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RESEARCH ARTICLE

Pregnancy Survey of Smoking and Alcohol Use in South Dakota American Indian and White Mothers

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Introduction: American Indian populations are believed to have relatively high tobacco use and alcohol consumption before and during pregnancy compared with other populations despite little evidence.

Methods: Population-based survey distributed 2–6 months postpartum to 1,814 South Dakota mothers having a live birth in 2014. Prevalence of self-reported smoking and alcohol use before and during pregnancy were calculated for American Indian and white mothers and AORs were determined controlling for Hispanic status, marital status, age, education, and income. Analysis was completed in 2017–2018.

Results: Smoking among American Indian mothers was similar to white mothers before and during pregnancy (AOR=1.60, 95% CI=0.95, 2.67 and AOR=0.67, 95% CI=0.37, 1.21, respectively). Among smokers, a higher percentage of American Indian mothers smoked less than six cigarettes/day than white mothers (AOR=6.79, 95% CI=3.21, 14.35, before and AOR=4.85, 95% CI=1.08, 21.7, during pregnancy), and American Indian mothers had greater odds of quitting (AOR=3.60, 95% CI=1.74, 7.43). No difference in relapse rates by race were found (AOR=0.57, 95% CI=0.19, 1.72). Alcohol consumption before pregnancy was less among American Indian than white mothers (AOR=0.53 95% CI=0.30, 0.94), and among those who drank no differences by race in drinks/week were observed (AOR for American Indians drinking more than four drinks/week=1.20, 95% CI=0.56, 2.55) or binge drinking (AOR=1.50, 95% CI=0.75, 3.04). Rates of alcohol consumption during pregnancy and topics covered by healthcare providers during prenatal visits did not differ by race.

Conclusions: After adjusting for covariates, no differences by race in smoking rates before or during pregnancy were observed and American Indian mothers who smoked were more likely to smoke fewer cigarettes and quit smoking during pregnancy than white mothers. Lower alcohol consumption among American Indian mothers before pregnancy challenges the commonly held belief of elevated alcohol consumption among American Indians compared with other races.

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INTRODUCTION

Studies have shown that use of tobacco and alcohol by pregnant women, even at low amounts, can increase the risk of poor birth outcomes and that risk increases as exposure increases.[1,2] In 2011–2012, about 15.9% of pregnant women in the U.S. aged 15–44 years smoked cigarettes during the previous month.[3] Race differences in prevalence rates of smoking before and during pregnancy have been reported; in particular, the crude smoking prevalence for American Indian (AI) mothers before or during pregnancy is generally reported to be higher than other races.[4–9] However, for younger ages (18–24 years)[5] or after controlling for race differences in demographic characteristics,[6] smoking rates for

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AI and white mothers have been reported to be similar. It also is commonly believed that AI mothers have elevated alcohol consumption both before and during pregnancy compared with white mothers, despite little evidence.[8,10–12]

South Dakota has a large AI population and little is known about race differences among South Dakota mothers in terms of the prevalence of tobacco and alcohol consumption before and during pregnancy and which demographic characteristics are associated with tobacco and alcohol use. The purpose of this report is to compare AIs and whites for differences in and demographic characteristics associated with (1) tobacco and alcohol consumption among South Dakota mothers giving birth in 2014; (2) quantities smoked or drinks consumed before and during pregnancy, and quit status, smoking relapse rates, and binge drinking rates among those mothers who smoked or drank; and (3) clinical advice provided to mothers concerning smoking and drinking during pregnancy. These results can provide health professionals with information so as to target specific populations for prevention and treatment efforts in order to improve the health of mothers and infants.

METHODS

Study Sample

The South Dakota 2014 Pregnancy Survey was modeled after the Centers for Disease Control and Prevention Pregnancy Risk Assessment Monitoring System survey and followed the Centers for Disease Control and Prevention protocol using Phase 6 questions (https://cdc.gov/prams/). Surveys were mailed 2 months postpartum to sampled mothers giving birth in 2014 and attempts were made to obtain the completed survey back before 6 months postpartum (data collection 2014–2015). Random sampling was stratified by mother's race into three categories: white, AI, and other race, which consisted of numerous racial groups each comprising a small number of women (n=574 sampled, results not presented). Sampling was done to ensure adequate sample sizes for an ≅5% margin of error for prevalence estimates within each race, and the sample size was determined after adjusting for finite population sampling and an expected participation rate of 60%. Approximately 10% of all South Dakota mothers delivering a live infant in 2014 completed the survey.

Measures

Survey data were linked to birth certificate data and weighted for sampling design and nonresponse. The weighting of data adjusts for sampling rates and nonresponse associated with demographic factors within each race strata to provide estimates that represent all live births to South Dakota mothers in 2014. Questions related to smoking, quit status during pregnancy, alcohol use, prenatal advice received, and income were ascertained from the survey (Appendix Table 1, available online); and race, ethnicity, marital status, maternal age, and educational level were obtained from vital records. Smoking relapse was defined as someone who smoked 3 months before pregnancy, was not smoking the last 3 months of pregnancy, but was smoking at the time the survey was completed.

Statistical Analysis

Analysis was conducted in 2017–2018 using procedures within SAS, version 9.4, that account for complex survey design. Chi-square analysis or t-tests were used to test race differences in demographic characteristics or time postpartum for survey completion, and logistic regression analyses were used to identify relative differences in the odds between races. AORs were obtained with all other demographic characteristics (ethnicity, marital status, maternal age, education level, and household income) included as covariates, and 95% Wald CIs are provided. To evaluate linear trend for the ordinal variables maternal education, maternal age, and household income, the logistic regression model described above was used except that maternal education, age, and household income were included as numerical variables. The values assigned for maternal education categories were one, two, and three; values assigned for maternal age categories were 17, 22, 27, 32, and 39; and the values assigned for income categories were five, 17, 37, 62, and 100. Significance was defined as $p \leq 0.05$ for bivariate chi-square analyses and t-tests or an OR 95% CI that did not include 1.0.

Human subjects' approval was obtained through the South Dakota State University IRB, and participation in the survey was voluntary.

RESULTS

The breakdown of eligible births, sampled births, and participant numbers by race are shown in Table 1. Response rates for AI and white mothers were 48.6% and 79.1%, respectively. AI mothers were less likely to be married, and the distribution of age, education, and household income indicated that AI mothers were younger, had fewer years of education, and had lower annual household income than white mothers (Table 1). Mean days postpartum at survey completion differed by race: 107 (95% CI=101, 113) and 90 (95% CI=86, 93) days for AI and white mothers, respectively ($p < 0.001$).

Prevalence rates of smoking the 3 months before pregnancy among AI and white mothers were 61.4% and 20.7%, respectively (Table 2). Adjusting for demographic characteristics, no race difference in the odds of smoking before pregnancy was observed (Table 2). Based on AORs, unmarried mothers had greater odds of smoking before pregnancy than married mothers, and there were significant trends of decreasing odds of smoking with increasing maternal education and with increasing household income (Table 2). The distribution for cigarettes smoked per day differed among mothers who smoked before pregnancy, with a higher percentage of AI mothers smoking less than six cigarettes/day than white mothers: 61.1% (95% CI=53.9, 68.3) and 34.5% (95% CI=25.8, 43.2), respectively (AOR for AI smoking less than six cigarettes/day=6.79, 95% CI=3.21, 14.35).