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Alcohol use before and during unwanted pregnancy

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Abstract

Background—There is little information about pregnancy-related changes in alcohol use and factors contributing to changes among women with unwanted pregnancies. This study describes changes in alcohol use from before pregnancy recognition to during pregnancy and identifies important predictors of alcohol use severity among women with unwanted pregnancies.

Methods—Data are from the Turnaway Study of 956 women seeking pregnancy termination at 30 U.S. facilities between 2008 and 2010, some of whom were denied care because they were past the gestational limit of the facility where they were recruited and were still pregnant at the baseline interview, one week after termination-seeking. Predictors of alcohol use severity (a latent variable) were identified.

Results—56% of the total sample reported any alcohol use the month before pregnancy recognition, with 23% reporting six or more drinks on an occasion. Among the total sample, 35% of those drinking before pregnancy recognition had quit and 20% had reduced one week after termination seeking. Among those denied terminations and still pregnant, 71% had quit and 14% had reduced. In a multivariate model predicting alcohol severity, younger age, still pregnant, one or more previous births, later gestation, childhood physical abuse, and marijuana and other drug use were associated with lower severity; having completed college, tobacco use, and recent physical violence were associated with higher severity.

Conclusions—The proportion of the total sample drinking before pregnancy recognition is similar to national samples of women of childbearing age while the proportion binge drinking appears higher. Of women denied terminations who were still pregnant, the proportion having quit is similar to other populations of pregnant women. More research is needed to examine whether pregnant women may be substituting alcohol for marijuana and other drugs. Interventions focusing on alcohol use severity during pregnancy may need to also focus on tobacco.

Keywords

alcohol; pregnancy; pregnancy termination; unintended pregnancy

Introduction

Most women cease or reduce alcohol consumption upon discovering pregnancy or over the course of pregnancy (Hellerstedt et al., 1998, Ethen et al., 2009, Kost et al., 1998, Chambers et al., 2005, Tough et al., 2006, Pirie et al., 2000, Alvik et al., 2006b, Harrison and Sidebottom, 2009, Ockene et al., 2002, Massey et al., 2011, Chasnoff et al., 2005, Bolumar et al., 1994, Terplan et al., 2013). Estimates of cessation and reduction from general population samples range from 37% (in Spain) to 87% (in the U.S.), with most studies finding close to two-thirds or more reporting cessation or reduction (Alvik et al., 2006b, Harrison and Sidebottom, 2009, Ockene et al., 2002, Massey et al., 2011, Chasnoff et al., 2005, Bolumar et al., 1994, Terplan et al., 2013). Those who fail to reduce during pregnancy as well as women who drink heavily and in binge patterns are at increased risk for adverse outcomes (May et al., 2008, May et al., 2005, Whitehead and Lipscomb, 2003, Jacobson et al., 1998, Maier and West, 2001, Sayal et al., 2009). Thus, understanding more about risk factors for continued drinking during pregnancy is an important public health priority.

The previously described cessation and reduction patterns are also found among women with unintended pregnancies (Hellerstedt et al., 1998, Kost et al., 1998, Pirie et al., 2000, Johnson et al., 1987, Tenkku et al., 2009, Terplan et al., 2013). There has also been substantial research examining predictors of alcohol use among pregnant women, including in income and race/ethnicity subgroups (Chambers et al., 2005, Tenkku et al., 2009, Pirie et al., 2000, Harrison and Sidebottom, 2009, Chasnoff et al., 2005, Johnson et al., 1987, Hellerstedt et al., 1998, Kost et al., 1998, Ethen et al., 2009). However, literature on alcohol use patterns and risk factors among women with *unwanted* pregnancies is sparse. Unwanted pregnancies, or pregnancies that women sought to terminate, are a subset of unintended pregnancies. The lack of information about cessation and reduction among women with unwanted pregnancy is of concern as unwanted pregnancy is common in the U.S.. Half of all pregnancies in the U.S. are unintended at conception and half of these are terminated; 27% of births are from unintended pregnancies (Finer and Zolna, 2011). While the proportion of births from unintended pregnancies that were truly unwanted is not known, a recent estimate suggests that approximately 4,000 women per year are unable to terminate unwanted pregnancies because they exceed facility gestational age limits for providing termination services (Upadhyay et al., 2013), with many more unable to terminate pregnancies for other reasons. The number of women unable to obtain pregnancy termination services is expected to rise with the numerous new state-level restrictions on pregnancy-termination services enacted throughout the U.S. since 2010 (2012b). Thus, having more information about which women are most at risk and factors associated with increased risk is essential to meet the needs of this growing population.

Alcohol use by women with unwanted pregnancies has implications beyond the index pregnancy, as women who cease or reduce use during pregnancy tend to resume after

pregnancy, although at a lower frequency (Fried et al., 1985, Bailey et al., 2008, O'Connor et al., 1986, Jacobson et al., 2002, Gilchrist et al., 1996, Spears et al., 2010, Forrest et al., 1991, Alvik et al., 2006a). Resumption after pregnancy can affect women's health and future pregnancies. If women with unwanted pregnancies cease or reduce at lower rates than other women, they may be at higher risk of adverse consequences if they continue drinking at higher levels.

This study uses baseline data collected as part of the U.S. Turnaway Study, a study of women seeking pregnancy terminations, most of whom received the termination and some of whom were denied the termination and then continued the pregnancies. The Turnaway Study is a prospective, longitudinal study that examines the effects on women's mental and physical health and socioeconomic status of receiving a pregnancy termination compared to being denied the termination and continuing the pregnancy. The analyses in this paper use data collected at the baseline interview and seek to describe alcohol cessation and reduction from before pregnancy recognition to during pregnancy among the study sample, all of whom had unwanted pregnancies, and compare the proportion reporting cessation and reduction to other samples of pregnant women. The analyses also assess whether still being pregnant at baseline as well as pre-pregnancy alcohol use patterns are associated with cessation and reduction. In addition, the study seeks to identify factors associated with more severe alcohol use during pregnancy among this sample of women with unwanted pregnancies.

Methods

Data source

This secondary data analysis study analyzes data from baseline interviews from the Turnaway Study. The Turnaway Study has been approved by the University of California, San Francisco Committee for Human Research.

Study details have been published previously (Dobkin et al., 2014, Rocca et al., 2013). Briefly, women seeking pregnancy termination services at 30 facilities across the U.S. between January 2008 and December 2010 were recruited for participation. Women were eligible for study participation if they were pregnant, spoke English or Spanish, were 15 years or older and did not have a known fetal anomaly or demise. They also had to present for care within the gestational age range of one of the three study groups used for the main Turnaway Study analyses. These groups included women who presented for care 1) within two weeks under a facility's gestational age limit for providing termination care and received terminations (Near Limit Termination Group); 2) within three weeks over the limit and were denied care (Turnaways), and 3) under the limit and in their first trimester (First Trimester Termination Group). The First Trimester Group was included in the main study because they represent the more typical experience of pregnancy termination in the U.S., where 90% of terminations are performed in the first trimester (Pazol et al., 2012); only 22% of women in the Near Limit Group received their termination in the first trimester. Of eligible participants approached, 37.5% (n=1,132) consented to participate. Of those who consented, 85% (n=956) completed the baseline interview, which took place by telephone about a week after the woman sought the termination. The sample of those who completed the first

interview includes 452 Near Limit Termination Group, 231 Turnaways, and 273 First Trimester Termination Group. The current paper combines the three groups for analysis.

Measures

Alcohol use was assessed with seven questions, all pertaining to the past month. Women were asked whether they consumed any alcohol, whether they consumed 6 or more drinks on a single occasion (any binge drinking), frequency of consuming 6 or more drinks (binge frequency), and two alcohol-related problems or symptoms: - eyeopener and blackout - and frequency of eyeopeners and blackouts. The dichotomous eyeopener question asked, "...did you ever have a drink first thing in the morning to steady your nerves or get rid of a hangover?" The dichotomous blackout question asked, "...were you ever unable to remember what happened the night before because you had been drinking?" At baseline, women were asked about drinking during the past month as well as during the month before pregnancy-recognition. The month before pregnancy recognition was described in the question as "in the month before you found out you were pregnant." Four dichotomous variables for each timepoint (*any alcohol use*, *any binge drinking*, *any blackout*, and *any eyeopener*) and three frequency variables (*binge frequency*, *blackout frequency*, and *eye-opener frequency*) were created. *Alcohol use severity* is a latent variable based on four of the alcohol use measures (any alcohol use, binge frequency, eyeopener frequency, and blackout frequency).

We also created two dichotomous variables – *Quit* and *Reduced* – to examine change in alcohol use from before pregnancy recognition to baseline. Both *Quit* and *Reduced* exclude from the denominator women who did not report alcohol use before pregnancy recognition. *Quitters* are participants who reported any alcohol consumption before pregnancy recognition and who reported no alcohol consumption one week after termination, whereas those who reported alcohol use at both time points are considered to have not quit. *Reduced* is a dichotomous variable. Reducers are participants who reported any binge drinking, any blackouts, or any eyeopeners before pregnancy recognition and reported any drinking (but not binge, blackout, or eyeopeners) at baseline **and** participants who reported a lower frequency of binge drinking, blackouts, or eyeopeners at baseline than before pregnancy recognition. Non-reducers are women who maintained or increased their level or frequency of binge drinking, eyeopeners, or blackouts between before pregnancy recognition and baseline, women who reported any alcohol use - but not binge, blackout, or eyeopener – before pregnancy recognition and reported any alcohol use with or without binge, blackout, or eyeopener at baseline, and women who quit.

Independent variables

Demographic characteristics include: *age* (categorized as 15-19, 20-24, 25-34, and 35-46), *race/ethnicity* (White, Black, Hispanic/Latina, Other), *poverty* [household income <100% Federal Poverty Level (FPL), 100% - <200% FPL, >=200% FPL, and FPL missing], *education* (less than high school, high school graduate, some college, college graduate), *marital status* (married, cohabiting, single, divorced/widowed), and *employed* (no, yes). Reproductive health characteristics include: *pregnant* (by the baseline interview, 49 Turnaways had received a pregnancy termination at another facility subsequent to being

turned away; the remaining 182 Turnaways are considered still pregnant at baseline.), *parity* (nulliparous, parity=1, parity=2), *birth within previous year* (no, yes), *after first trimester* (no, yes), and *pregnancy intentions* (continuous, scale 1-12, with <3 indicating unplanned pregnancies, measured with the London Measure of Unplanned Pregnancy, a validated measure of pregnancy intentions (Barrett et al., 2004)). Substance use includes: current *tobacco use* (no, yes, referring to the 30 days before baseline) and pre-pregnancy recognition *drug use* (no drugs, marijuana only, one or more drugs other than marijuana - i.e. methamphetamine, cocaine, heroin, prescription drug misuse – with or without marijuana, referring to the 30 days before pregnancy recognition). Current drug use data were also collected. Violence includes: *childhood neglect* (no, yes), *childhood physical abuse* (no, yes), *childhood sexual abuse* (no, yes), *past year physical violence* (no, yes), *past year psychological violence* (no, yes).

Analysis

To compare proportions of women having quit or reduced to other samples, confidence intervals were used. Assessment of whether still being pregnant at baseline and whether binge drinking, blacking out, or having an eyeopener vs. non-binge, non-blackout, non-eyeopener drinking before pregnancy recognition were associated with having quit or reduced was conducted with mixed effects logistic regression, to account for clustering of participants by recruitment facility. These models included demographic characteristics (age, race, employment, poverty, marital status, education) and trimester of termination-seeking. These analyses were conducted in Stata 13.0. To identify factors associated with more severe drinking at baseline, we then created a latent alcohol use severity measure using Structural Equation Modeling (SEM). Modification indices were used to refine the model and RMSEA and CFI were used to decide upon the final latent *alcohol severity* variable. The alcohol use severity variable with four observed variables was a better fit for the data than the alcohol use severity variable with all seven observed variables. The observed variables that were not retained were the dichotomous variables of those that also had frequency data (i.e., any binge drinking, any eyeopener, any blackout). Finally, SEM models to assess which risk factors predicted *alcohol use severity* at baseline were estimated. First, bivariate estimates were examined and then a multivariate model was estimated. All SEMs account for clustering of participants by site. SEM analyses were conducted in MPlus 7.11.

Results

Sample description

The sample was racially and ethnically diverse, with more than half below 200% FPL, and about three-fourths (74%) between 20 and 34 years old [See Table 1]. A little more than half were employed; 20% were still in high school or had not completed high school, while almost 50% had completed schooling beyond high school. More than 60% had had a previous live birth, with 11% having given birth in the previous year, and 19% still pregnant at the baseline interview. More than half (59%) were after their first trimester of pregnancy at recruitment, and participants reported low pregnancy intentions (mean=2.73, with scores under 3 indicating unplanned pregnancies). A little more than one-fourth reported a history of depression or anxiety, while almost two out of five (38%) reported current smoking and

about 15% reported drug use the month before pregnancy recognition. Violence was also common, with about 15% reporting each of four types of violence – childhood physical abuse, childhood sexual abuse, physical violence, and psychological violence – with closer to 10% reporting childhood neglect.

Alcohol use changes from before pregnancy recognition to during pregnancy

More than half (56%) reported any alcohol use during the month before pregnancy recognition, with almost one fourth (23%) reporting binge alcohol use, 5% reporting blackouts, and 1% reporting having had an eyeopener. Among the total sample, 35% (95% CI: 31%, 39%) of those drinking before pregnancy recognition had quit and 20% had reduced one week after termination seeking [See Table 2]. Fewer women having first trimester than later termination had quit 21% (95% CI: 16%, 26%) versus 37% (95% CI: 30%, 44%), with no difference in the proportion reducing 19% (95% CI: 14%, 24%) versus 24% (95% CI: 18%, 30%). Among those denied terminations and still pregnant, 71% (95% CI: 60%, 80%) had quit and 14% (95% CI: 7%, 23%) had reduced. In a multivariate model, among all participants reporting any alcohol use before pregnancy recognition, still being pregnant was associated with higher odds of having quit or reduced alcohol use (OR = 3.98, 95% CI: 2.04, 7.74) by one week after termination seeking. In the total sample, of women reporting binge drinking, blacking out, or having an eye opener before pregnancy recognition, 25% had quit and 46% had reduced alcohol use by one week after termination seeking. In a multivariate model, among all participants reporting any use before pregnancy recognition, odds of having quit were lower (OR = 0.35, 95% CI: 0.22, 0.55) among women reporting binge drinking, blacking out, or having an eyeopener vs. non-binge, non-blackout, non-eyeopener drinking before pregnancy recognition.

Latent alcohol use severity variable

Model fit statistics and standardized estimates [in Table 3] indicate that the latent alcohol severity variable is a reasonable fit for the data, with a RMSEA of 0.0 and a CFI of 1.0. The latent alcohol use severity variable before pregnancy recognition also was a good fit for the data, with a RMSEA of 0.0 and CFI of 1.0. There were no statistically significant differences in alcohol severity before pregnancy recognition (and thus before termination seeking) between those who were still pregnant at baseline and those who had received the termination and were no longer pregnant ($p = .113$).

Predictors of alcohol use severity one week after termination seeking

Table 4 presents results from bivariate and multivariate analyses. In bivariate analyses, younger age, being Black, Hispanic, or Other compared to White race/ethnicity, having had one or more previous live births, being after the first trimester, still pregnant, and using marijuana or other drugs were associated with lower alcohol use severity at baseline. Being above 100% FPL, having education beyond high school, being employed, being divorced/separated versus single, having a history of depression or anxiety, currently using tobacco, and experiencing childhood sexual abuse as well as past year physical or psychological violence were associated with higher alcohol use severity at baseline. Past year birth, pregnancy intentions, childhood neglect, and childhood physical abuse were not associated with alcohol use severity at baseline.

In the multivariate model, younger age, having had one or more previous live births, being after the first trimester, still pregnant and using marijuana or other drugs were still associated with lower alcohol use severity at baseline; having completed college, tobacco use, and recent physical violence were still associated with higher severity at baseline. Childhood physical abuse was associated with lower severity (but had not been associated in bivariate analyses). Race, poverty, employment, marital status, depression or anxiety history, childhood sexual abuse, and past year psychological violence were no longer associated. Past year birth, pregnancy intentions, and childhood neglect still were not associated with alcohol use severity. The model fit statistics suggest that this model is a good fit for the data, with an RMSEA of 0.0 and a CFI of 1.0.

Exploratory analyses of substitution

Because the finding of a negative association between drug use and alcohol severity was unexpected, we conducted additional post-hoc analyses to examine whether it was possible that women were substituting alcohol for drugs. First, we estimated an additional multivariate model with baseline drug use variables instead of drug use before pregnancy recognition. There was no substantive change in the findings. Second, we examined the 143 participants who reported using drugs before pregnancy recognition. Twenty-seven percent ($n = 39$) of those who reported using drugs before pregnancy recognition reported using only alcohol or only drugs at baseline. More were using only alcohol (64% of the 39) than only drugs (36% of the 39), with 8% (of the 39) reporting alcohol use at baseline when they had not reported alcohol use before pregnancy recognition.

Discussion

To our knowledge, this study represents one of the first efforts to examine alcohol consumption before pregnancy recognition and during pregnancy among women with unwanted pregnancies. We found that the proportion drinking any alcohol is similar to women of childbearing age and the proportions reporting a blackout or eyeopener are similar to women overall (SAMHSA, 2011, 2012a, Graham et al., 2011). The proportion binge drinking is likely higher than that of women of childbearing age in the U.S., which recent Behavioral Risk Factor Surveillance System estimates using a four or more threshold have placed at 15% and the National Survey on Drug Use and Health (NSDUH) using a five or more threshold have placed at 25% (SAMHSA, 2011, 2012a). While the 23% reporting binge drinking in our sample is close to the NSDUH estimate, the proportion of binge drinking in our sample may be an underestimate, as our binge drinking measure was six or more drinks instead of five or more or four or more, the more conventional binge drinking cutoffs (Centers for Disease Control and Prevention, 2009, NIAAA, 2004, Wechsler et al., 1995). This higher level of binge drinking among this sample seeking pregnancy terminations may reflect previous findings of higher levels of drinking before pregnancy recognition among women with unintended pregnancies (Tough et al., 2006, Strandberg-Larsen et al., 2008). It may also partly explain why previous research has found that women terminating pregnancies have higher levels of alcohol use subsequent to the termination than women who either had not become pregnant or had carried a pregnancy to term (Steinberg and Finer, 2011, Major et al., 2009, Olsson et al., 2014).

It is also important to note that the proportion of women still pregnant at baseline who had ceased alcohol use was well within the range (50% - 87%) reported in other studies of women in the U.S. (Harrison and Sidebottom, 2009, Ockene et al., 2002, Massey et al., 2011, Chasnoff et al., 2005, Terplan et al., 2013). The proportion of women who had terminations who reported quitting was lower than other samples of pregnant women in the U.S. It is possible, however, that women who had terminations may have resumed drinking after the termination (but before the baseline interview). It is also possible that women who had more difficulty ceasing or reducing or who did not try to cease or reduce their alcohol consumption were more determined to obtain a termination and thus arrived at facilities earlier in their pregnancies, as (heavier) alcohol use is a reason that some women decide to terminate pregnancies (Roberts et al., 2012).

The finding that pregnant women with unwanted pregnancies have similar cessation/reduction patterns to other pregnant women is consistent with previous literature that, for the most part, has not found associations between pregnancy intentions and alcohol cessation/reduction (Chambers et al., 2005, Kost et al., 1998, Johnson et al., 1987, Hellerstedt et al., 1998, Strandberg-Larsen et al., 2008, Ethen et al., 2009, Tough et al., 2006, Terplan et al., 2013). The finding that pregnant women with unwanted pregnancies have similar cessation/reduction patterns to other pregnant women is also supported by our finding of no association between pregnancy intentions and alcohol severity at baseline. Together, these findings suggest that women with unintended pregnancies may have higher levels of risky drinking before pregnancy/before pregnancy recognition, but once they discover their pregnancies, they do not appear to behave differently from other pregnant women. It is important to recognize, though, that official recommendations about alcohol use during pregnancy in the U.S. advise complete abstinence from alcohol (O'Leary et al., 2007) and do not address the value of reducing alcohol intake at later points in pregnancy. These may not be the most appropriate messages for a population of women who find themselves carrying an unwanted pregnancy to term after having consumed alcohol or for the larger group of women who have already consumed alcohol when they discover their pregnancies. Research is needed to inform the development of messages about alcohol use for these populations of women. In particular, this research might seek to develop messages about what women can do now about their alcohol use and information that accurately characterizes risks associated with having consumed alcohol earlier in pregnancy.

Our findings from bivariate analyses identified demographic subgroups who have higher alcohol severity one week after termination seeking – non-adolescents, nulliparous women, White women, women of higher socioeconomic status, and divorced/separated women. While only non-adolescence, nulliparity, and college completion were still associated with alcohol severity in the multivariate model, all of the groups identified in bivariate analyses may be groups to focus on when identifying subgroups of women who might benefit from alcohol-related interventions. We also identified past and current experiences and behaviors that may influence alcohol severity and thus may be important to focus on in interventions to reduce alcohol severity among women with unwanted pregnancies. In particular, we found that having had a previous live birth was associated with lower alcohol severity; this could indicate that women with a previous live birth have maintained some pregnancy and parenting-related reductions in alcohol use from previous pregnancies (Forrest et al., 1991,

Alvik et al., 2006a) or that they learned in previous pregnancies that they were not supposed to drink and thus were more likely than nulliparous women to cease/reduce alcohol use upon discovering pregnancy. We also found in multivariate analyses that women with a history of childhood physical abuse had lower alcohol severity, although we did not find statistically significant associations between childhood neglect or childhood sexual abuse and alcohol severity. The direction of the finding for physical abuse differs from what we would have expected if women were drinking more heavily to cope with childhood abuse. It is possible that a history of physical abuse is particularly salient to some pregnant women; such women may be determined not to repeat the cycle of physical violence with their own children and thus may limit any behaviors (such as heavy alcohol use) that they might perceive as increasing risks of becoming violent. We also found that women with recent physical violence had higher alcohol severity. It is possible that women were drinking to cope with experiencing the violence. On the other hand, it is also possible that drinking in more severe patterns puts women at higher risk for recent physical violence. Regardless of the direction of causality between recent physical violence and alcohol severity, this finding suggests that any psychological consequences of experiencing violence may need to be addressed as part of an alcohol intervention for this population.

Importantly, we also found that tobacco use was positively associated with alcohol use severity, suggesting that interventions to address one of these substances should also address the other. Surprisingly, we found that both marijuana and other drug use before pregnancy recognition were negatively associated with alcohol severity at baseline; one possibility is that women substitute one for the other. This is consistent with research that has found that the prevalence of alcohol use was higher among women who reduced methamphetamine use over the course of pregnancy than among women who did not reduce methamphetamine use (Della Grotta et al., 2010). There is some suggestion that this is occurring in our sample, as more than one fourth of those reporting drug use before pregnancy recognition were using either only alcohol or only drugs one week after termination seeking, with somewhat more using only alcohol. It is also possible that the population of women drinking in more severe patterns is distinct from the population of women using drugs. More research should examine whether pregnant women substitute one substance for another. If so, studies should explore how women understand risks of these different substances during pregnancy and possibly develop messages that accurately reflect risk associated with different substances so that women can make informed decisions if they feel capable of ceasing use of only one substance at a time. Finally, while depression and anxiety history was associated with alcohol severity in bivariate analyses, it was not associated in the multivariate model. This is a similar finding to some previous research (Fortner et al., 2011, Beijers et al., 2014), but inconsistent with other literature (Massey et al., 2011, Leis et al., 2012, Strine et al., 2008).

Limitations

Findings from this study should be interpreted in light of some limitations. First, the participation rate of 37.5% is lower than would be expected in a one-time anonymous survey, and is likely a consequence of the study request for contact information and repeated interviews over five years. However, as only 3% of potential participants declined participation after going through the informed consent process and learning that surveys

would include questions about substance use (Dobkin et al., 2014), it is unlikely that non-participation was related to our outcome. Second, it is worth noting that our alcohol use severity measure is unconventional. However, it allows us to use much more of the available observed alcohol measures in the Turnaway Study dataset than would be possible if we restricted our analyses to the individual dichotomous outcomes. The fit statistics suggest that the latent variable is a good fit to the data. In addition, the demographic predictors of higher severity drinking during pregnancy (i.e. older than teen and college education) are consistent with those found in other samples of pregnant women (2012a). In addition, the binge drinking threshold in the dataset was six or more drinks rather than the more conventional five or more or four or more (NIAAA, 2004, Wechsler et al., 1995) and thus may underestimate binge drinking. Also, the alcohol and drug variables are self-reported, and thus may underestimate actual levels of use among this population. If drug use during pregnancy is more stigmatized than alcohol use during pregnancy and thus more under-reported, this would be another plausible explanation for the findings that we have interpreted as evidence of substitution.

Strengths

This study also has strengths. To our knowledge, this is one of the first studies to examine alcohol use among women with unwanted pregnancies, and especially examine alcohol use among women carrying unwanted pregnancies to term. Given that the population of women with unwanted pregnancies who are unable to terminate their pregnancies is expected to grow due to the increase in state-level regulation of pregnancy termination services in the U.S., understanding more about alcohol consumption among this population is important.

Conclusions

Women with unwanted pregnancies appear to have relatively high levels of risky drinking before pregnancy recognition. However, once they discover their pregnancies, they do not appear to behave differently from other pregnant women. More research is needed to develop interventions that take the unique experiences and needs of women in this population into account. In addition, there is some suggestion that women may be substituting alcohol for drugs during pregnancy; more research is needed to examine whether such substitution is occurring in this and other populations, and, if so, to develop interventions and messages to address this issue. Interventions focusing on alcohol use severity for women with unwanted pregnancies may need to also focus on tobacco.

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Table 1

Sample description (n=956)

	% (or mean)
<i>Age</i>	
15 – 19 years	18
20 -24 years	36
25 – 34 years	38
35 – 46 years	8
<i>Race/ethnicity</i>	
White	37
Black	29
Hispanic/Latina	21
Other race/ethnicity	13
<i>Poverty status</i>	
<100% FPL	34
100% - <200% FPL	22
>200% FPL	13
FPL Missing	32
<i>Education</i>	
Less than high school	20
High school	33
Some college	39
College	8
<i>Marital status</i>	
Married	9
Cohabiting	18
Single	62
Divorced/separated	11
<i>Employed</i>	53
<i>Pregnant</i>	19
<i>Parity</i>	
Nulliparous	38
Parity = 1	29
Parity=2	34
<i>Birth within previous year</i>	11
<i>After first trimester</i>	59
<i>Pregnancy intentions (mean)⁺</i>	2.73 (mean)
<i>Depression or anxiety history</i>	27
Substance use	
<i>Tobacco</i>	38
<i>Drugs before preg recognition</i>	
No drugs	85

	% (or mean)
Marijuana only	11
Other drugs	4
<i>Alcohol before preg recognition</i>	
Any alcohol	56%
Binge alcohol	23%
Any blackout	5%
Any eyeopener	1%
Violence	
<i>Childhood Neglect (n=944)</i>	8
<i>Childhood physical abuse (n=946)</i>	13
<i>Childhood sexual abuse (n=943)</i>	15
<i>Past year physical violence (n=953)</i>	18
<i>Past year psychological violence (n=956)</i>	13

⁺ pregnancy intentions were measured on a 0 – 12 point scale, with 0 as less intended and 12 as more intended

Table 2

Changes in alcohol consumption from before pregnancy recognition to during pregnancy

	n	Quit %, (95% CI)	Reduced % (95% CI)
<i>By level of alcohol use before pregnancy recognition</i>			
Any alcohol	534	35% (31%, 39%)	20% (17%, 23%)
Any binge, any blackout, or any eyeopener	229	25% ^a (19%, 31%)	46% (40%, 53%)
<i>By termination characteristics, among participants reporting any alcohol before pregnancy recognition^b</i>			
Had a first trimester termination	251	21% (16%, 26%)	19% (14%, 24%)
Had a termination after the first trimester	197	37% (30%, 44%)	24% (18%, 30%)
Denied termination and still pregnant at baseline	86	71% ^c (60%, 80%)	14% (7%, 23%)

^aOf those reporting any drinking before pregnancy recognition, odds of having quit were lower (OR=0.35, 95% CI: 0.22, 0.55) among women reporting any binge, any blackout, or any eyeopener versus non-binge, non-blackout, non-eyeopener drinking before pregnancy recognition, adjusting for age, race, employment, poverty, marital status, trimester of termination seeking, education, and pregnant.

^bfewer women having a termination after the first trimester versus having a termination in the first trimester consumed alcohol before pregnancy recognition

^cOdds of having quit or reduced were higher (OR=3.98, 95% CI: 2.04, 7.74) among women still pregnant versus not still pregnant at baseline, adjusting for age, race, employment, poverty, marital status, trimester of termination seeking, and education.

Table 3

Alcohol use severity measure (Standardized)

Variable	Estimate	p value
Any alcohol use	1.159	<.001
Binge frequency	.647	<.001
Blackout frequency	.356	<.001
Eye-opener frequency	.232	<.001

Model fit statistics:

Chi-square test of model fit: .22, RMSEA: .0, CFI:1.0, TLI: 1.01

Table 4

Predictors of alcohol use severity

Variable	Bivariate analyses (unadjusted)		Final model (n=937)	
	Estimate	p value	Estimate	p value
<i>Age</i>				
15 – 19 years	-.576	<.001	-.367	.007
20 -24 years	ref		ref	
25 – 34 years	.161	.037	.138	.358
35 – 46 years	-.170	.435	-.107	.693
<i>Race/ethnicity</i>				
White	ref		ref	
Black	-.657	<.001	-.238	.329
Hispanic/Latina	-.489	<.001	-.192	.287
Other race/ethnicity	-.565	<.001	-.320	.052
<i>Poverty status</i>				
<100% FPL	ref		ref	
100% - <200% FPL	.200	.026	.087	.544
>200% FPL	.394	.005	.111	.339
FPL Missing	-.198	.024	-.032	.744
<i>Education</i>				
Less than high school	-.128	.215	-.017	.899
High school	ref		ref	
Some college	.262	.001	.151	.115
College	.593	<.001	.375	.020
<i>Marital status</i>				
Married	.116	.412	-.080	.586
Cohabiting	.189	.052	-.003	.979
Single	ref		ref	
Divorced/separated	.312	<.001	.051	.685
<i>Employed</i>	.259	.001	.094	.395
<i>Pregnant</i>	-.860	<.001	-.678	<.001
<i>Parity</i>				
Nulliparous			ref	
Parity = 1	-.248	.007	-.332	.009
Parity=2	-.180	.038	-.359	.002
<i>Birth within previous year</i>	-.069	.611	.134	.428
<i>After first trimester</i>	-.598	<.001	-.360	<.001
<i>Pregnancy intentions</i>	.016	.327	-.018	.286
<i>Depression or anxiety history</i>	.510	<.001	.207	.103
Substance use				
<i>Tobacco</i>	.597	<.001	.406	<.001
<i>Drugs</i>				

Variable	Bivariate analyses (unadjusted)		Final model (n=937)	
	Estimate	p value	Estimate	p value
No drugs	ref		ref	
Marijuana only	-.964	<.001	-.486	<.001
Other drugs	-.984	<.001	-.632	.002
Violence				
<i>Childhood Neglect</i>	.012	.931	-.116	.586
<i>Childhood physical abuse</i>	.085	.425	-.308	.037
<i>Childhood sexual abuse</i>	.308	<.001	.144	.228
<i>Past year physical violence</i>	.394	.001	.322	.003
<i>Past year psychological violence</i>	.363	.005	.055	.804

Model fit statistics for multivariate model:

Chi-square test of model fit: 73.30, RMSEA: .0, CFI:1.0, TLI: 1.33