Alcohol use before and during pregnancy in western Washington, 1989-2004: implications for the prevention of fetal alcohol spectrum disorders

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OBJECTIVE: We examined trends in rates of self-reported pregnancy alcohol use among women in western Washington.

STUDY DESIGN: Between 1989 and 2004, we conducted 3 studies in western Washington State on problems that are associated with maternal prenatal alcohol or drug abuse (n = 12,526). To determine study eligibility, we screened hospitalized postpartum women for alcohol and drug use in the month before and during pregnancy. We examined trends in alcohol use rates and identified characteristics that were associated with any drinking and binge drinking (≥ 5 drinks on any occasion).

RESULTS: We found a substantial decrease in pregnancy alcohol use between 1989 and 2004 (from 30-12%) across almost all demographic categories. Binge drinking in the month before pregnancy increased significantly among all race categories, except Native American.

CONCLUSION: Increased prepregnancy binge drinking rates may estimate alcohol use during very early gestation and warrant clinical attention because of the potential for fetal alcohol spectrum disorders.

Key words: alcohol, fetal alcohol spectrum disorders, pregnancy

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Public health messages that discourage alcohol use during pregnancy have evolved since alcohol was first identified as a teratogen in 1973, at which time the fetal alcohol syndrome was named.[1,2] On a federal policy level, in 1981, the Surgeon General of the United States issued an advisory recommending that women not drink alcoholic beverages during pregnancy or while considering pregnancy.[3] In late 1990, the "Alcohol Beverage Labeling Act of 1988" went into effect, which required that all alcoholic beverage containers in the United States be labeled with a specific health warning.[4] The Surgeon General's advisory was reissued in 2005 and urged women who are pregnant or who are considering becoming pregnant to abstain from alcohol consumption to eliminate the risk of alcohol-related birth defects.[5]

The Behavioral Risk Factor Surveillance System (BRFSS) population-based surveys that were conducted by the Centers for Disease Control and Prevention indicate that, between 1991 and 1995, drinking rates during pregnancy increased nationally. The use of any alcohol rose from 12.4-16.3%, and binge alcohol use increased from 0.7-2.9%.[6] However, beginning in 1997, these national rates began to decrease and stabilize; any alcohol drinking during pregnancy was estimated at 11.4% in 1997, 12.8% in 1999,[7] and 10.1% in 2002.[8] Binge drinking among pregnant women has fluctuated slightly: 2.9% in 1995, 1.8% in 1997, 2.7% in 1999,[6,7] and 1.9% in 2002.[8]

Fetal alcohol spectrum disorders (FASD) is the term that is used to describe the range of physical and neurodevelopmental problems that may be associated with frequent or heavy maternal drinking during pregnancy. FASD prevention efforts are informed by understanding the prevalence of such alcohol use and the characteristics of those who drink. Between 1989 and 2004, we conducted 3 federally funded research studies in western Washington State on problems that are associated with maternal prenatal alcohol or drug abuse. The purpose of this paper is 2-fold: to examine trends in rates of self-reported pregnancy-related alcohol use by demographic category among women who were screened for participation in the 3 studies (n = 12,526) and to examine maternal characteristics that are associated with prepregnancy alcohol use in the most recent study (2002-2004). We will

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discuss implications for the role of clinicians in the prevention of FASD.

MATERIALS AND METHODS

The 3 studies and the 5 hospitals from which our data were derived are described later. In each study, research methods involved screening hospitalized women after delivery for prenatal alcohol and drug use. The primary purpose of the screening protocol was to identify mothers who were eligible for our studies (not to ascertain prevalence as in the national studies cited earlier). We screened women using the Hospital Screening Questionnaire (HSQ), which is a confidential 1-page self-administered questionnaire that was developed and piloted by our research unit in 1987.[9] Procedures for the administration of the HSQ have been described elsewhere.[9] The HSQ asks about demographic characteristics and use of any alcohol, binge alcohol (≥ 5 drinks on an occasion), illicit drugs, and cigarettes during 2 time periods: the "month or so before pregnancy" and "during this pregnancy." In all 3 studies, the HSQ screened women for alcohol use by asking the same 2 questions: "Any alcohol (wine, beer, liquor)?" and "Five or more drinks at a time?" Questions that were asked in the national prevalence studies differed by asking pregnant women about any alcohol use and binge alcohol use in the previous 30 days.

The screening studies were conducted in King (studies 1, 2, and 3) and Pierce Counties (study 3), which are the most populous counties in western Washington and in the state. According to US census figures, in 1990, the population of King County was 31% of the entire state population; in 2000, the combined King and Pierce County population was 41.4% of the state.

Study 1: prenatal cocaine exposure: maternal assessment and effects on children[10] (March 1989 through April 1991; n = 7178)

In this study, we used the HSQ to screen 7178 women at 4 King County area hospitals, which included a university-affiliated teaching hospital (hospital A), a private urban hospital (hospital B), a private urban hospital that serves high-risk patients (hospital C), and a suburban hospital (hospital D). Of the 12,867 total deliveries at these hospitals during the study period, we have data from 7178 HSQs (56% of the total deliveries). HSQs were not collected from 44% of the deliveries for the following reasons (specific percentages not available): not approached because of our weekday screening schedule, refusal, unavailability because of medical reasons or early discharge, and non-English speaking.

Study 2: Home visitation intervention for high-risk substance-abusing mothers[11] (July 1991 through December 1992; n = 2230)

We screened women by using the HSQ at hospitals A and C. Of the 4342 total deliveries at the 2 hospitals during the study period, we have HSQ data on 2230 deliveries (51%); 44 women (1.0%) refused; 231 women (5.3%) were unavailable for medical reasons or early discharge; and 323 women (7.4%) were non-English speaking. A total of 1514 women (34.9%) were not approached because of our limited screening schedule (4.5 days per week).

Study 3: Alcohol abuse during pregnancy: 12-month intervention[12] (June 2002 through March 2004; n = 3118)

In study 3, we screened women after delivery at hospital A and at a large general delivery hospital in Pierce County, western Washington. Of 5694 total combined deliveries at the 2 hospitals during the study period, we have HSQ data on 3124 deliveries (54.9%); 638 women (11.2%) refused; 672 women (11.8%) were non-English speaking; 536 women (9.4%) were not approached primarily because of our weekday screening schedule; 194 women (3.4%) were not approached for medical reasons; 336 women (5.9%) did not return the HSQ for unknown reasons; and 188 women (3.3%) lived out of area and were not eligible to participate in the larger study. Data from 6 women were not used in the analysis because alcohol information was incomplete.

Protocols for the 3 studies were approved by Institutional Review Boards at the University of Washington and participating hospitals. Confidentiality certificates were obtained from the US Department of Health and Human Services.

Data analysis

Descriptive statistics (means and standard deviations or percentages, depending on the form of the variables) were calculated on demographic characteristics for each of the 3 studies. Percentages are reported for any alcohol and binge alcohol drinking for 2 time periods: in the month before pregnancy and during pregnancy. We used multiple logistic regression to examine factors that were associated with drinking rates and changes in drinking rates across the 3 studies. Analyses were carried out separately by racial group. We also carried out logistic regressions to examine more closely the factors that are associated with any drinking and binge drinking in the month before pregnancy among participants in study 3 (the most recent study). The multiple logistic regressions reported here and the associated odds ratios (ORs) and 95% CIs assume independent (additive) effects of each of the covariate factors (age, race, education, marital status, parity, and smoking) on the logit (log odds) of the probability of drinking.

We assessed the adequacy of the assumptions for this model by testing the inclusion of pairwise interaction terms, by comparing models in terms of the Akaike information criterion, and by running "quasibinomial" models that permit the dispersion parameter to deviate from the value 1 assumed by a binomial model.[13] All analyses were done with S-PLUS statistical software (version 6.1 for Windows [Insightful Corp, Seattle, WA]; TIBCO Software, Inc, Palo Alto, CA).

RESULTS

Demographic characteristics (Table 1)

Most of the women in the 3 studies were between 21 and 30 years old; study 3 participants were slightly older