,

[*] $p<0.05$