

Correlates of Continued Alcohol Consumption During Pregnancy: Implications for Health Promotion

Joshua H. West¹, Rosemary Thackeray¹, Christina D. Chambers², Kelly K. Kao², Lyn M. Dick²
and Ken L. Jones²

¹*Department of Health Science, Brigham Young University*

²*Department of Pediatrics, University of California, San Diego*

Abstract

Purpose: Too many women continue to drink alcohol during recognized pregnancy. This purpose of this study was to explore factors related to alcohol use during pregnancy. **Design:** Data came from reviews of charts from women that called the California Teratogen Information Service (CTIS) at some point during the time period from 1981 and 2006 and enrolled in a pregnancy outcome study. **Subjects:** Approximately 40% of the 181 women in the study sample were 25 years of age and younger, and most women had not previously given birth (61.3%). **Measures:** Chart extraction data included whether or not women discontinued alcohol consumption at anytime during pregnancy, at what point in their pregnancy they first contacted CTIS, and other demographic information. **Results:** Approximately 20% of women continued to drink alcohol throughout pregnancy and 37.6% contacted CTIS after the first trimester. Initiating contact with CTIS after the first trimester ($p < .01$) and being older than 25 years of age ($p < .05$) were both associated with continued drinking throughout pregnancy. **Conclusion:** Older women, still of reproductive age, may benefit most from health promotion interventions that focus on alcohol consumption during pregnancy.

© 2011 Californian Journal of Health Promotion. All rights reserved.

Keywords: Alcohol; Pregnancy; Teratogen; Health Promotion

Introduction

Prenatal exposure to alcohol can have deleterious effects on a developing fetus, including Fetal Alcohol Syndrome (FAS) with manifestations such as growth deficiency, mental retardation, central nervous system dysfunction, craniofacial anomalies, and neurodevelopment disorders (American Academy of Pediatrics, 2000; Gladstone, Levy, Nulman, & Koren, 1997; Jones & Smith, 1973). Despite compelling evidence of adverse outcomes, even after recognizing pregnancy, many pregnant women continue to consume alcohol. Recent studies have reported rates of alcohol use during pregnancy between 5% and 52.3% (Ethen et al., 2009; Strandberg-Larsen, Rod Nielsen, Nybo Andersen, Olsen, & Grønbaek, 2008; Rayburn, Meng, Rayburn, Proctor, & Handmaker, 2006; Tough,

Tofflemire, Clarke, & Newburn-Cook, 2006; Chambers et al., 2005;).

Despite recent research, there are limited data about factors that relate to a woman's decision to continue to use alcohol after pregnancy recognition (Tough, et al., 2006). Self-disclosing alcohol related information could be considered sensitive to some women, especially if they know they are pregnant and also are aware of the risks associated with such behaviors. Therefore, the lack of data may be attributable to women not reporting alcohol exposures during pregnancy in traditional settings (Alvik, Haldorsen, & Lindemann, 2005).

One setting in which screening for alcohol use in pregnancy can complement and enhance identification of high-risk pregnant women is a teratogen information service (TIS). TISs

provide telephone-based confidential counseling services located in universities or hospitals throughout the U.S. and Canada. TISs provide risk assessments to pregnant women regarding exposures in pregnancy, including prescription or over the counter medications, disease, chemicals, illicit drugs or alcohol, and other environmental agents.

The purpose of this study was to explore factors associated with continued alcohol consumption throughout pregnancy. We hypothesized that women who contacted the California TIS (CTIS) after the first trimester would be more likely to continue drinking throughout pregnancy compared to women who contacted CIS during their first semester.

Method

Participants

Each year approximately 8,000 women contact CTIS. Contact usually initiates through referral or direct-to-consumer advertising (87.5% of this sample was referred by a medical source). From among these callers, approximately 150 women per year are invited to participate in an ongoing pregnancy outcome study. The current study sample was drawn from all women who called CTIS with questions about teratogenic agents at some point between 1981 and 2006, were pregnant, enrolled in the pregnancy outcome study (N= 3,750), and reported binge drinking. Despite the large number of women enrolled in the larger pregnancy outcome study, the current study focused on continued alcohol use during pregnancy, which could only be confirmed with the detailed measures that were applied only to women that reported binge drinking. The final study sample consisted of 181 women.

Procedures

Data were collected using chart reviews. Charts were comprised of information derived from monthly telephone interviews, starting from the initial call to CTIS and then followed monthly throughout the course of the pregnancy.

CTIS staff was responsible for updating participants' charts with data that was collected either in face-to-face visits or via telephone, or

both. For this study, charts were examined for information on demographics, alcohol and tobacco use, and CTIS access. Prior to the mid 1990s, information about race/ethnicity and education were rarely collected, which resulted in too many missing values to include these variables in this study.

Measures

Demographic variables included maternal age and parity, which refers to the number of times a woman has given birth to a fetus. Women were coded as nulliparous if they had not previously given birth and multiparous if they had already given birth prior to the current pregnancy. Each chart was reviewed to determine whether or not alcohol consumption discontinued at any point during the pregnancy (yes/no). Whereas alcohol use was measured throughout pregnancy, smoking use was determined by smoking status only at the time of the first call (yes/no) to CTIS.

Variables related to CTIS access included the time period during pregnancy when the first call was received (1st trimester vs. 2nd – 3rd trimesters) and the time frame during which the initial call to CTIS occurred (1981-1989, 1990-1999, and 2000-2006). The latter item was included because of the increased social awareness concerning alcohol use during pregnancy since the discovery of FAS (Jones & Smith, 1973). The authors attempted to control for this knowledge by including a variable indicating the time period during which women first contacted CTIS.

Analysis

Analyses were computed using SPSS 16.0 for Windows. Logistic regression was used to compute adjusted odds ratios to assess the factors associated with continued alcohol consumption. The Hosmer-Lemeshow Goodness of Fit statistic was calculated to ensure the model's adequate fit.

Results

Table 1 shows that most of the women in the sample had not previously given birth (61.3%) and were older than 25 years of age (60.8%). Smoking rates at the time of the first contact

with CTIS were 54.1%. Sixty-two (62.4%) percent of the sample initiated contact with CTIS during the first trimester.

Table 2 shows that continued drinking throughout pregnancy was associated with an

initial call to CTIS that occurred during the second or third trimesters, and calling during an earlier time period (e.g., 1989 or earlier). Compared to women 25 years of age and younger, older women were more likely to continue drinking after their initial contact to

Table 1
Characteristics of the Study Sample (N = 181)

Age		Parity	
25	39.2 (71)	Never given birth	61.3 (111)
>25	60.8 (110)	Previously given birth	38.7 (70)
Education		Race/Ethnicity	
High school	39.3 (71)	White	35.3 (64)
College	10.5 (19)	Hispanic	13.3 (24)
Post-graduate	3.8 (7)	African American	3.3 (6)
Missing	46.4 (84)	Other	3.9 (7)
		Missing	44.2 (80)
Continued Drinking		Smoked	
No	78.5 (142)	No	45.9 (83)
Yes	21.5 (39)	Yes	54.1 (98)
Decade Called		1st Contact to CTIS	
1981-1989	52.5 (95)	1st trimester	62.4 (113)
1990-1999	16.0 (29)	2nd – 3rd trimester	37.6 (68)
2000-006	31.5 (57)		

Table 2
Summary of Logistic Regression Analysis for Variables Associated with Continued Drinking (N =181)

Variable	OR	p	95% CI	
			Lower	Upper
Called CTIS after 1 st trimester ^a	5.02	.00	2.19	11.53
Multiparous ^b	1.72	.20	0.75	3.93
Smoked	1.66	.25	0.70	3.90
> 25 years old	2.57	.04	1.01	6.53
Time period of 1 st call				
After 2000 ^c	1	-	-	-
Between 1990 & 1999	6.30	.01	1.68	23.67
Before 1989	7.49	.01	1.65	34.15
Constant	0.05	<.001		

Note: Table displays adjusted odds ratios (OR); Demographic variables such as race/ethnicity and education had too many missing values and were excluded from the multivariate analyses; ^aCompared 2nd & 3rd Trimesters combined against 1st.

^bCompared women with at least 1 previous live birth against women with no previous live births. ^cReference group.

CTIS. The model significantly explained 31.5% of the variance in continued drinking, based on the Nagelkerke R^2 .

Discussion

Previous studies point to recognition of pregnancy as the time at which alcohol consumption is probably altered (Rayburn, et al., 2006; Tough, et al., 2006). The current study focused on the point at which the caller made the first contact to CTIS, because it is a proactive behavior that likely represents interest in changing. The finding that callers during the first trimester were less likely to continue drinking presents another perspective on Gladestone et al.'s (1997) report that binge-drinking women contacted a TIS earlier in the gestational period than non-binge drinking women.

In our sample, comprised entirely of women that reported binge drinking, women who continued drinking during pregnancy were less likely to have called CTIS at the end of the first trimester for teratology information. It is unknown if the information CTIS provided increased motivation to discontinue drinking, or if women that called earlier were more conscientious about their pregnancy and therefore more inclined to stop drinking. In the current study, some women may have been unaware of their pregnancy status when they engaged in drinking. Upon discovering they were pregnant they may have called CTIS to get more information about the possible risks associated with the exposure. Nonetheless, the significant association between first trimester CTIS contact and discontinued drinking suggests that it may be of value to encourage pregnant women, or sexually active women of child bearing age at risk for alcohol exposed pregnancy to contact CTIS or other like services that offer teratology information sooner in pregnancy rather than later. Especially if such women are not using effective methods of birth control (Mengel, Searight & Cook, 2006). There are known risks associated with alcohol exposures during pregnancy, and the information and recommendations to change

may have an impact on a pregnant woman's drinking behavior.

Conflicting reports have been noted in the literature about the impact of age on alcohol consumption during pregnancy. For example, Strandberg-Larsen et al. (2008) reported that age was not significantly related to binge drinking during recognized pregnancy, but Ethen et al. (2009) observed that older women drank more throughout pregnancy. Tough et al. (2006) demonstrated that when compared to women 25 years of age and younger, older women were more likely to continue using alcohol post-recognition of pregnancy. Findings from our study confirm Tough et al.'s (2006) findings, women older than 25 were more likely to continue drinking. This pattern indicates that older women may engage in riskier drinking behaviors during pregnancy, which should be confirmed with additional research.

The prevention strategies for risky alcohol consuming behaviors that have been recommended by the U.S. Institute of Medicine include universal alcohol education for all women of childbearing age, targeted interventions for risky drinkers, and selective interventions for women who have previously delivered a child affected by alcohol (Stratton, Howe, & Battaglia, 1996). Although alcohol education ideally would be successfully accomplished in routine obstetric care practice, health care practitioners may have limited time or expertise to evoke sensitive information in sufficient detail and provide appropriate education.

TIS services provide an alternative 'entry point' for health promotion at which high-risk women can be screened for alcohol use, and provided with education about possible adverse outcomes. The results from this study suggest that services and hotlines that provide prenatal counseling of any sort should be very proactive in eliciting information from women who call late in pregnancy. Furthermore, patients may benefit from practitioner recommendations to contact TIS like services early in pregnancy, regardless

of whether or not they perceive the patient to be at risk for an alcohol exposed pregnancy.

Limitations

Important limitations related to this study should be noted. In particular, respondents in the present sample represent a group of self-selected women that were willing to participate in follow up measures. They may not represent the entire population of pregnant women. Their involvement in follow-up measures could have altered their motivation to discontinue drinking, even though CTIS does not engage callers in

formalized and systematic cessation interventions to that end. Also, race/ethnicity, income and education data were sporadically collected before the mid 1990s, which resulted in large amounts of missing data, rendering these variables virtually unusable for analyses.

Acknowledgements

The Fred H. Bixby Foundation provided funding for this study. The authors would like to thank the California Teratogen Information Service and its attending staff for their cooperation.

References

- Alvik, A., Haldorsen, T., & Lindemann, R. (2005). Consistency of reported alcohol use by pregnant women: Anonymous versus confidential questionnaires with item nonresponse differences. *Alcoholism: Clinical Experiments and Research*, 29(8), 1444-1449.
- American Academy of Pediatrics. (2000). Fetal alcohol syndrome and alcohol-related neurodevelopmental disorders. *Pediatrics*, 106(2), 358-361.
- Chambers, C. D., Hughes, S., Meltzer, S. B., Wahlgren, D., Kassem, N., Larson, S., et al. (2005). Alcohol consumption among low-income pregnant Latinas. *Alcoholism: Clinical Experiments and Research*, 29(11), 2022-2028.
- Ethen, M., Ramadhani, T., Scheuerle, A., Canfield, M., Wyszynski, D., Druschel, C., et al. (2009). Alcohol consumption by women before and during pregnancy. *Maternal and Child Health Journal*, 13(2), 274-285.
- Gladstone, J., Levy, M., Nulman, I., & Koren, G. (1997). Characteristics of pregnant women who engage in binge alcohol consumption. *Canadian Medical Association Journal*, 156(6), 789-794.
- Jones, K., & Smith, D. (1973). Recognition of the fetal alcohol syndrome in early infancy. *Lancet*, 2, 999-1001.
- Mengel, M. B., Searight, H. R., & Cook, K. (2006). Preventing alcohol-exposed pregnancies. *The Journal of the American Board of Family Medicine*, 19(5), 494-505.
- Rayburn, W. F., Meng, C., Rayburn, B. B., Proctor, B., & Handmaker, N. S. (2006). Beer consumption among hazardous drinkers during pregnancy. *Obstetrics & Gynecology*, 107(2 Pt 1), 355-360.
- Strandberg-Larsen, K., Rod Nielsen, N., Nybo Andersen, A., Olsen, J., & Grønbaek, M. (2008). Characteristics of women who binge drink before and after they become aware of their pregnancy. *European Journal of Epidemiology*, 23(8), 565-572.
- Stratton, K., Howe, C., & Battaglia, F. (1996). Fetal Alcohol Syndrome: Diagnosis, Epidemiology, Prevention, and Treatment. Washington, DC: National Academy Press, 156-166.
- Tough, S., Tofflemire, K., Clarke, M., & Newburn-Cook, C. (2006). Do women change their drinking behaviors while trying to conceive? An opportunity for preconception counseling. *Clinical Medical Research*, 4(2), 97-105.

Author Information

Joshua H. West, Ph.D., MPH*
Brigham Young University
Department of Health Science
229-L Richards Building
Provo, UT, 84602
Telephone: (801) 422-3444
Fax: (801) 422-0273
Email: josh.west@byu.edu

Rosemary Thackeray, Ph.D., MPH
Brigham Young University
Department of Health Science

Christina D. Chambers, Ph.D., MPH,
University of California, San Diego
Department of Pediatrics

Kelly K. Kao, M.A.
University of California, San Diego
Department of Pediatrics

Lyn M. Dick, B.A.
University of California, San Diego
Department of Pediatrics

Ken L. Jones, MD
University of California, San Diego
Department of Pediatrics

* corresponding author