

## ORIGINAL ARTICLE

# Factors Associated With Recent and Discontinued Alcohol Use by Pregnant Adolescents

CONSTANCE M. WIEMANN, Ph.D., AND ABBEY B. BERENSON, M.D.

**Purpose:** To determine easily identifiable risk factors that differentiate pregnant adolescents who report recent (past 30 days) alcohol use and those who discontinue use by their first prenatal visit from those who deny consuming alcohol altogether.

**Methods:** A structured interview was completed by 378 adolescents  $\leq 17$  years of age as part of standard care at our institution's adolescent obstetric clinic between July 7, 1992, and December 28, 1994. Using Chi-square or Student's *t*-tests, unique risk factors associated with recent or discontinued alcohol use in pregnancy were separately identified by comparing demographic, reproductive, behavioral, and environmental factors among recent users ( $n = 43$ ), discontinued users ( $n = 48$ ), and adolescents who denied ever using alcohol ( $n = 108$ ). Significant indicators were then entered into stepwise logistic regression analyses to determine the most efficient models for predicting alcohol use.

**Results:** Partner alcohol use and use of alcohol during sexual activities were important risk factors for alcohol use by pregnant adolescents. Recent alcohol users were also more likely to be Mexican-American, to have quit school, and to report recent tobacco use, while adolescents who stopped using alcohol during pregnancy were significantly more likely to have witnessed or been a victim of or known a victim of violence.

**Conclusions:** Screening at the first prenatal visit for these unique and easily assessed factors will help clinicians identify adolescents at greatest risk for alcohol use during pregnancy. © Society for Adolescent Medicine, 1998

**KEY WORDS:**

Alcohol use  
Adolescent pregnancy  
Alcohol screening

Prevalence estimates of alcohol use among sexually active adolescents range from 28% to 94% depending on the region of the country and the racial/ethnic composition of the sample under study (1-4). Alcohol remains the most frequently abused substance among women of childbearing age (5), 17-54% of pregnant adolescents report drinking alcohol at some point in pregnancy (6,7). Many pregnant teenagers reduce or eliminate their use of alcohol once they recognize they have conceived (1,4,8). Nevertheless, a significant number of young adolescents continue to drink alcohol throughout pregnancy (6,7). Despite evidence that characteristics of women who drink only at the beginning of pregnancy are different from those of women who continue to drink throughout pregnancy (4), surprisingly few studies have attempted to distinguish pregnant adolescents who report ongoing alcohol use from those who stop drinking altogether. Moreover, most studies have assumed that risk factors for alcohol and illicit drug use are the same, combining users of different substances into a single group (6,9,10). This assumption may be misleading, as at least two recent investigations (9,11) indicate that different risk factors exist for alcohol and illicit drug use during pregnancy.

Identified risk factors for alcohol use among sexually active adolescents or for alcohol or illicit drug use among pregnant adolescents include demographic and reproductive characteristics: age, school discontinuation, poverty, race/ethnicity, lack of

From the Division of Pediatric and Adolescent Gynecology, Department of Obstetrics and Gynecology the University of Texas Medical Branch, Galveston, Texas.

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Address reprint requests to: Constance M. Wiemann, Ph.D., Division of Pediatric and Adolescent Gynecology, Department of Obstetrics and Gynecology, 301 University Blvd., Galveston, TX 77555-0587.

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closeness with the baby's father (10–13); behavioral indicators: early onset of sexual intercourse, multiple lifetime sexual partners, unintended pregnancy, prior elective abortion, tobacco or illicit drug use, use of alcohol or illicit drugs during sexual activities (10,14); and social or environmental factors: peer, partner or parental alcohol or illicit drug use, physical or sexual assault, and living in households separate from parents (4,8,15,16). It is unclear, however, which of these factors are most useful in the identification of ongoing alcohol consumption by pregnant adolescents, and which may be used to identify those who stopped using alcohol before they enter care. This information is important as medical providers are often reluctant to ask young patients about alcohol use owing in part to time constraints, uneasiness with the topic of substance abuse, or feelings of inadequacy in being able to correctly identify users (17).

Given the negative sequelae associated with alcohol use during pregnancy (18,19), particularly during the first 3 months of gestation, it is essential that adolescents with early gestational use and those at greatest risk for continued use be easily and quickly identified by clinicians so that these young women can receive appropriate interventions. Thus, the purpose of this study was to identify risk factors for pregnant adolescents who report recent (past 30 days) alcohol use and those who discontinue use by their first prenatal visit.

## Methods

Adolescents  $\leq 17$  years of age who received prenatal care at our institution's adolescent obstetric clinic between July 7, 1992, and December 28, 1994, and who completed a structured interview as part of standard patient care, were eligible to participate in this study. This clinic serves a predominantly low-income, triethnic (African-American, white, and Mexican-American) population. Owing to scheduling conflicts, approximately 7% of adolescents (28 patients) who received care during this period were not interviewed. A total of 378 patients were successfully interviewed at their first prenatal visit. All interviews were conducted in a private room away from family or friends by one of two trained clinic personnel.

With institutional review board approval, a trained research assistant extracted patient responses to interviews, reproductive histories, and the results of urine drug analyses screens and ultrasonography from medical records. All data were entered into a

computerized database by a second trained assistant. To insure accuracy, a random 10% of data entries was verified with agreement of  $\geq 99\%$  observed across all data items.

This structured interview elicited demographic and reproductive characteristics as well as risk behaviors, including the use of tobacco, alcohol and illicit drugs (marijuana, cocaine, amphetamines, barbiturates, PCP, etc.), prior elective abortion, multiple sexual partners, age at first intercourse, desire for the current pregnancy, and use of alcohol or illicit drugs during sexual activities. This interview also measured environmental factors previously found to be associated with alcohol use among sexually active adolescents, including exposure to violence [using a scale adapted from Gladstein (20)], living arrangements, and specific characteristics of the baby's father (their marital relationship; physical, sexual, or emotional abuse of the patient; and use by father of alcohol or illicit drugs). Pregnant adolescent patients supplied information about their baby's father; direct interviews of the fathers were not conducted. Alcohol use by the pregnant adolescent was measured using standardized questions adapted from the Monitoring the Future Project (21). To facilitate patient recall, the interviewer first identified the date of each patient's last menstrual period. Each patient was then asked to report the number of times she had used alcohol in her lifetime, since her last menstrual period, and in the previous 30 days. Recent alcohol use at the first prenatal visit was defined as use in the previous 30 days. Matching questions were used to evaluate prenatal use of tobacco, marijuana, and other illicit drugs. Results of drug analyses conducted on urine specimens submitted by 95% of the sample during this same visit as part of standard patient care validated self-reported use of marijuana, opiates, and cocaine.

Poverty status was defined as 0–100% (impoverished; coded 1) or  $>100\%$  (coded 0) of the federally established poverty level, based on household income and the number of household members dependent on that income. Gestational age at entry into care was determined by last menstrual period, corrected by ultrasound when appropriate. Report of alcohol or illicit drug use during sexual activities over the previous 12-month period was coded as 1. Exposure to violence [coded 1 (any) or 0 (none)] was based on the patient's report of experiencing, witnessing, or knowing someone who had experienced one or more of the following: robbery with or without a weapon, attack with or without a weapon, threat of rape, rape with or without a weapon, attack

with a knife or gun, threat to life, or murder. Being hurt by the father of her baby was defined as having been pushed, slapped, kicked, hit, forced to have sexual intercourse, or verbally abused by him. This variable was coded 1 for any type of assault and 0 for no assault reported. Alcohol or illicit drug use by the father of her baby (coded 1) was based on the patient's report that he used these substances  $\geq 1$  days/week. Because patients in this study were not queried as to when they first identified their pregnancy, timing of entry into prenatal care ( $>12$  weeks' gestation, coded 1, versus  $\leq 12$  weeks' gestation, coded 0) was used as a proxy measure and controlled for in subsequent analyses.

Of the 378 pregnant patients assessed, 270 (71%) reported having used alcohol at some point in their lifetime. These patients were divided into the following three groups: 179 (47%) patients who reported lifetime use but denied using alcohol since their last menstrual period; 43 (11%) patients who reported using alcohol in the last 30 days ("recent users"), and 48 (13%) patients who reported using alcohol since their last menstrual period but not in the last 30 days ("discontinued users"). The remaining 108 patients who reported never having used alcohol served as the control group for subsequent analyses.

Using Chi-square or Student's *t*-tests, risk factors were identified by comparing the demographic, reproductive, behavioral, and environmental indicators of alcohol use among patients in each of the two user groups to those of adolescents who denied ever using alcohol. Patients who disclosed prior alcohol use but denied its use since their last menstrual period ( $n = 179$ ) were excluded from these analyses to prevent misclassification into the reference group of patients who might be willing to disclose previous but not current alcohol use. Power calculations indicate that moderate and large (but not small) differences could be detected using Chi-square analyses to compare recent ( $n = 43$ ) or discontinued ( $n = 48$ ) users to those who reported never having used alcohol ( $n = 108$ ), with  $\alpha \leq .05$ . Bivariate correlates of recent or discontinued alcohol use during pregnancy ( $p \leq 0.10$ ) were then considered for entry into stepwise logistic regression analyses to determine the most efficient models for predicting alcohol use. Socioeconomic status and gestational age at entry into prenatal care were controlled in these analyses when significant at the bivariate level.

## Results

Pregnant adolescents who reported recent alcohol use at their first prenatal visit were significantly

**Table 1.** Demographic and reproductive indicators of alcohol use in pregnancy\*

	Recent ( $n = 43$ )		Discontinued ( $n = 48$ )		None ( $n = 108$ )	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)
Age >15 yr	34	(79) <sup>†</sup>	35	(73)	66	(61)
In school	22	(51) <sup>†</sup>	34	(71)	88	(84)
Impoverished	39	(98) <sup>†</sup>	41	(89)	89	(85)
Race/ethnicity						
African-American	16	(17)	21	(22)	56	(60)
White	9	(16)	19	(35)	27	(49)
Mexican-American	18	(38) <sup>†</sup>	7	(15)	22	(47)
Other	0	(0)	1	(25)	3	(75)
Gravidity >1	15	(35)	6	(13)	22	(20)
Parity >0	7	(16)	2	(4)	9	(8)
Elective AB >0	5	(12) <sup>†</sup>	3	(6)	3	(3)

\*Nonusers separately compared to patients who reported recent or discontinued use using Chi-square analyses. Denominator terms vary across variables owing to missing data.

<sup>†</sup> $p \leq 0.05$ .

<sup>‡</sup> $p \leq 0.01$ .

AB = Abortion.

older ( $p < 0.03$ ;  $16.1 \pm 1.1$  years; range 13–17 years) than never-users ( $15.7 \pm 1.2$  years; range 12–17 years) and were significantly more likely to be  $>15$  years of age (Table 1). No significant difference in age was observed between adolescents who discontinued alcohol use ( $16.0 \pm 1.0$  years; range 14–17 years) and those who never used this substance.

Pregnant adolescents who reported recent alcohol use compared with those who never used this substance were significantly more likely to be Mexican-American, to live at or below the poverty level, and to have experienced a prior elective abortion (Table 1). These adolescents were also significantly less likely to be enrolled in school. No significant differences were observed in gravidity or parity or school dropout among any groups compared.

Comparison of behavioral indicators revealed that adolescents who reported recent alcohol use entered prenatal care an average of 5 weeks earlier than nonusers ( $11.1 \pm 5.4$  vs.  $16.2 \pm 7.7$  weeks gestation;  $p < 0.01$ ) and were significantly more likely than nonusers to have entered care in the first trimester of pregnancy (Table 2). There were no significant differences in average age in weeks of gestation at entry into care between nonusers and those who discontinued alcohol use ( $15.5 \pm 7.2$  weeks gestation). Both recent and discontinued alcohol users were significantly more likely than nonusers to report recent (30-day) tobacco use and use of alcohol or illicit drugs during sexual activities, and to have had three or more lifetime sexual partners (Table 2). Adoles-

**Table 2.** Behavioral indicators of alcohol use in pregnancy\*

	Recent (n = 43)		Discontinued (n = 48)		None (n = 108)	
	n	(%)	n	(%)	n	(%)
Age first sex ≤14 yr	25	(58)	27	(57)	53	(50)
≥3 sexual partners	27	(63) <sup>†</sup>	26	(54) <sup>†</sup>	25	(23)
Entered care >12 wks gestation	10	(23) <sup>†</sup>	27	(56)	63	(58)
Unplanned pregnancy	38	(88)	39	(83)	90	(86)
Tobacco use	16	(38) <sup>†</sup>	6	(13) <sup>†</sup>	3	(3)
Marijuana use	14	(33) <sup>†</sup>	6	(13)	7	(7)
Alcohol use before sex	25	(61) <sup>†</sup>	24	(50) <sup>†</sup>	16	(15)
Drug use before sex	16	(37) <sup>†</sup>	12	(25) <sup>†</sup>	8	(7)

\* Nonusers separately compared to patients who reported recent or discontinued use using Chi-square analyses. Denominator terms vary across variables owing to missing data.

<sup>†</sup>  $p \leq 0.01$ .

<sup>‡</sup>  $p \leq 0.05$ .

cents who reported recent alcohol use were also significantly more likely to report recent (30-day) marijuana use. Moreover, four patients (9%) from those with recent alcohol use reported binge drinking (five or more drinks in a row) over the previous 2-week period (not shown). No other illicit drug use during pregnancy was reported by any adolescent. Age at first intercourse at ≤14 years and desirability of the current pregnancy did not significantly differ among any of the groups compared.

Exposure to violence and reports of alcohol and illicit drug use by the father of the baby were significantly more common among both groups who used alcohol during pregnancy (Table 3). However, physical or emotional abuse by the father of the baby was reported more frequently only by those pregnant adolescents who reported recent alcohol use.

**Table 3.** Environmental indicators of alcohol use in pregnancy\*

	Recent (n = 43)		Discontinued (n = 48)		None (n = 108)	
	n	(%)	n	(%)	n	(%)
Exposure to violence	26	(62) <sup>†</sup>	32	(68) <sup>†</sup>	38	(36)
FOB hurt teen	14	(33) <sup>†</sup>	6	(13)	10	(9)
FOB alcohol use	30	(70) <sup>†</sup>	30	(64) <sup>†</sup>	21	(20)
FOB illicit drug use	15	(37) <sup>†</sup>	20	(43) <sup>†</sup>	8	(8)
Married to or dating FOB	32	(76)	34	(72)	83	(83)
Living with parents	26	(61)	37	(77)	73	(68)

\* Nonusers separately compared to patients who reported recent or discontinued use using Chi-square analyses. Denominator terms vary across variables owing to missing data.

<sup>†</sup>  $p \leq 0.01$ .

FOB = father of baby.

**Table 4.** Logistic regression models of alcohol use during adolescent pregnancy\*

	Recent Alcohol Use			Discontinued Alcohol Use		
	AOR	95% CL		AOR	95% CL	
Tobacco use	17.2	2.6	115.5			
Not in school	4.0	1.3	12.6			
Mexican-American	3.7	1.2	11.9			
Alcohol used before sex	3.7	1.1	11.7	4.4	1.8	11.0
FOB uses alcohol	7.2	2.3	22.8	5.7	2.4	13.2
Exposed to violence				3.1	1.3	7.2

\* Only those factors significant at  $p \leq 0.05$  are reported here. AOR = adjusted odds ratio; CL = confidence limits; FOB = father of baby.

The proportion of adolescents who reported living with their parents or those who were still in a relationship with their baby's father did not significantly differ among groups compared.

Stepwise logistic regression analyses were used to identify characteristics associated with recent and discontinued alcohol use. Poverty status and gestational age at entry into prenatal care were controlled for in analyses evaluating risk factors for recent alcohol use. To simplify interpretation of results, racial/ethnic categories were collapsed so that Mexican-Americans (the group most likely to report recent alcohol use) were compared with adolescents from all other groups sampled (white, African-American, and other). Because high correlations ( $r > 0.35$ ) were observed between alcohol and illicit drug use by father of the baby, and between alcohol and illicit drug use during sexual activities, father's illicit drug use and illicit drug use during sexual activities were excluded from these analyses.

Risk profiles for recent and discontinued alcohol use were generated with two overlapping characteristics (Table 4). Use of alcohol by the father of the baby and alcohol use during sexual activities were significant risk factors for alcohol use by adolescents from each group. Recent alcohol users were also more likely to be Mexican-American, to have quit school, and to report recent tobacco use, while adolescents who stopped using alcohol were significantly more likely to have experienced, witnessed, or known someone who had experienced violence. Overall, models predicting recent and discontinued alcohol use correctly classified 87% and 81% of users and nonusers, respectively.

## Discussion

We found that a significant proportion of adolescents report alcohol consumption at their first prenatal

visit. Twenty-four percent of adolescents in this sample used alcohol at some point following conception, one in ten of whom used it in the previous 30 days. These findings are consistent with rates of alcohol use among pregnant adolescents previously reported to cluster between 17% and 28% (1,6,13). Tobacco and marijuana use during pregnancy were more common among both groups of alcohol users, although those who stopped consuming alcohol were more likely to also eliminate use of these other substances. Of particular concern is our finding that 9% of recent alcohol users reported binge drinking during the previous 2 weeks, posing unique risks to their developing fetuses. Polydrug use is common among adolescent substance users, with those using multiple soft drugs at risk for more serious drug use later in life (22), making the identification and referral of these patients even more critical.

Distinct risk profiles were identified in this study for pregnant adolescents who reported recent alcohol use at their first prenatal visit (tobacco use, discontinued school, Mexican-American race/ethnicity, alcohol use during sexual activities, and alcohol use by the baby's father) compared with those who discontinued alcohol use (alcohol use during sexual activities, alcohol use by the baby's father, and exposure to violence). Assessment of recent tobacco use and school enrollment, as well as alcohol use by the baby's father (or other current partner), can be easily incorporated into routine medical screening to help clinicians more accurately identify those young patients with the greatest need for intervention, especially those who might otherwise deny current use. This is important as medical providers, using nonstandardized screening methods (such as vaguely worded questions) have been unable to detect more than half of pregnant adolescent patients who reported alcohol use using a self-report instrument administered in a clinic waiting room (12). Moreover, objective screening for alcohol consumption during adolescent pregnancy has previously failed to identify use even among self-reported alcohol users (12), largely because urine toxicology screens for alcohol are dependent on recent use.

Consistent with previous research on pregnant adolescents (6,13) and problem behavior theory (23), adolescents in this study who reported recent alcohol use were significantly less likely to be enrolled in school at their first prenatal visit. This finding underscores the need to develop strategies to reach adolescents in nontraditional settings. Because symptoms of pregnancy are often not recognized until well into or beyond the important period of

early fetal development, it is critical that the harmful effects of alcohol use during pregnancy be communicated at all points of contact with the health care system. Television, billboards, community youth centers, and clinic waiting rooms can serve as vehicles for the dissemination of communitywide messages about the dangers of alcohol use during pregnancy.

Both groups of alcohol users reported higher levels of exposure to violence (experiencing, witnessing, or knowing victims of violence) and recent alcohol users were at increased risk of physical, sexual, or emotional abuse by the father of the baby than adolescents who denied previous alcohol use. Prior investigators have suggested that psychoactive substance use may be used to self-medicate the victim's physical or emotional injury received as a result of battering (24). It may also serve as a catalyst for episodes of assault, especially when both the adolescent and her partner have been drinking. Further longitudinal studies are needed to determine whether alcohol use precedes or is promoted by the violence experienced by these teens, and whether alcohol use during sexual activities is associated with episodes of sexual or physical violence.

Although relative rates of alcohol use by pregnant adolescents from different race/ethnicities observed in this study were consistent with trends previously reported among pregnant and nonpregnant adolescents (whites and Mexican-Americans reporting higher rates than African-Americans) (15,25), we were surprised to find that Mexican-Americans were significantly less likely than adolescents from any other group to report discontinuation of alcohol use prior to their first prenatal visit. Acculturation has been used to help explain racial/ethnic differences in substance use previously observed among pregnant adolescent and adult women at our institution (26). Although Mexican-Americans interviewed for this study were primarily second- or third-generation immigrants, and all spoke fluent English, stress from acculturation may still have played a role in their use of alcohol. Other investigators have identified that more tolerant attitudes toward alcohol consumption and higher levels of stressful life events predict third-trimester alcohol use among racially diverse adolescent or adult samples (4,27). We speculate, therefore, that greater numbers of stressful life events owing to the process of acculturation and/or more tolerant attitudes toward alcohol consumption may have affected the alcohol-using behaviors observed here.

Contrary to popular belief, adolescents who enter

care early may not engage in the most healthful behaviors; we found that those teens at highest risk for recent alcohol consumption were most likely to enter care within the first 12 weeks of gestation. While this finding is difficult to interpret, one plausible explanation is that adolescents who entered care in the first trimester had less time after recognizing the symptoms of pregnancy to eliminate their alcohol use. It is also possible that those who had recently used alcohol may have sought care owing to their concerns about alcohol use and fetal development. Since reasons for entry into prenatal care were not ascertained as part of this study, future investigations are needed to determine the reasons for the relationship between recent alcohol use and entry into prenatal care. Finally, it is important that all pregnant adolescents, even those who enter care early, be monitored carefully throughout gestation.

This study has several important implications for the development of interventions to decrease alcohol use during adolescent pregnancy. Alcohol use by the father of the baby and use during sexual activities were important risk factors for both recent and discontinued alcohol use. Social influences such as partner or peer use, identified in both this and previous studies as important in maintaining substance use behaviors among pregnant adolescents (8,13), may also be used to promote alcohol abstinence. In addition, previous studies have documented an association between perceived harm of using substances while pregnant and reduced substance use (4,6). Among nonpregnant adolescents, higher perceptions of social disapproval and risk of marijuana and cocaine use have significantly contributed to recent declines in use of these substances (28,29). To be effective, therefore, strategies to reduce/eliminate alcohol use during adolescent pregnancy must include the following: involve the adolescent's current partner in the implementation of services; provide anticipatory guidance as to the harmful effects of alcohol use; build social skills in handling situations where alcohol is being used; and strive to reduce the use of alcohol during sexual activities so that both unplanned pregnancy and alcohol use early in pregnancy are less likely.

Several limitations should be considered when interpreting the results of this study. Data on alcohol use were obtained by history only, as no laboratory test can accurately identify all alcohol users. Self-reported use in combination with objective screening for alcohol would likely have provided a more accurate prevalence of alcohol use. Generalization of the results of this study may be limited by the small

sample size and the facts that all participants received some form of prenatal care and that most adolescents were from lower socioeconomic levels. Different risk factors for alcohol use during pregnancy may exist among adolescents who fail to enter care altogether and those from middle or upper socioeconomic levels. Finally, patients were queried about alcohol use at their first prenatal visit only. Sequential interviews conducted throughout pregnancy may have identified a higher or lower prevalence and different patterns of risk factors associated with continued alcohol use.

Although alcohol remains the most frequently abused substance among women of childbearing age, assessment of its use is often overlooked in clinical practice owing to time constraints, lack of instruction about alcohol and other drug use issues during medical training, concerns that patients will underreport alcohol use, lack of adequate objective screening tools, failure to perceive the true prevalence of its use, attitudinal barriers, and perceived lack of skill (30–32). Although many adolescents reduce or eliminate their use of alcohol once they recognize their pregnancy, a significant number continue to consume alcohol throughout pregnancy, frequently in combination with tobacco and illicit drugs. The results of this study provide clinical markers that may be easily incorporated in routine patient screening at the first prenatal visit as part of a previsit questionnaire used to determine risk for alcohol use. Direct questioning of actual use should then be performed during the subsequent clinical interview, as recommended in the American Medical Association Guidelines for Adolescent Preventive Services (33), to identify adolescents who require intervention.

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