Alcohol Consumption During Pregnancy

Prevalence and Provider Assessment

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OBJECTIVE: To estimate the prevalence of prenatal alcohol consumption and the extent of provider screening and discussion about alcohol use during pregnancy.

METHODS: Data were obtained from a stratified random sample of 12,611 mothers from Maryland who delivered live infants during the years 2001–2008 and completed the Maryland Pregnancy Risk Assessment Monitoring System survey. Analyses were conducted using Proc Surveyfreq in SAS 9.2.

RESULTS: Nearly 8% (95% confidence interval 7.1–8.4) of mothers from Maryland reported alcohol consumption during the last 3 months of pregnancy. The highest prevalence of late-pregnancy alcohol consumption was reported by mothers who were non-Hispanic white, (10.9%, confidence interval 9.8–11.9), aged 35 years or older (13.4%, confidence interval 12.4–14.4), and college graduates (11.4%, confidence interval 10.2–12.6) ($P<.001$). Nineteen percent (confidence interval 17.6–21.0) of mothers reported that their prenatal care provider did not ask whether they were drinking alcoholic beverages, and 30% (confidence interval 28.3–30.8) reported that a healthcare provider did not counsel them about the consequences of alcohol use on the child. Reported screening and counseling were least prevalent among mothers who were non-Hispanic white, aged 35 years or older, and college graduates ($P<.01$).

CONCLUSION: Despite the substantial number of women who continue to drink alcohol during pregnancy, healthcare providers do not routinely assess alcohol consumption or counsel all women about its harmful effects. Counseling was least prevalent among the same groups of women with the highest rates for drinking. Provider alcohol assessment, as recommended by the U.S. Surgeon General to prevent alcohol misuse, needs further promotion as a routine part of prenatal care.

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Alcohol use during pregnancy is associated with a wide range of adverse health effects for both the mother and developing fetus. It is the leading preventable cause of mental retardation in the United States and is also associated with many other physical, cognitive, and behavioral disabilities known collectively as fetal alcohol spectrum disorder. Although the risk of fetal alcohol spectrum disorder increases as the quantity of alcohol consumed during pregnancy increases, no known level of alcohol consumption at any time during pregnancy is considered safe. For this reason, the Surgeon General Advisory on Alcohol Use in Pregnancy "urges women who are pregnant or who may become pregnant to abstain from alcohol."[1]

A 2000 report of a survey of active members of the American College of Obstetricians and Gynecologists revealed that 97% of physicians who responded (n=604) asked their patients at least once during prenatal care about alcohol use.[2] However, only 23% of respondents reported using a standard screening questionnaire, and the most common screen used had not been validated for pregnancy. The majority of physicians reported the existence of barriers to effective alcohol use assessment such as time limitations, patient sensitivity, and the need for additional clinician training to enhance ascertainment skills. Prenatal alcohol screening and counseling from the patient's perspective are largely unknown. A survey of women about their prenatal care may provide different results about the prevalence and content of screening for alcohol use. Our objective was to estimate the prevalence of prenatal alcohol consumption and the extent of provider screening and discussion about alcohol use during pregnancy.

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MATERIALS AND METHODS

We examined data collected from a random sample of postpartum mothers in Maryland who delivered live births between 2001 and 2008 and completed the Pregnancy Risk Assessment Monitoring System survey 2–9 months after delivery. The Maryland Department of Health and Mental Hygiene conducted the survey under a cooperative agreement with the Centers for Disease Control and Prevention. Using the Maryland birth certificate file, stratified random sampling was used to oversample mothers 35 years of age or older and women who delivered low-birth-weight (LBW) infants (less than 2,500 g). This stratification was used by Maryland to target mothers who were at risk for chronic medical conditions (age 35 and older) and those who had an adverse pregnancy outcome (LBW). The four resultant strata were: 1) maternal age younger than 35 years and normal infant birth weight; 2) maternal age younger than 35 years and infant LBW; 3) maternal age 35 years and older and infant normal birth weight; and 4) maternal age 35 years and older and infant LBW. The annual random sample size, determined by the Centers for Disease Control and Prevention for each Pregnancy Risk Assessment Monitoring System state, is large enough for estimating statewide risk factor proportions within 3.5% at a 95% confidence level. Mothers are sent up to three surveys, which are followed by telephone interviews if no response is received by mail. Survey data were linked with birth certificate data to provide information on maternal race, ethnicity, marital status, and years of education completed. The 12,611 responders to the survey received during the study years were statistically weighted by the Centers for Disease Control and Prevention to make the results representative of all Maryland women delivering live infants in the state during the study period and to account for survey design, non-coverage, and non-response.[3] The populations by age and race with the lowest response rates were mothers who were younger than 20 years of age and African American (each with approximately 60% response rate). The overall response rate for the survey was 72%, with annual response rates more than 70%.

Alcohol consumption during late pregnancy was assessed by responses to the following survey question, "During the last 3 months of your pregnancy, how many alcoholic drinks did you have in an average week? (A drink is one glass of wine, wine cooler, can or bottle of beer, shot of liquor, or mixed drink)." Responses were aggregated into two categories, none or any amount. Provider discussion about alcohol use was assessed by the following question, "During any of your prenatal care visits, did a doctor, nurse, or other healthcare worker talk with you about any of the things listed below? Please count only discussions, not reading materials or videos." The option "effect of drinking during pregnancy" was one of ten other prenatal topics.

Provider screening for alcohol use was assessed by the following survey question, "At any time during your prenatal care, did a doctor, nurse, or other healthcare worker ask if you were drinking alcoholic beverages (beer, wine, wine cooler, or liquor)?" This question only appeared on surveys for women who delivered between 2001 and 2003.

Pregnancy Risk Assessment Monitoring System mothers are also given the opportunity to share information on the back page of the survey booklet, and some mothers wrote comments in the margins of the survey booklet relating to particular questions. A few of the comments pertaining to provider screening or counseling are presented verbatim in the Discussion.

Univariable and bivariable analyses were conducted using Proc Surveyfreq in SAS 9.2. The Maryland Department of Health and Mental Hygiene Institutional Review Board qualified this project as exempt research.

RESULTS

A total of 12,611 women who delivered from 2001 to 2008 responded to the Maryland Pregnancy Risk Assessment Monitoring System survey (Table 1). Overall, 8% (95% confidence interval [CI] 7.1–8.4) of mothers reported that they consumed alcohol during the last 3 months of pregnancy. Nineteen percent (CI 17.6–21.0) of mothers reported that their prenatal care provider did not ask if they were drinking alcoholic beverages, and 30% (CI 28.3–30.8) of mothers reported that a healthcare provider did not counsel them on how drinking alcohol could affect the baby (Table 2). Disparities were present among women who reported alcohol use during pregnancy and among populations who received counseling about the effects of prenatal alcohol exposure and who were screened for alcohol use (Table 2). Self-reported alcohol use during the last 3 months of pregnancy was most prevalent ($P<.01$) among women who were 35 years of age or older (13.4%, CI 12.4–14.4), college graduates (11.4%, CI 10.2–12.6), non-Hispanic white race and ethnicity (10.9%, CI 9.8–11.9), not enrolled in Medicaid for delivery (9.4%, CI 8.5–10.2), married (9.3%, CI 8.5–10.2), and used private physicians for their prenatal care (8.1%, CI 7.4–8.9). These identical groups were also the

Table 1. Survey Respondents by Selected Characteristics, Maryland 2001–2008

Characteristic	Maryland PRAMS Respondents (N=12,611) n	Weighted %*
Maternal race or ethnicity		
White, non-Hispanic	6,702	52.2
African American, non-Hispanic	3,894	30.2
Other	2,015	17.6
Maternal age (y)		
Younger than 20	1,002	9.5
20–24	1,503	20.4
25–29	1,896	26.4
30–34	2,148	26.1
35 or older	6,059	17.6
Infant birth weight		
Low birth weight (less than 2,500 g)	5,524	8.1
Normal birth weight (2,500 g or more)	7,083	91.9
Maternal education (y)		
Less than 12	1,385	13.8
12	3,199	29.8
13–15	2,301	17.6
16 or more	5,640	38.8
Maternal marital status		
Married	8,577	61.5
Unmarried	4,034	38.5
Delivery paid by Medicaid		
Yes	3,099	30.8
No	9,402	69.2

PRAMS, Pregnancy Risk Assessment Monitoring System.
* Percentages are weighted to account for sampling design and nonresponse and reflect births to Maryland residents who delivered in-state.

least likely to receive discussions about the effect of alcohol on the fetus ($P<.001$) or to be screened for alcohol use during pregnancy ($P<.01$; Table 2). Provider discussion and screening for alcohol use during pregnancy were nearly identical for women who reported drinking during pregnancy and for those who did not drink (Table 3).

A few mothers commented about the content of their provider's prenatal discussions regarding alcohol use. Some women indicated that their providers did not ask them about alcohol use while they were pregnant and two women wrote that their doctors told them they could drink while pregnant.

DISCUSSION

The following are quotes from women who completed the survey: "My ob/gyn did not speak to me about alcohol …"; "It [drinking] was discussed with my first child but not with my second"; and "I had been going to her [doctor] for years so she knew my lifestyle."

As these comments from the Pregnancy Risk Assessment Monitoring System survey respondents indicate, prenatal screening for alcohol use was not performed routinely by providers. Despite the American College of Obstetricians and Gynecologists' recommendation that all pregnant women should be asked and counseled about alcohol use,[4] 19% (CI 17.6–21.0) of Maryland women reported they were not asked about alcohol use during pregnancy and 30% (CI 28.3–30.8) were not counseled about its effects on the fetus. Our Maryland Pregnancy Risk Assessment Monitoring System data showed that alcohol consumption during pregnancy is prevalent across all income levels, races, ethnicities, education levels, and ages (Table 2). In our study and in national studies,[5–7] the prevalence of alcohol use during the last 3 months of pregnancy was highest among women with any of the following characteristics: non-Hispanic white, college-educated, or married. Ironically, these were the same groups who were the least likely to have received provider prenatal screening and counseling about alcohol use. According to the 2008 American College of Obstetricians and Gynecologists Committee Opinion,[8] the ethical principle of justice "requires that screening questions related to alcohol and drug use should be asked equally …, regardless of race or economic status." Our study revealed that women who reported alcohol consumption during pregnancy were no more likely to be screened for alcohol use or receive counseling from prenatal providers than women who did not drink (Table 3). Targeting certain populations of women for screening may be based more on stereotype than evidence and therefore may miss those women who are the most vulnerable.

Disclosure of alcohol use during pregnancy may be especially difficult for some mothers who may feel guilty about drinking even though they may be harming their babies. Women may also worry that they will be punished for their drinking. Underreporting of alcohol use by some women therefore may be expected.[8,9] The following statements were made from survey respondents: "Things like this [drinking] will not be disclosed by mothers" and "Not all women want 'officials' to know [they're] addicted to alcohol …."

To deal with these issues, T-ACE, a four-question tool specifically developed by an obstetrician for use with pregnant women, minimizes social stigmatization by indirectly asking about alcohol use with a

Table 2. Alcohol Consumption and Prenatal Provider Assessment, Maryland 2001–2008

Maternal Factor	Alcohol Use, Last 3 mo of Pregnancy		Not Counseled About Prenatal Alcohol Effects		Not Asked About Prenatal Alcohol Consumption*	
	% (95% CI)	*P*	% (95% CI)	*P*	% (95% CI)	*P*
Total N=12,611	7.7 (7.1–8.4)		29.5 (28.3–30.8)		19.3 (17.6–21.0)	
Race or ethnicity		<.001		<.001		.003
White, non-Hispanic	10.9 (9.8–11.9)		34.3 (32.6–36.0)		22.9 (20.5–25.4)	
African American, non-Hispanic	4.4 (3.3–5.4)		23.2 (21.0–25.4)		16.5 (13.3–19.6)	
Age (y)		<.001		<.001		.002
Younger than 20	3.6 (1.8–5.3)		13.6 (10.3–17.0)		11.0 (6.9–15.1)	
20–24	4.6 (3.2–6.0)		20.7 (18.0–23.5)		19.1 (14.7–23.5)	
25–29	5.6 (4.3–6.9)		28.8 (26.2–31.4)		17.1 (13.2–20.9)	
30–34	10.0 (8.3–11.6)		36.3 (33.6–39.0)		21.0 (17.4–24.5)	
35 or older	13.4 (12.4–14.4)		39.2 (37.7–40.6)		24.2 (22.0–26.3)	
Education (y)		<.001		<.001		<.001
Less than 12	4.0 (2.6–5.4)		11.7 (9.1–14.2)		11.4 (7.4–15.4)	
12	4.6 (3.6–5.7)		23.8 (21.5–26.0)		16.7 (13.6–19.8)	
13–15	7.7 (6.1–9.4)		32.0 (29.1–35.0)		21.5 (17.2–25.9)	
16 or more	11.4 (10.2–12.6)		38.9 (37.0–40.9)		23.3 (20.5–26.1)	
Marital status		<.001		<.001		<.001
Married	9.3 (8.5–10.2)		36.8 (35.2–38.4)		22.0 (19.8–24.2)	
Unmarried	5.2 (4.2–6.1)		17.8 (16.0–19.6)		14.5 (11.7–17.3)	
Medicaid paid for delivery		<.001		<.001		<.001
Yes	4.0 (3.0–5.0)		17.7 (15.7–19.7)		12.7 (9.7–15.7)	
No	9.4 (8.5–10.2)		34.9 (33.4–36.4)		21.7 (19.6–23.8)	
Prenatal provider		.007		<.001		<.001
Private MD	8.1 (7.4–8.9)		33.8 (32.4–35.3)		22.4 (20.3–24.5)	
Clinic, hospital or health department	5.7 (4.3–7.1)		16.3 (14.0–18.7)		10.1 (7.0–13.3)	

CI, confidence interval.
Percentages are weighted to account for sampling design and nonresponse and reflect births to Maryland residents who delivered in-state.
* This question was available only from 2001 to 2003.

"tolerance" question (Box 1).[10] T-ACE has been validated for identifying prenatal alcohol use in diverse populations and can be questioned directly or self-administered by pregnant and non-pregnant patients.[11] Other validated screens for prenatal alcohol use include TWEAK and AUDIT-C.[12–14] Universal screening may be most easily accomplished by adding validated screening questions to a standard prenatal patient intake form.[15,16]

Along with screening, brief interventions such as provider discussions or referrals for treatment have been shown to be effective in helping women stop drinking during pregnancy.[16–19] Our Pregnancy Risk Assessment Monitoring System survey did not include questions about referrals or counseling for women who disclosed alcohol use. However, because many women may not disclose alcohol use, the consequences of prenatal alcohol use should be

Table 3. Prenatal Provider Alcohol Assessment by Maternal Alcohol Use During Pregnancy, Maryland 2001–2008

Maternal Prenatal Alcohol Use	Not Counseled About Prenatal Alcohol Effects		Not Asked About Prenatal Alcohol Consumption*	
	% (95% CI)	*P*	% (95% CI)	*P*
Total N=12,611	29.5 (28.3–30.7)		19.2 (17.5–21.0)	
Alcohol use during last 3 mo of pregnancy		.87		.57
Yes	29.8 (25.9–33.8)		20.7 (15.3–26.2)	
No	29.5 (28.2–30.8)		19.1 (17.3–20.9)	

CI, confidence interval.
Percentages are weighted to account for sampling design and non-response and reflect births to Maryland residents who delivered in-state.
* This question was available only from 2001 to 2003.

Box 1. The T-ACE Screen for Maternal Prenatal Alcohol Use

1. Tolerance (T): How many drinks does it take to make you feel high?
2. Annoyed (A): Have people annoyed you by criticizing your drinking?
3. Cut down (C): Have you ever felt you should cut down on your drinking?
4. Eye-opener (E): Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover?

Each affirmative reply is scored as 1 point for the A, C, and E questions. The T question is scored 2 points if the respondent answers more than two drinks. The T-ACE is considered positive for at-risk alcohol use, defined as 1 oz or more per day, with a total score of 2 or more.

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discussed with all pregnant women. Our research showed that nearly one-third of the women reported not having had any discussion about the effects of alcohol on their pregnancies. Furthermore, we have no data to indicate the quality or content of the discussions that reportedly did occur. A few women wrote on the Pregnancy Risk Assessment Monitoring System survey comments page that their prenatal providers did not discourage alcohol use: "I drank 7 times per week … I was instructed by my doctor to drink one wine cooler at night to relax my cervix and to stop me from going into labor" and "… they [doctors] said I could drink after the third trimester."

As evidenced by these comments from new mothers, some physicians clearly do not tell their patients to abstain from alcohol during the entire pregnancy, as recommended by American College of Obstetricians and Gynecologists, the American Academy of Pediatrics, and the Surgeon General. More provider education needs to be performed so that a consistent message is given to prenatal patients to abstain from alcohol during every stage of pregnancy. This message also needs to be conveyed to women before pregnancy so that drinking is minimized during the early weeks of pregnancy before the pregnancy is confirmed. In a previous survey of obstetrics-gynecology physicians,[2] 83% reported they needed more information about the levels at which alcohol causes adverse pregnancy outcomes and, perhaps because of their ambivalence about harmful drinking levels during pregnancy, 50% did not counsel every patient about the potential effects of alcohol on pregnancy.

Our data from Maryland Pregnancy Risk Assessment Monitoring System reported lower levels of prenatal alcohol use (7.7%, CI 7.1–8.4) than the 2007–2008 National Survey on Drug Use and Health data (10.6%)[6] and the 2001–2005 Behavioral Risk Factor Surveillance System data (11.2%).[5] Whereas Maryland Pregnancy Risk Assessment Monitoring System asks about alcohol consumption during the last 3 months of pregnancy, National Survey on Drug Use and Health and Behavioral Risk Factor Surveillance System data ask about alcohol use during the previous 30 days and therefore are representative of all gestational ages, including the first month of pregnancy when few women realize they are pregnant and have not changed their alcohol use patterns. Data from the1997–2002 National Birth Defects Prevention Study reported alcohol consumption rates from various stages of preconception and pregnancy.[7] The National Birth Defects Prevention Study data reported similar rates of alcohol use to Pregnancy Risk Assessment Monitoring System data (7.9% compared with 7.7%) during the third trimester.

Maryland Pregnancy Risk Assessment Monitoring System uses survey response data that are completed by mothers 2 to 9 months after delivery. Mothers may not accurately remember their drinking behavior or prenatal discussions that occurred months ago. Self-report data are also subject to social desirability and responder bias. Under-reporting of alcohol use is likely and many mothers may not see drinking as an unhealthy behavior. The heaviest drinkers may not have been accessible to the survey, which required that the respondent have an address or telephone. Only mothers with live births are surveyed. We do not have prenatal information of mothers who have had a fetal death or other nonviable pregnancy outcome. Binge drinking during pregnancy (defined in the Pregnancy Risk Assessment Monitoring System survey as the consumption of "five alcoholic drinks or more in one sitting") was not included in this report. The small numbers and low rate (0.05%) of binge drinkers made conclusions about the results difficult. Binge drinkers may have different characteristics than the mothers who reported consumption of "any alcoholic drinks" during pregnancy.

CONCLUSION

A survey respondent commented, "What I think will help is more education and encouragement." Obstetric providers have a key opportunity to play a major

role in the prevention of fetal alcohol spectrum disorder by educating all women about the effects of prenatal alcohol use and identifying women who consume alcohol during pregnancy. Our research showed that one out of five pregnant women did not get screened for alcohol consumption and one out of three did not receive information about the effects of alcohol on the pregnancy. Ironically, the lack of provider screening and counseling occurred most often among women who had the highest prevalence of self-reported alcohol consumption during pregnancy. Universal screening and counseling would bridge this gap; however, we must also ensure that providers are knowledgeable about the guidelines for prenatal alcohol use, validated screening tools, office interventions, and treatment resources.

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