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Self-Reported alcohol and Drug Use in Pregnant Young Women: A Pilot Study of Prevalence and Associated Factors

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Abstract

Objectives—This study describes the prevalence and factors associated with self-reported substance use in young women receiving prenatal care at a hospital clinic.

Methods—Cross-sectional, study of 30 pregnant young adults who responded to a mail survey containing the CRAFFT screening tool. All completed a diagnostic interview that included self-report information on their use of alcohol and drugs before and during pregnancy, including the contexts in which they would be likely to use.

Results—One third of participants consumed alcohol, marijuana, or both while pregnant. Many had lifetime diagnoses of alcohol (23%) or cannabis (30%) use disorders, but only one met criteria for current diagnosis. The CRAFFT was best in identifying prenatal substance use (c-statistic=0.9). Age, race, education, and children, were not associated with either prenatal alcohol or cannabis use. Before pregnancy alcohol drinking was associated with prenatal alcohol use ($p=.02$) and prenatal cannabis use ($p=.06$). Another trend of before pregnancy cannabis use being associated with prenatal cannabis use ($p=.08$) was observed. Most participants indicated little likelihood of substance use in convivial, intimate, or negative coping contexts while pregnant. However, participants with prenatal substance use had significantly higher convivial ($p=.02$) and intimate ($p=.01$) subscale scores of the Drinking Context Scale before pregnancy.

Conclusions—Asking directly about the circumstances of prenatal alcohol and drug is not likely to be helpful. Two promising approaches in the identification of prenatal substance use were identified: the CRAFFT screening instrument and asking about the contexts during which alcohol might have been consumed before pregnancy.

Keywords

prenatal substance use young women CRAFFT

Introduction

Since pregnant young adults tend to recognize their pregnancies later than other expectant women and underreport health risk behaviors that affect pregnancy outcomes, accurate identification of prenatal alcohol and drug use in this group by clinicians is desirable (Cornelius, Richardson, Day et al., 1994; Kaiser & Hays, 2005). Although precise figures are unavailable, it has been estimated that 17 to 54% of pregnant adolescents will drink throughout pregnancy (Weimann & Berenson, 1998). Approximately 20% of pregnant adolescents will smoke marijuana (Bragg, 1997; Teagle & Brindis, 1998; Richardson, 1999; Quilivan & Evans, 2002).

The CRAFFT is a developmentally appropriate, readily scored brief screening instrument for both alcohol and drug use that is both valid and reliable in adolescent outpatients attending hospital-based clinics, with good sensitivity (0.76), specificity (0.94), positive predictive value (0.83), and negative predictive value (0.91) for any substance problem, including abuse and dependence (Knight, Sherritt, Shrier, et al, 2002; Knight, Sherritt, Harris, et al., 2003). As such, the CRAFFT may be helpful to clinicians, but it has not been extensively evaluated among pregnant young people who are at high risk for negative health behaviors such as drinking alcohol or using drugs (Stueve & O'Donnell, 2005). In an earlier study, the feasibility of offering a self-report measure of health habits embedded with the CRAFFT screening tool among a group of 100 pregnant young people was tested; but information about their actual use of alcohol and drugs was not obtained. The majority (81%) was CRAFFT negative (Braaten, Briegleb, Hauke, et al., 2008).

The primary purpose of this pilot study is to describe the self-reported alcohol and drug use in a sample of 30 pregnant young adults receiving prenatal care at the Brigham and Women's Hospital in Boston, MA. The prevalence of self-reported prenatal alcohol and drug use was based on information derived from validated measures. This information was compared to two brief screens, the CRAFFT and T-ACE, and the medical record. The T-ACE and CRAFFT questions are listed in Table 1 (Sokol, Martier, & Ager 1989). Other factors associated with prenatal self-reported alcohol and drug use were also evaluated. Finally, the contexts in which the pregnant young women reported that they were likely to use alcohol and drugs were described.

Methods

Participants were pregnant young adults up to the age of 25 initiating care at the obstetrics practices of the Brigham and Women's Hospital in Boston, MA. The upper limit of 25 was chosen to include those who may have become pregnant when they were 24; the World Health Organization has classified young people as 10 to 24 year olds, with adolescence (10–19 years) and youth (15–24 years) overlapping within that age range (Viner & Booy, 2005). They received a study invitation issued by the last and first authors, which contained an explanatory letter and the Health Habits Survey that contained the CRAFFT embedded in questions about weight, height, diet, exercise, and sleep among others. Those who were interested in participating were asked to return the Health Habits Survey. A total sample of thirty participants was planned to include as many people as possible with at least one positive CRAFFT response. The liberalized threshold for a positive CRAFFT has been recommended to prevent alcohol-exposed pregnancies (Floyd, O'Connor, Bertrand, et al., 2006).

Of the 100 letters sent, 45 were returned, 5 of which were unopened. Twenty four of the 40 (60%) returned surveys had at least one positive CRAFFT response; of the 24, 21 (88%) enrolled, 2 were ineligible because they were no longer pregnant, and 1 could not be

reached. From the remaining 16 returned surveys that had no positive CRAFFT responses, 9 young women were interviewed. Seven of the 16 were not enrolled because 2 surveys were incomplete, 2 were receiving prenatal care at other hospitals, 2 did not keep or cancel their study appointments, and 1 was no longer pregnant. Hence, a total of 30 were interviewed.

Written informed consent was obtained at the Diagnostic Interview, which was completed in approximately 60 minutes. Participants were asked to provide demographic background information which included their educational status, household composition, marital status, self-identified racial and ethnic background, as well as clinical information such as their estimated date of conception and due date. They completed an additional six measures during the Diagnostic Interview. Each participant received a \$50.00 honorarium and \$10.00 for travel expenses. This study was reviewed and approved by the Partners Institutional Review Board.

Study Measures

1. Structured Clinical Interview for DSM-IV, Substance Use Disorder Module (SCID): to generate current and lifetime alcohol and drug diagnoses according to criteria from the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (First, Spitzer, Gibbon, et al., 1996);
2. Timeline Followback (TLFB): to obtain daily estimates of drinking and drug use for the 6 month period up to the date of interview (Sobell & Sobell, 1992). These daily estimates were used to calculate drinks per drinking day, percent drinking days, amount of drug per day of use (e.g., number of marijuana cigarettes per day of use), and percent days of drug use in the previous 6 months. Since the date of conception was known, it was possible to calculate measures of alcohol and drug use both *before* and *during* pregnancy;
3. Drinking Context Scale: 23 items to measure the self-reported likelihood of drinking in three contexts – convivial or intimate circumstances, and coping with negative emotion. Examples of contexts are “at a party” (convivial), “with the person who is my lover” (intimate), or “angry with myself or someone else” (negative coping). This was completed twice, once for *before* and once for *during* pregnancy (O’Hare, 1997).
4. Drug Context Scale: 23 items based on the Drinking context scale, modified to reflect the likelihood of drug use in three contexts – convivial or intimate circumstances, and coping with negative emotion. This too was completed twice, once for *before* and once for *during* pregnancy.
5. The T-ACE, the 4-item alcohol screening questionnaire based on the CAGE and extensively tested among adult pregnant women (Sokol, Martier, & Ager, 1989).
6. Likelihood of Change: Subjects were asked to estimate on a Likert Scale how likely they were to change behaviors such as drinking, smoking, diet, exercise, and another behavior of their choice as a result of their participation in the study. The scales were anchored with zero being no change and five being certain change. The rationale for asking these questions is based on previous research where women with alcohol use disorders demonstrated reactivity to assessment measures, so that there was change in use after assessment alone (Worden, McCrady, & Epstein, 2008).
7. Medical record review: The initial prenatal staff intake note for the participants was reviewed for documentation of prenatal alcohol or drug use.

Data Analysis

All analyses were carried out using the SAS statistical package (version 9.1). Simple descriptive statistics were calculated and are reported as percentages, means, and standard deviations (SD), as appropriate. The association between prenatal alcohol and drug use and four demographic factors (age, race, education, and presence of children) was tested with Fisher's exact test. Fisher's exact tests were also used to assess the association between alcohol and drug use before pregnancy and prenatal alcohol and drug use. Wilcoxon tests were used to compare those with and without prenatal substance use according to the contexts of substance use: degree of convivial use, intimate use, and negative coping use. The CRAFFT and T-ACE scales were evaluated as indicators of prenatal alcohol and drug use as established by the Timeline Followback interview and lifetime DSM-IV substance (alcohol and drug) use disorders by calculating the positive and negative predictive values, and using logistic regression to calculate the c-statistic, or the area under the receiver operating characteristic (AUROC) curve, and its p-value. AUROC values can range from 0.5 to 1; whereas an area of 1 indicates a perfect test, an area of 0.5 means that the test performs no better than chance.

Results

Subject Characteristics

The 30 participants ranged in age from 17 to 25 years, with a mean of 20.5 (SD=2.1). Most were single (90%); 2 (6.7%) were married and 1 (3.3%) was separated. Most (63.3%) were about to become first time mothers, but nine (30%) had 1 child and 2 (6.7%) had 2 children at home. Mean weeks gestation at the time of study interview was 21.8 (SD=6.9). With regards to education, 8 (26.7%) had not yet completed high school, 9 (30%) had a high school diploma, 12 (40%) had some college education, and 1 (3.3%) had a 4 year baccalaureate degree. More than half (53.3%) indicated that their ethnic background was Hispanic; 27% were Caucasian and 33% were African American. The participants completed the study interview a mean of 23 (SD=26) days after the Health Habits Survey was completed.

Alcohol and Drug Use

Of the 30, 8 (27%) consumed an average of 1.8 drinks per drinking day while pregnant (on 4% of days) and 3 (10%) smoked an average of 4.3 marijuana cigarettes per drug use day while pregnant (on 88% of days); these behaviors were found in 10 non-overlapping individuals, so that one used both alcohol and marijuana while pregnant. Before pregnancy, 16 people (53%) had an average 3.0 drinks per drinking day (on 8% of days) and 6 (20%) consumed an average of 2.8 marijuana cigarettes per drug use day (on 56% of days). Seven participants satisfied DSM-IV criteria for lifetime alcohol use disorders and 1 had a current disorder. Nine satisfied DSM-IV criteria for lifetime cannabis use disorders. Information about the participants' alcohol and cannabis use is summarized in Table 2.

Factors Associated with Prenatal Alcohol and Cannabis Use

Factors associated with prenatal alcohol and cannabis use are summarized in Table 3. Demographic variables such as age, race, education, and number of children were not associated with prenatal alcohol or cannabis use. There was no difference in the number of week's gestation between the users and non-users. Before pregnancy alcohol use was associated with prenatal alcohol use ($p=.02$). Two trends were noted. Before pregnancy alcohol use was associated with any prenatal substance use ($p=.06$) and before pregnancy cannabis use was associated with prenatal cannabis use ($p=.08$). Before pregnancy cannabis use alone was not strongly associated with subsequent prenatal substance use.

With regards to the Drinking Context Scale, it appears that those participants who used prenatal alcohol and/or cannabis had significantly higher scores on the convivial ($p=.02$) and intimate ($p=.01$) use scales before pregnancy. Both users and non-users of substances in the prenatal period had very similar responses on all three subscales of this measure when describing the circumstances of alcohol consumption during pregnancy. Similarly, prenatal substance users had higher scores on the Drug Context Scale in the before pregnancy period compared to non-users, although these differences were not statistically significant. No participants acknowledged any circumstances during which they would use drugs while pregnant.

Screening Instruments

Evaluations of the screening instruments are summarized in Table 4. Overall, CRAFFT scores were distributed as follows: 0, 30%; 1, 37%; and 2 or more, 33%. T-ACE scores were: 0, 33% and 2 or more, 67%. The T-ACE and CRAFFT were compared to two criterion standards: 1) any prenatal substance (alcohol and cannabis) use as measured on the Timeline Followback Interview, and 2) any lifetime DSM-IV substance (alcohol or cannabis) use disorder diagnoses.

Any Prenatal Substance Use—The c-statistic, or the AUROC, was 0.90 ($p=.004$) for the CRAFFT and 0.80 ($p=.02$) for the T-ACE. The CRAFFT using the standard cut point of 2 was the best measure of prenatal substance use. When it was positive, 90% used prenatal substances and when it was negative, 80% did not use prenatal substances. When the T-ACE was positive, 90% used prenatal substances, but when it was negative, 45% did not use substances.

Lifetime Substance Use Disorders—The T-ACE and the CRAFFT were compared to lifetime substance (alcohol and cannabis) use disorder diagnoses. Both the T-ACE ($c=0.75$, $p=.03$) and the CRAFFT ($c=0.72$, $p=.04$) had comparable AUROC values. When the T-ACE was positive, 92% satisfied diagnostic criteria for lifetime substance use disorders and when it was negative, 50% did not meet criteria. In contrast, when the CRAFFT was positive using the standard cutpoint (≥ 2), 58% satisfied diagnostic criteria for lifetime substance use disorders, and when it was negative, 83% did not meet criteria. When the CRAFFT was positive using the liberalized cutpoint (≥ 1), 83% had lifetime substance use diagnoses, and 39% did not have lifetime substance use diagnoses when the CRAFFT was negative.

Medical Record Review

Seven of the 29 (24%) initial notes available for abstraction indicated that the providers assessed participants for prenatal alcohol or drug use. The providers were entirely correct about the 3 patients they identified as using prenatal substances, however, one of the four patients they determined to be abstinent indicated otherwise in the study interview. Substance use information was not recorded for the 22 remaining records, which included 6 additional pregnant young adults with prenatal substance use.

Change after Interview

Participants were asked to estimate how likely they were to change their behaviors as a result of the study interview. Using a scale of 0 (no change) to 5 (certain change), they indicated little likelihood of change in smoking (mean =0.7, SD=1.7), drinking (mean=0.7, SD=1.5), diet (mean =1.3, SD=1.7), exercise (mean =1.5, SD=1.9), or other behaviors (mean=1.8, SD=2.5).

Discussion

The principal findings of this pilot study of 30 young adults are that one third consumed alcohol, marijuana, or both while pregnant. Rates of use were higher before pregnancy, and a substantial proportion of participants satisfied criteria for lifetime diagnoses of alcohol use disorders (23%) and lifetime cannabis use disorders (30%). It appeared that the CRAFFT screening tool, using the standard cut point was the better than the T-ACE screening measure in identifying prenatal substance use within the past six months. However, the T-ACE seemed to be more accurate than the CRAFFT in identifying those with lifetime substance use disorders. Review of initial clinic notes indicated that 24% had documentation assessing prenatal substance use, with more than half of the prenatal substance users otherwise unidentified.

Among the possible factors associated with prenatal alcohol or marijuana use in pregnant young adults, it appears that asking about the contexts during which they might have consumed alcohol *before* pregnancy is the most promising. In general, the mean values for the before pregnancy convivial, intimate, and negative coping scale results were comparable to those based on a sample 197 college undergraduates (O'Hare, 2001). Their self-report of prenatal alcohol and drug use contradicted their responses as to likelihood of use in convivial, intimate, or negative coping contexts during pregnancy. Hence asking directly about the circumstances of prenatal alcohol and drug is not likely to be helpful.

Potential limitations to the generalizability of the study's findings include the small sample size and the design, where screen positive responders were over-sampled. As a result, it was not possible to calculate sensitivity and specificity for the measures. However, a previous study in the same clinical setting found no systematic differences (e.g., age, weeks gestation, education, ethnic background, among others) between those with positive or negative CRAFFT screens (Braaten, Briegleb, Hauke, et al., 2008). Less than half of the pregnant young women responded to the study invitation. It is possible that particularly motivated people participated, as a reflection of their interest in the content area or perhaps in the study stipend, which was commensurate with our community standard. In addition, the modification of the Drinking Context Scale to reflect the contexts of drug use is novel, and needs additional testing in other settings. This study relied on self-report of prenatal alcohol and drug use in the past 6 months, which captured both before pregnancy and during pregnancy use. More data about before pregnancy use might be recommended in future studies. There was a 23 day difference between the times that the CRAFFT and TACE were completed; both measures ask about past practices and so, responses should not be impacted by the time gap. Nonetheless, self-reports of substance use may have been inaccurate with over-reporting being less likely than under-reporting of alcohol and drug use because of concerns about stigma or other reasons. Although more than half of the participants indicated that they were of Hispanic origin, only one person required the services of an interpreter in completing the interview.

One third of the diverse pregnant young adults in this study used alcohol, marijuana, or both after conception. None stated that they would modify their behaviors as a result of their participation in the diagnostic interview. Thus, it seems that more effort might be put forth in modifying their consumption, such as a tailored brief intervention or counseling that may take into account the social contexts of use before pregnancy. Also, additional work is needed to improve the identification of prenatal alcohol and drug use in this age group. In particular, the CRAFFT appears to be especially promising, but further research is needed to confirm its utility. Since pregnant young adults who drink alcohol and smoke marijuana pose a risk to themselves, given the potential persistence of these habits into later life and to their offspring, timely identification and effective intervention would be ideal.

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Table 1

The CRAFFT and T-ACE Questionnaires

C	Have you ever ridden in a car driven by someone (including yourself) who was “high” or had been using alcohol or drugs?
R	Do you ever use alcohol or drugs to relax , feel better about yourself, or fit in?
A	Do you ever use alcohol or drugs while you are by yourself, alone ?
F	Do you ever forget things you did while using alcohol or drugs?
F	Do your family or friends ever tell you that you should cut down on your drinking or drug use?
T	Have you ever gotten into trouble while you were using alcohol or drugs?
The CRAFFT asks six yes-no questions, with each affirmative answer scoring one point, and is positive with a score of two or more, with good test-retest reliability (Knight, Sherritt, Harris, et al., 2003). Although the standard CRAFFT cut-point is 2, a cut-point of 1 has been recommended to prevent alcohol-exposed pregnancies (Floyd, O’Connor, Bertrand, et al., 2006).	
T	How many drinks does it take to make you feel high (tolerance)?
A	Have people annoyed you by criticizing your drinking?
C	Have you ever felt you ought to cut-down on your drinking?
E	Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hang-over (eye-opener)?
The T-ACE is positive with a score of two or more points. Two points are given if the person reports tolerance to MORE THAN 2 drinks. One point is given for each positive answer to the A, C, or E questions.	

Table 2

Subjects' Self-Reports of Alcohol and Marijuana Use

	<u>Alcohol Use</u>		<u>Cannabis Use</u>	
	Before Pregnancy	During Pregnancy	Before Pregnancy	During Pregnancy
Use by Timeline Followback	16 (53%)	8 (27%)	6 (20%)	3 (10%)
Among substance users				
% days of use	8%	4%	56%	88%
Amount/day of use*	3.0 (SD=1.5)	1.8 (SD=.6)	2.8 (SD=2.6)	4.3 (SD=3.1)
Subjects with DSM-IV Dx**	7 (23%)	1 (3%)	9 (30%)	0 (0%)

* Means shown are for drinks per drinking day and marijuana cigarettes per smoking day.

** Subjects with lifetime diagnoses are shown for “before pregnancy” and current diagnoses are shown for “during pregnancy.”

Table 3

Factors associated with Self-Reports of Pregnancy Substance Use

Demographic Factors				
		Users n=10	Non Users n=20	p-value ¹
Age		21.2 (2.2)	20.1 (2.1)	0.17
Race	Caucasian (27%)	10%	35%	0.21
	Minority (73%)	90%	65%	
High School vs < High school		50%	60%	0.71
Children vs No Children		50%	30%	0.43
Before Pregnancy Substance Use		Users, n=10	Non-users, n=20	p-value
Before Pregnancy Alcohol vs Pregnancy Alcohol		75%	46%	0.021
Before Pregnancy Alcohol vs Pregnancy Substance Use		80%	40%	0.058
Before Pregnancy Cannabis Use vs Pregnancy Cannabis Use		100%	11%	0.083
Before Pregnancy Cannabis Use vs Pregnancy Substance Use		30%	15%	0.23
Contexts of Alcohol and Marijuana Use ²				
ALCOHOL USE				
Drinking Context Scale, Before Pregnancy		Users, n=10	Non-users, n=20	p-value ³
Convivial 10–50		32 (13.6)	19.6 (8.8)	0.022
Intimate 8–40		16.2 (8.1)	11.4 (4.8)	0.012
Negative Coping 5–25		10.8 (5.8)	6.5 (3.7)	0.25
Drinking Context Scale, Pregnancy		Users, n=10	Non-users, n=20 ⁴	p-value
Convivial 10–50		10.8 (2.5)	10 (0)	0.24
Intimate 8–40		8.1 (.32)	8 (0)	0.29
Negative Coping 5–25		5.6 (1.3)	5 (0)	0.13
Marijuana USE				
Drug Context Scale, Before pregnancy		Users, n=10	Non-users, n=20	p-value
Convivial 10–50		21.4 (18.4)	14.6 (10.6)	0.15
Intimate 8–40		16.1 (13.2)	10.3 (6.8)	0.061
Negative Coping 5–25		9.4 (6.8)	6.8 (4.8)	0.21
Drug Context Scale, Pregnancy ⁵		N/A	N/A	N/A

¹ Fisher exact test² Numbers immediately to the left of the subscales are the range of possible values.³ Wilcoxon test⁴ All respondents endorsed the same minimal replies, so that the SD=0⁵ No participants acknowledged any contexts of pregnancy drug use, and so no results are reported.

Table 4

Performance of Screening Instruments for Alcohol or Drug Use

<u>Screening Instrument</u>			
<u>Comparison to Any Prenatal Substance Use by the Time-Line Followback:</u>			
	<u>T-ACE</u>	<u>CRAFFT</u>	
Cutpoint	>2	>=1	>=2
Positive Predictive Value	90% (54–99%)	100% (63–100%)	90% (67–98%)
Negative Predictive Value	45% (24–68%)	48% (26–70%)	80% (44–96%)
c-statistic *	c = .80		c = .90
p-value	p = .02		p = .004
<u>Comparison to Lifetime Substance Use Disorders:</u>			
	<u>Screening Instrument</u>		
	<u>T-ACE</u>	<u>CRAFFT</u>	
Cutpoint	>2	>=1	>=2
Positive Predictive Value	92% (60–99%)	83% (51–97%)	58% (29–84%)
Negative Predictive Value	50% (27–73%)	39% (18–64%)	83% (58–96%)
c-statistic *	c = .75		c = .72
p-value	p=.03		p=.04

* The c-statistic is the Area Under the ROC curve, without regard to cutpoint. Values can range from 0.5 (chance) to 1.0 (a perfect test).