

Health Care Provider Advice and Risk Factors Associated With Alcohol Consumption Following Pregnancy Recognition*

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ABSTRACT. Objective: This study examined the extent to which pregnant women participating in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) were counseled by their health care providers to stop drinking alcohol during pregnancy. A second purpose was to identify characteristics associated with alcohol consumption postrecognition of pregnancy. **Method:** The sample consisted of 279 women who continued to drink after learning they were pregnant. Measures of provider advice on alcohol consumption, demographic characteristics, caffeine intake, smoking, other drug use, alcohol risk (using the TWEAK scale), and depressive symptoms on the Center for Epidemiological Studies Depression Scale (CES-D) were collected. **Results:** Sixty-two percent of women had significantly high TWEAK scores, and 60% scored within the clinical range for depression (CES-D ≥ 16). Sixty percent of sample women had been advised by their care

providers not to drink alcohol during pregnancy. Women who were most likely to receive advice were black non-Hispanic and Hispanic, were Spanish speaking, were less educated, were on public assistance, and had a higher number of alcohol-related risk behaviors. Advanced age, public assistance, caffeine use, smoking, and elevated TWEAK and CES-D scores predicted elevations in alcohol consumption rates. **Conclusions:** Although advice to stop drinking during pregnancy was provided to 60% of this sample, women continued to drink following pregnancy recognition, with alcohol consumption rates highly associated with sociodemographic and psychological factors, namely maternal depression. Because elevations in alcohol consumption during pregnancy are associated with poorer developmental outcomes for children, further efforts are needed to better address social and mental health factors that influence consumption. (*J. Stud. Alcohol* 67: 22-31, 2006)

MATERNAL CONSUMPTION OF ALCOHOL during pregnancy is arguably the most significant cause of developmental disabilities of known etiology, with fetal alcohol syndrome (FAS) representing the most severe manifestation (Stratton et al., 1996). Estimates of the number of live births in the United States meeting criteria for a diagnosis of FAS range from 0.5-3.0 infants per 1,000, with estimates of the number of children born with alcohol-related neurodevelopmental disorders even higher, at approximately three times those of FAS (May and Gossage, 2001). The combined rate of fetal alcohol spectrum disorders (FASD) is thus estimated to be at least 1% of all live births. Cost estimates of FAS alone for the United States range

from \$2.8 to \$9.7 billion per year (National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2000).

Despite the robust findings that prenatal drinking is associated with significantly increased negative consequences on fetal growth and child development, recent research indicates substantial alcohol use among pregnant women (Centers for Disease Control and Prevention [CDC], 2002; Substance Abuse and Mental Health Services Administration [SAMHSA], 2002). Indeed, high-risk drinking thought to increase the risk of infant mortality and morbidity has not decreased in the last decade.

Given high rates of consumption, there is an obvious need for medical and allied health professionals working with preconceptional and pregnant women to provide screening and counseling to prevent FAS and related conditions. However, although awareness and knowledge of the impact of alcohol on fetal development have increased over the last 30 years, research conducted in the last decade suggests that there remains a significant need to further improve health care practices related to the prevention of prenatal alcohol use (Department of Health and Human Services, 2000). For example, although the majority of health care professionals report that they assess for prenatal alcohol use in some manner, there remains a significant number who do not routinely inquire about prenatal alcohol use, with percentages ranging from 3% to 47% across various

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studies (Abel and Kruger, 1998; Diekman et al., 2000; Nanson et al., 1995; Nevin et al., 2002).

An equally disconcerting finding is that advice to pregnant women regarding alcohol cessation may vary depending on certain sociodemographic characteristics such as ethnicity, socioeconomic status, and educational level. For example, Kogan et al. found that 40% of black women and 35% of Hispanic women reported not receiving advice regarding alcohol cessation during pregnancy, compared with 30% of white women (Kogan et al., 1994). Poorer women and women with less than a high school education were also less likely to receive advice. This pattern suggests that women from vulnerable populations are less likely to receive education and counseling regarding alcohol use during pregnancy, which is consistent with findings that suggest that FAS is more common among lower-income minority populations (Abel, 1995).

Of note, the disparity in the provision of information to poor minority women has resulted in a lack of understanding of the risks of drinking during pregnancy for these women (Dufour et al., 1994; Serdula et al., 1991). Furthermore, when "frequent" prenatal drinking has been examined, low-income minority women with less education are more likely to be overrepresented (Centers for Disease Control and Prevention, 1995). These results illustrate the need to increase awareness of the risks of drinking during pregnancy among all pregnant women, including those from low-income, ethnically diverse populations.

In addition to the problems of inadequate or selective screening, education, and counseling of pregnant women, certain factors unique to the woman herself may make it more difficult for her to stop drinking even if she has been advised by her care provider of the adverse consequences to her fetus. One such factor is the woman's alcohol risk based on the psychological and behavioral consequences associated with her drinking behavior (Chang et al., 1999b; Dawson et al., 2001; Russell et al., 1996). Indeed, although many instruments have been developed to assess risk status, ones that have proven to be most effective for women are those that assess alcohol intake indirectly by asking about tolerance to alcohol's effects and social and psychological consequences of drinking (Bradley et al., 1998; Chang, 2001; Dawson et al., 2001).

Comorbid psychiatric problems, such as depression, also have the potential to exacerbate the negative consequences of alcohol use during pregnancy. It is well established that depression is a significant contributing factor to high-risk drinking in nonpregnant women (NIAAA, 1997). Studies reveal that women who are experiencing symptoms of depression drink a higher number of drinks per drinking occasion (Flynn et al., 2003; Haack et al., 1988) and have more problems associated with alcohol use (Marcus et al., 2003), thus impeding the effectiveness of treatment attempts (Haller et al., 1993; Raskin, 1993).

The interactive nature of maternal alcohol use and depression may be particularly confounded during pregnancy. Previous studies have reported that up to 70% of women experience some depressive symptoms during pregnancy (Llewellyn et al., 1997). Rates of diagnosed depression in pregnancy have ranged from 10% to 50% depending on the diagnostic criteria used and populations studied (Gotlib et al., 1989; Kurki et al., 2000; McKee et al., 2001). Moreover, women drinking at levels that would be detrimental to the fetus have been shown to have the highest levels of depressive symptoms (Hanna et al., 1994; Meschke et al., 2003; Zukerman et al., 1989). Significantly, comorbid alcohol use and depression have been shown to have negative consequences on infant outcomes. For example, a retrospective report of over 500,000 women in California found that those women diagnosed with comorbid substance-use disorders and psychiatric disorders were more likely to deliver low birth weight and preterm infants than those with either of these conditions alone (Kelly et al., 2002).

Regarding ethnic or cultural differences and rates of depression, although depressed mood has been found to relate to a higher likelihood of prenatal alcohol use in predominately white non-Hispanic women (Flynn et al., 2003; Meschke et al., 2003), the relation between alcohol use and depression has also been well documented among minority populations, with some studies revealing strong associations among black non-Hispanic and Hispanic women (Caetano, 1987; Golding et al., 1993; Grant and Harford, 1995; Vega et al., 2003). Indeed, one study found that 51% of black non-Hispanic and Hispanic pregnant women could be categorized as depressed on a standardized depression screening instrument (McKee et al., 2001). These findings strongly suggest that maternal depression is an important variable to consider when counseling women about alcohol cessation during pregnancy. In fact, counseling and treatment efforts may be unsuccessful unless concomitant treatment for depression is instituted.

Given the findings that drinking alcohol during pregnancy is associated with negative impacts on child development and that low-income minority children may be particularly vulnerable, we examined a group of women participating in a Women, Infants, and Children (WIC) program in Los Angeles and Orange Counties, California, who reported drinking alcohol postpregnancy recognition. The purpose of this study was to examine the extent to which women were counseled by their health care providers to stop drinking during pregnancy and to describe the characteristics of women who received advice. A second purpose was to identify variables associated with postconception drinking in this population of low-income minority women. Unlike other studies examining differences between abstinent women and women who drank during pregnancy, our sample was composed entirely of women who reported current alcohol use postpregnancy recognition. This report is

part of a larger study designed to improve screening techniques at WIC in order to provide specialized brief interventions to reduce prenatal alcohol exposure.

Method

Procedures

The Public Health Foundation Enterprises (PHFE) Management Solutions WIC Program (PHFE-WIC) in southern California is the largest WIC agency in the country, serving over 316,000 pregnant women, infants, and children every month in 53 centers. Approximately 11% of the PHFE-WIC caseload is pregnant women. Because of the severity of the effects of prenatal alcohol consumption, WIC is mandated to screen and counsel all prenatal clients who report using alcohol and other drugs. At the first prenatal visit, a nutritionist carries out an enrollment interview that includes questions on potential risk factors during pregnancy including alcohol and drug use. This information, along with demographic information on ethnicity, age, and education, is recorded in the Integrated Statewide Information System (WIC-ISIS), the data system for all WIC clients seen in California.

For this research, 12 PHFE-WIC centers were randomly selected for study to examine the impact of improved screening and counseling procedures on prenatal alcohol use. While waiting for their prenatal enrollment visit, pregnant women received a self-report alcohol screener. Bilingual WIC staff was available for those participants needing assistance reading the screener. During the course of the study, 4,630 women were screened for postconception drinking, representing approximately 70% of the prenatal enrollment population. Of that number, approximately 82% (3,797/4,630) of the women consented to participate. This percentage is consistent with participation rates for other studies conducted at PHFE-WIC. Analyses of demographic data from ISIS revealed that women who volunteered for the study did not differ from the general PHFE-WIC population on major demographic variables of ethnicity, age, or education. The screener asked about alcohol consumption both prior to pregnancy recognition and following recognition. In addition, women were asked to provide demographic information and completed instruments designed to record risk drinking (TWEAK; Russell, 1994) and recent depressive symptoms (Center for Epidemiological Studies Depression Scale [CES-D]; Radloff, 1997). Approximately 23.8% (904/3,797) of women screened indicated that they used alcohol postconception. Of that percentage, approximately 62% (560/904) reported drinking prior to pregnancy recognition and 38% (344/904) continued drinking after finding out they were pregnant. Of the 344 women who were current drinkers, 81% (279/344) participated in a more extensive interview of their drinking patterns. Women who

participated in this interview did not differ significantly from women who declined to participate on measures of ethnicity, age, marital status, education, income, public assistance, language preference, or gestation on enrollment. Further, they did not differ on their average scores on the TWEAK or CES-D. Regardless of whether or not they chose to participate in the interview, all women received counseling from the WIC nutritionists to stop drinking. Women with significant problems of abuse or dependence, as determined by NIAAA guidelines (Sobell and Sobell, 1995), were counseled and provided with appointments to treatment programs.

Women who participated in the more extensive interview were asked about their alcohol and other drug consumption using the Health Interview for Women (O'Connor and Kasari, 2000). Women were assured of confidentiality and told that refusal to participate in the study would not affect their WIC benefits. The University of California, Los Angeles, Institutional Review Board approved all procedures and a Certificate of Confidentiality was obtained from the NIAAA.

Participants

Participant characteristics are presented in Table 1. The ethnic breakdown of the sample was 6.8% ($n = 19$) white non-Hispanic; 17.6% ($n = 49$) black non-Hispanic; 71.6% ($n = 200$) Hispanic [29.7% ($n = 83$) English speaking; 41.9% ($n = 117$) Spanish speaking]; and 3.9% ($n = 11$) Other [1.4% ($n = 4$) Asian; 0.3% ($n = 1$) Native American; and 2.2% ($n = 6$) mixed ethnicity]. The participants ranged in age from 15 to 44 years, with an average (SD) age of 27.89 (6.07) years. Most women were married or living with a partner and had an average of 11.34 (3.37) years of education. The majority of women had incomes of \$15,000 or less, and more than a fifth of the sample was receiving public assistance. On average, women were screened at 17.79 (7.98) weeks gestation.

Measures

Alcohol screener. Following consent, all participants were asked to fill out a two-page alcohol screener. The screener, in English or Spanish, was written in simple language to be understandable to women with a fourth-grade level of education. The Spanish version of the screener was constructed by a process of translation and back-translation of the basic English screener. Information on the woman's ethnicity (self-identified), age, marital status, years of education, income, utilization of public assistance, language preference, and weeks of gestation was queried. Number of weeks gestation was determined using the date of screening and the due date that was given at pregnancy confirmation. The screener incorporated quantity-frequency questions to inquire about typical consumption patterns. Women also were

TABLE 1. Demographic characteristics and health care provider advice

Variables ^a	Total sample (N = 279)	Advice to stop drinking (n = 138/230)	No advice (n = 92/230)	p
Ethnicity, %				.003
White non-Hispanic	6.8	50.0	50.0	
Black non-Hispanic	17.6	70.7	29.3	
Hispanic English speaking	29.7	45.3	54.7	
Hispanic Spanish speaking	41.9	71.1	28.9	
Other	3.9	37.5	62.5	
Age in years, mean (SD)	27.89 (6.07)	27.92 (6.26)	27.86 (6.11)	NS
Marital status, %				.01
Married/partner	69.3	55.3	44.7	
Single/divorced	30.7	72.1	27.9	
Education in years, mean (SD)	11.34 (3.37)	11.04 (3.31)	11.83 (3.06)	NS
≥High school education, %	57.7	54.1	45.9	.02
<High school education, %	42.3	68.4	31.6	
Income, %				.06
≤\$15,000	67.1	60.8	39.2	
>\$15,000	32.9	47.1	52.9	
Public assistance, %				.03
Yes	22.0	71.7	28.3	
No	78.0	55.7	44.3	
Language preference, %				.01
English	58.0	54.3	45.7	
Spanish	42.0	70.8	29.2	
Weeks gestation, mean (SD)	17.79 (7.98)	18.51 (8.33)	17.12 (7.42)	NS
MAX, mean (SD)	2.08 (3.21)	2.27 (3.76)	1.83 (2.90)	NS
TWEAK, mean (SD)	1.87 (1.50)	2.09 (1.64)	1.70 (1.20)	.05
CES-D, mean (SD)	18.24 (9.83)	17.66 (9.03)	18.76 (11.09)	NS

Notes: NS = not significant; MAX = maximum drinks per drinking occasion; CES-D = Center for Epidemiological Studies Depression Scale. ^aN's vary based on missing data: For ethnicity, age, education, language preference, and MAX, N = 279; for marital status, n = 277; for income, n = 239; for public assistance, n = 270; for weeks gestation, n = 268; for TWEAK and CES-D, n = 272.

queried as to whether or not they had any alcohol in the previous week, on the previous weekend, or during the previous month. Any report of alcohol consumption on any of the questions constituted a positive screen.

The TWEAK was included in the screener to assess high-risk drinking (Russell, 1994). This tool identifies potential problem drinking with items that inquire about consequences, behaviors, and perceptions frequently associated with alcohol abuse. The TWEAK has been determined to be the optimal screening tool for pregnant women and high levels of sensitivity/specificity can be obtained across different ethnic groups using a cut point of 2 or more (Bradley et al., 1998; Dawson et al., 2001; Russell et al., 1996). To assess health care provider advice on alcohol use during pregnancy, women were asked if their doctor (1) had told them not to drink alcohol during pregnancy, (2) had never talked to them about drinking alcohol during pregnancy, or (3) had said that it was "okay" to drink alcohol during pregnancy.

Health Interview for Women. If a woman screened positive for current alcohol use, she was administered the Health Interview for Women (O'Connor and Kasari, 2000). The interview yields standard alcohol measures of average number of drinks per drinking occasion, maximum drinks per

occasion, and the frequency of both. The measure used for this study, maximum drinks per drinking occasion (MAX), was selected based on previous work demonstrating that it is a valid predictor of prenatal alcohol exposure effects and more accurately reflects heavy episodic drinking shown to result in more significant teratogenesis (O'Connor et al., 1993). The measure consisted of a simple count of the maximum number of drinks the mother reported consuming per drinking occasion during her pregnancy. Container size and amount of absolute alcohol were considered when estimating alcohol consumption levels. One drink was considered to be 0.60 oz of absolute alcohol; thus, one 12-oz can of beer containing 5% absolute alcohol was considered one drink, whereas one 16-oz can of 8% malt liquor was considered two drinks. All alcohol levels obtained were considered estimates of actual exposure because they were based on maternal self-report.

Caffeine ingested during pregnancy was calculated according to the procedure of Jacobson et al. (1984). The number of cups of coffee and tea was calculated along with the number of caffeinated soft drinks. Coffee was assigned a weight of 3, whereas caffeinated tea and soft drinks were assigned a weight of 1. The sum of these weighted scores was used as the measure of caffeine consumption per day.

Amount of smoking was estimated by a simple count of the number of cigarettes the mother reported smoking each day. The number of prescription versus over-the-counter drugs was calculated separately for data analysis. Illegal drug use was also queried. For example, marijuana or cocaine use was coded on a scale from 0 to 2, with 0 representing no cocaine or marijuana use, 1 representing use 1-2 times a week, and 2 representing use 3 or more times a week.

The Center for Epidemiological Studies Depression Scale. Current depressive symptoms were measured by the CES-D (Radloff, 1997). The CES-D is a self-report measure containing 20 items designed to assess recent depressive symptoms. The scale is used widely as a screening instrument to detect depression in nonclinical and clinical populations. The measure has high internal consistency, reliability, and validity and has been used extensively in studies of depression in women from low-income minority populations (Chung et al., 2003; Lennon et al., 2002). Items on the CES-D cover a woman's symptoms during the previous week and are rated on a 4-point Likert scale (0 = rarely, less than 1 day; 1 = sometimes, 1-2 days; 2 = occasionally, 3-4 days; 3 = often, 5-7 days). A total score is derived by summing the ratings across the 20 items. A standard cutoff score of 16 or above has been used to define clinically significant depressive symptoms, with a score of ≥ 30 reflecting severe depression (Beeghly et al., 2002).

Nutritionist training

WIC nutritionists from the 12 intervention sites were trained to score the self-administered alcohol screener and to administer the Health Interview for Women prior to participant enrollment. The initial training focused on education regarding the risks of prenatal alcohol use and the importance of increasing more accurate detection of prenatal alcohol consumption by pregnant women. Further training included observation of the administration of the Health Interview for Women and practice administering the interview supervised by the study research team. Nutritionists attained 100% reliability in administering the Health Interview for Women before they administered it to participants. Completed interviews were checked for accuracy of scoring daily by research staff. In the event an interview form was inaccurate or incomplete, the nutritionist was refreshed on the correct procedure and practiced again to 100% reliability. Quarterly meetings were held at WIC headquarters as well as monthly visits to participating centers to ensure that the protocol was being followed and the interviews were being conducted correctly.

Data analysis plan

Descriptive information on sample participants was examined and is shown in Table 1. To examine care provider

advice, the percentage of women who had been advised by their health practitioner not to drink during pregnancy versus those who had not received such advice was calculated. Variables included ethnicity, age, marital status, education, income, public assistance, language preference, weeks of gestation on enrollment in WIC, and TWEAK, MAX, and CES-D scores. Next, we examined advice provided in relation to demographic characteristics, alcohol risk score (TWEAK), alcohol consumption levels (MAX), and depressive symptoms (CES-D) using chi-square analyses and independent samples *t* tests. Of primary interest was the association among health care provider advice, demographic and health behavior variables, and elevations in alcohol consumption during pregnancy as measured by the maximum drinks score (MAX). Independent variables were entered simultaneously in a single multiple regression equation. This method allows for examination of the association of each independent variable to the outcome variable after controlling for all other variables. The statistical significance of the overall model and individual standardized beta coefficients were calculated.

Results

Alcohol consumption, alcohol risk score, and other drug use during pregnancy

The average maximum drinks per drinking occasion for the sample was 2.08 (3.21). Fifty-four percent of women drank a maximum of one drink per occasion, 21% drank a maximum of two drinks, and 25% reported drinking three or more drinks per occasion. Total average TWEAK score for the sample was 1.87 (1.50) with a range of 0 to 7. Sixty-two percent of sample women scored ≥ 2 on the TWEAK, which has been suggested as a cut point for pregnant women who may not be alcohol dependent but who may, nevertheless, drink at levels that place the fetus at risk (Russell et al., 1996).

Sample women reported drinking 1.86 (2.63) caffeinated drinks and smoked 0.64 (2.31) cigarettes per day. Eighteen percent of women took aspirin or over-the-counter drugs. A very small minority of women reported use of prescription medications or illegal drug use ($\leq 3\%$). Marijuana use one to two times a week was endorsed by six women (2.2%) and three or more times a week by three women (1.1%). Cocaine use one to two times a week was acknowledged by one woman (0.4%) and three or more times a week by one woman (0.4%). Three women (1.1%) acknowledged using antidepressants regularly.

Depression during pregnancy

The mean score on the CES-D revealed that, on average, sample women were endorsing a high number of

depressive symptoms (mean = 18.24 [9.83]). The CES-D scores ranged from 0 to 48, with 60% of women scoring above the clinical cut point (≥ 16) for depression. Forty percent of women were classified as minimally (scores of 0-9) or mildly (10-15) depressed, 49% were moderately depressed (16-29), and 11% were severely depressed (≥ 30).

Health practitioner advice to women

Of the 279 women who participated in the study, data on care provider advice were available on 230 women (82.4%). Although data were missing on 49 of the 279 women, the question was not asked on an earlier version of the screening questionnaire given to 24 of the women. Thus, for those women who were given the opportunity to answer the question, 90% (230/255) provided an answer. Women with missing data did not differ from the women who completed the screening questionnaire on demographic variables previously described. Examination of the data revealed that, of those women who had an opportunity to respond to this item, 60% ($n = 138$) had been advised not to drink during pregnancy, 37% ($n = 85$) were never told anything about drinking during pregnancy, and 3% ($n = 7$) were told that it was "okay" to drink.

Analysis of demographic data, presented in Table 1, suggested that health care providers were more likely to advise black non-Hispanic (70.7%) and Hispanic Spanish speaking (71.1%) women to stop drinking during pregnancy than white non-Hispanic (50.0%) or Hispanic English speaking (45.3%) women or women classified as Other (37.5%) ($\chi^2 = 15.67$, 4/230 df, $p < .003$). Providers were also more likely to give advice to women who were single or divorced (72.1%) than to married women or women living with a partner (55.3%), to women with less than a high school education (68.4%) compared with those who had been graduated from high school or who had some college education (54.1%), to women with incomes of less than

\$15,000 per year (60.8%) compared with women with higher incomes (47.1%), and to women on public assistance (71.7%) compared with those who were not on public assistance (55.7%). Spanish speakers (70.8%) were more likely to receive advice than English speakers (54.3%). Maternal age, weeks gestation on enrollment in WIC, and level of depressive symptoms did not appear to be related to provider advice.

Women who had been advised to stop drinking during pregnancy reported higher alcohol risk scores, as measured by the TWEAK (mean = 2.09 [1.64]), compared with women who had not received advice (mean = 1.70 [1.20]; $t = 1.89$, 224 df, $p < .05$); however, there was no statistically significant difference in level of alcohol consumption (MAX) between women who received advice (mean = 2.27 [3.76] drinks) and those who did not receive advice (mean = 1.83 [2.91] drinks; $t = 0.94$, 228 df, $p = .35$).

Predictors of higher levels of alcohol consumption during pregnancy

Simple correlations among all study variables are presented in Table 2. To test the relative contributions of each of these variables, including provider advice, to the prediction of drinking during pregnancy, they were entered into a multiple regression analysis with maximum number of drinks per drinking occasion (MAX) as the outcome variable. Ethnicity was significantly statistically related to a number of the predictor variables under study but was not associated with MAX ($r = -.10$; $p < .10$), so it was omitted from the final analysis so as not to obscure the significance of other individual predictors to outcome. The overall model was significant ($F = 7.61$, 12/163 df, $p < .0001$; $R^2 = .36$). Table 3 presents standardized beta coefficients and reveals that women who were older, who were not on public assistance, who enrolled in WIC earlier in their pregnancies, who consumed more caffeinated drinks, and who smoked

TABLE 2. Correlations among study variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	1	-.08	.05	.09	.12*	-.06	.07	.07	.23 [†]	-.05	-.04	-.01	.05
2. Marital status		1	-.02	.30 [†]	-.21 [†]	.23 [†]	-.06	-.02	-.33 [†]	-.02	-.21 [†]	.16 [†]	-.20 [†]
3. Education			1	.14*	-.02	.32 [†]	.06	-.14*	-.06	-.08	-.04	.14*	-.17 [†]
4. Income				1	-.19 [†]	-.06	.10	-.08	-.10	-.12	-.10	.13	-.08
5. Public assist					1	-.24 [†]	-.04	.01	.24 [†]	.03	.06	-.14*	-.07
6. Language						1	-.04	.06	-.23 [†]	-.00	-.15*	-.16 [†]	-.12
7. Weeks gestation							1	.02	-.04	.15*	.04	-.09	-.10
8. Caffeine								1	.24 [†]	.15*	.04	.08	.21 [†]
9. Smoking									1	-.04	.14*	-.02	.22 [†]
10. CES-D										1	.04	.06	.14*
11. TWEAK											1	-.13	.25 [†]
12. Advice												1	-.06
13. MAX													1

Notes: CES-D = Center for Epidemiological Studies Depression Scale; MAX = maximum drinks per drinking occasion.

* $p < .05$; [†] $p < .01$.

TABLE 3. Predictors of alcohol consumption during pregnancy (MAX)

Predictors	<i>b</i> (SE)	β
Age	.06 (.03)	.15*
Marital status	.21 (.14)	.04
Education	-.47 (.35)	-.09
Income	-.09 (.38)	-.02
Public assistance	-.92 (.38)	-.16*
Language	-.60 (.38)	-.12
Weeks gestation	-.06 (.02)	-.19 [†]
Caffeine	.20 (.07)	.21 [†]
Smoking	.93 (.53)	.14*
CES-D	.04 (.02)	.16*
TWEAK	.50 (.11)	.30 [‡]
Provider advice	.14 (.34)	.03

Note: MAX = maximum drinks per drinking occasion.

* $p < .05$; [†] $p < .01$; [‡] $p < .001$.

were more likely to consume more alcohol during pregnancy than those who did not present with these characteristics. Moreover, heavier consumption was more likely to be associated with higher levels of depression and higher TWEAK scores. Given these associations, provider advice proved not to be predictive of alcohol consumption level.

Discussion

Prevention of alcohol-exposed pregnancies has been identified as a healthcare priority by the Institute of Medicine (Stratton et al., 1996) and the U.S. Department of Health and Human Services in its publication, Healthy People 2010 (Department of Health and Human Services [DHHS], 2000). The goal of Healthy People 2010 is to reduce alcohol consumption in pregnant women by 94% and to eliminate binge drinking during pregnancy by the end of the decade. Achieving such significant reductions in prenatal alcohol use would have a major public health impact on reducing rates of fetal alcohol spectrum disorders in the United States. To achieve this primary prevention goal, health care providers must be willing to advise all women about the dangers of alcohol consumption. Ideally, this advice would be given during preconception counseling but, at the very least, should be provided to all pregnant women. Currently, however, counseling of pregnant women is not universal in the United States, as reported in a large national survey of obstetricians (Diekman et al., 2000). Despite the fact that 97% of physicians stated that they typically asked their pregnant patients about alcohol use, only 50% reported that they offered advice to all pregnant women. In the present study, a slightly higher percentage (60%) of women reported receiving advice, but universal counseling was not achieved. Because many of the characteristics of this sample are consistent with those of women who are more likely to deliver a child with FAS (Abel, 1995), there is a pressing need for providers to consistently provide alcohol counseling to all women of childbearing age (Wells et al., 2001).

Unfortunately, despite the fact that many women in this sample did report being told to stop drinking, provider advice proved to be a poor predictor of alcohol consumption in that there was no difference in the levels of alcohol consumed between those women who received advice and those who did not receive advice. These findings suggest that although health care providers are making some attempts to advise low-income minority women about the dangers of alcohol consumption during pregnancy, there are other important factors associated with drinking behavior that need to be addressed for women to be able to benefit from such advice. In this sample, although older age and poverty proved to be risk factors, women who were engaging in unhealthy practices such as consuming caffeinated drinks and smoking were more likely to consume alcohol in higher quantities, after other demographic variables were taken into consideration. Most important, women whose alcohol risk scores and levels of depressive symptoms were high proved to be at increased risk for greater alcohol consumption during pregnancy.

Indeed, a majority of women (62.5%) in this sample had scores on the TWEAK that were suggestive of alcohol consumption patterns that are potentially harmful for the fetus (Russell et al., 1996). Further, 46% of women were drinking two drinks or more per drinking occasion, a rate that has been demonstrated to be associated with negative developmental outcomes (Jacobson and Jacobson, 1999; O'Connor et al., 1993; Sood et al., 2001). A high number of depressive symptoms was also endorsed by a significant percentage of study participants (60%), with 11% of the sample scoring in the severe range of depression. Although fairly consistent with the literature on depressive symptomatology among pregnant minority women (Huynh-Nhy et al., 2004; Zayas et al., 2003), these rates are unacceptably high when compared with those of pregnant women in the general population that are estimated at between 8.5% and 11.0% (Gaynes et al., 2005). This finding is of further concern given that higher levels of depressive symptoms were also highly predictive of higher levels of alcohol consumption during pregnancy in this sample. Thus, results suggest that interventions aimed at reducing alcohol consumption during pregnancy may prove to be unsuccessful unless screening and referral for mental health problems are included.

Although interventions aimed at reducing psychological distress and depression during pregnancy may be difficult to provide on a large-scale basis, given the great risk afforded to the mother and the fetus related not only to maternal emotional distress but also to the concomitant increase in the likelihood that alcohol consumption will be higher, it is important to offer treatment. Unfortunately, there is a greater unmet need for treatment of mental health problems among low-income ethnic minority individuals than among the general population (Wells et al., 2001). Further,

although primary care providers may identify and recommend treatments for depression for their minority patients, these patients are less likely to seek mental health care or to take antidepressant medications (Cooper et al., 2003; Miranda and Cooper, 2004; Song et al., 2004; Vega et al., 1999). This was true in the present study, in which only 1% of sample women reported taking antidepressant medications despite the fact that the majority of women reported significant levels of psychological distress and that some of these medications have been found to be safe for use during pregnancy in controlled studies (Suri et al., 2004).

Limitations of the study

Some limitations should be considered in interpreting the results of this study. For example, the sample was drawn from a population of women living in southern California who volunteered to be screened, thereby limiting its generalizability to other populations of women in other parts of California and the United States. More specifically, the sample was highly saturated with low-income Hispanic participants, the majority of whom were born in Mexico and largely reflects the characteristics of this immigrant and U.S.-born population.

Another possible limitation is that women were queried only once about physician advice during their first prenatal enrollment appointment at WIC. Thus, data on counseling that might have taken place later in pregnancy were not obtained. However, because the average woman did not come to WIC until around 18 weeks gestation, this suggests a missed opportunity by health care professionals and supports the need to screen and provide treatment as early as possible.

The use of maternal self-report regarding alcohol consumption levels has been proposed as having suspect validity. Nevertheless, research indicates that self-reported alcohol consumption is more reliable than other methods of inquiry including collateral reports and some laboratory measures (Chang et al., 1999a; Derauf et al., 2003; Jacobson et al., 2002). In addition, factors shown to increase truthful reporting including enhanced assuredness of confidentiality, the utilization of supportive nonjudgmental techniques, conducting the assessments in a community setting, and the use of short questionnaires with clear wording were all used in this study, suggesting that this methodology utilized optimal procedures for increasing the likelihood of accurate reporting.

Finally, it is important to note that no clinical assessment of depression by a mental health professional was conducted in this study, so that formal diagnoses of depression in sample women are not implied. Furthermore, women were not asked specifically about any counseling or other forms of treatment that they may have been receiving for their depressive symptoms aside from the questions con-

cerning medications. For this reason, discussion about access to treatment and treatment response should be considered speculative.

Although results of this study suggest that many of the poorest low-income minority women participating in WIC did receive advice from their care providers to stop drinking alcohol during pregnancy, these women continued to drink despite this advice. Moreover, higher levels of alcohol consumption were related to cultural, socioeconomic, and psychological factors. To successfully reduce alcohol-exposed pregnancies, further efforts will be needed to train and encourage health care practitioners to screen all women for alcohol use, to provide more consistent alcohol and mental health counseling, and to better understand the barriers that influence whether or not women will heed their advice. Ongoing education of providers regarding cultural and personal factors influencing the use of care and access to brief interventions and treatment programs for alcohol use/abuse and mental health problems will be important policy initiatives that could be instituted in an effort to reach national goals of healthier pregnancies and the elimination of alcohol-related developmental deficits.

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Erratum

In "The Role of Women's Substance Use in Vulnerability to Forcible and Incapacitated Rape" by M. Testa, J.A. Livingston, C. Vanzile-Tamsen, and M.R. Frone, which appeared in the November 2003 (Vol. 64 [6], pp. 756-764) issue of the *Journal of Studies on Alcohol*, two percentages for "Perpetrator substance use" under the column "Incapacitated rape" in Table 4 (p. 761) are incorrect. The table is reprinted below with the corrected percentages in bold. The authors regret any inconvenience the error may have caused.

TABLE 4. Comparison of most recent forcible and incapacitated rape incidents

	Forcible rape (n = 65)	Incapacitated rape (n = 48)	χ^2 or F
Age at time of event, mean (SD)	19.37 (3.57)	19.21 (3.06)	0.06
Occurred following bar/party	16.9%	70.8%	33.49 [‡]
Previous sex with perpetrator	39.1%	14.6%	8.05 [†]
Force used	96.9%	31.3%	55.70 [‡]
Injury as a result of rape	56.9%	33.3%	6.17*
Woman's substance use			64.85 [‡]
Alcohol only	8.5%	62.5%	
Drugs only	1.5%	4.2%	
Both alcohol and drugs	4.6%	33.3%	
None	75.4%	0%	
For women who reported alcohol use, mean (SD)			
Number of drinks	4.00 (3.38)	9.11 (5.26)	12.40 [†]
Intoxication (1-7)	4.00 (2.10)	6.70 (0.59)	64.97 [‡]
Perpetrator substance use 27.27 [‡]			
Alcohol only	24.6%	54.2%	
Drugs only	6.2%	4.2%	
Both alcohol and drugs	12.3%	29.2%	
None	49.2%	6.3%	
Don't know	7.7%	6.3%	
For perpetrators reported to have used alcohol, mean (SD)			
Number of drinks	9.10 (4.45)	8.58 (4.75)	0.17
Intoxication (1-7)	4.97 (1.62)	4.60 (0.47)	1.05

Note: SD = standard deviation.

*p < .05; †p < .01; ‡p < .001.