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Alcohol Use Patterns Among Postpartum Women

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Abstract

While much attention has been paid to women's drinking during pregnancy, few studies address a woman's drinking once she has given birth, which presents potential dangers to herself and her child. This time of transition can be extremely stressful, potentially leading to problem drinking. On the other hand, this new role and change in lifestyle may be protective against alcohol use and abuse. We used the California Women's Health Survey (CWHs), a randomized sample of adult women in California, to compare new mothers' drinking behaviors to other women. In order to obtain a large enough sample to observe trends in subpopulations, we combined CWHs data from years 1997–2008 ($n = 28,537$ women aged 18–48). We used logistic regression to determine the individual-level characteristics that best predicted the outcomes postpartum and to compare new mothers (those with a child in the household <1 year and pregnant in the last 5 years) to other women for any alcohol use, heavy episodic drinking and number of days of alcohol use. New mothers were significantly less likely to engage in all behavior outcomes after adjustment for race/ethnicity, income, employment, education, age, and marital status, though new mothers who are not married and those in higher income brackets were identified as groups at higher risk of drinking. Although new motherhood could prove to be a risk factor for some women, we found that being a new mother is protective against all measures of drinking.

Keywords

Alcohol use; Postpartum; Mothers

Introduction

Research about maternal alcohol consumption has focused primarily on pregnant women, while much less emphasis and research has concentrated on the period postpartum. Alcohol use at this juncture could present significant problems for both mother and infant during this period of vulnerability [1–3]. The postpartum period is unique because of its potential for either increasing the risk of alcohol use due to heightened stress and isolation, or protecting against alcohol use because of changing social norms and increased responsibility.

Motherhood represents a significant, and often stressful, change in a woman's life, with increased responsibilities and expectations, as well as changes in women's relationships with their friends, family and partner [4–7]. The first year of a child's life is especially stressful for the mother, because of the infant's vulnerability, the added responsibilities of caring for the infant, and the adjustment to life changes. The link between stress and excessive alcohol use, though complicated, has been well established [8, 9].

On the other hand, this new role and change in lifestyle may be protective against alcohol use and abuse. Social conventions and expectations around drinking and motherhood may discourage alcohol use [10]. Further, there is evidence of women maturing out of drinking behaviors once they enter into traditional adult roles such as marriage and parenthood, perhaps due to social expectations and/or additional responsibilities that make heavy drinking difficult. Some research has indicated that women occupying multiple social roles (mother, wife, worker) are less likely to engage in alcohol use [11, 12]. A recent study based on 10-year longitudinal data among more than 500 disadvantaged women shows that motherhood is protective against alcohol use for both teen and adult mothers [13].

The majority of the literature on postpartum alcohol use emphasizes the increase in women's drinking postpartum compared to during pregnancy [14–16]. However, in studies that also include a comparison group of women who are not pregnant and not new mothers (women who are not considered in the postpartum period), there is evidence that the rates of drinking postpartum do not reach the level of alcohol use generally seen for women before becoming pregnant. A few studies have looked at the prevalence of postpartum drinking among adult mothers in the United States. Reports of any alcohol use varied between 49% [14] and 52% [17] depending on the number of months postpartum, with drinking levels increasing up to 12–14 months [17]. Binge drinking likewise increased by months postpartum to 17.6% just over a year after birth [17].

The increase in drinking between pregnant women and women postpartum is notable. A report based on the National Survey on Drug Use and Health (NSDUH) cross-sectional survey data found that from third trimester of pregnancy to the first 3 months postpartum, women with any reported alcohol use in the past month went from 6.2 to 31.9% and by 11 months postpartum 52% were drinking. Another analysis of the NSDUH survey data from 2002–2006, consisting of a sample of a nationally representative sample of 94,483 women, found that white women were heavier drinkers compared with other racial or ethnic groups [16]. This group, however, showed a reduction of use for pregnancy and the postpartum period across the board. Hispanic and African American parents also showed a reduction of alcohol use.

Heavy drinking among women postpartum is of significant public health concern because maternal alcohol abuse has been linked to poorer family functioning, lower quality of parental intellectual stimulation, increased punitive action toward children, and increased likelihood of being reported for child abuse or neglect [1–3]. For breastfeeding mothers there is also a risk of passing alcohol to the child through breast milk [18].

Among the studies conducted in the United States with adult mothers, drinking measures mainly capture any alcohol use and heavy drinking, though a few have used measures of moderate drinking. Additionally, most of the studies do not examine associations amongst specific race, income, marital status and education sub-samples of the population. In order to more thoroughly examine trends in a range of drinking behaviors amongst specific subgroups, we used the California Women's Health Survey (CWHs) to study new mothers' drinking behaviors by age, race, income, marital status and education. We examined associations of heavy drinking, occasional drinking, and any drinking at all. We focus on the first year of motherhood, which is the year of greatest transition and change, which may be associated with changing drinking patterns.

Methods

Data Source and Population

The data used in this analysis were drawn from the California Women's Health Survey (CWHs), an ongoing telephone survey conducted monthly with a randomized sample of adult women living in California in households with telephones [19]. Where possible, questions in the interview were selected from previous national or statewide surveys to improve comparability [20]. All women over the age of 18 in a household are eligible for participation. If more than one person is eligible, one member of the household is selected at random, at which point no other member can be used as a respondent. The average response rate from 1997 to 2008 was 75%. In order to obtain a large enough sample size to be able to observe trends in subpopulations, we combined data from 1997 through 2008. We found no temporal trends in the outcomes we examined so felt confident in combining these years. The cumulative sample size for 1997–2008 was 53,212 women. Ratio-adjusted post-stratification weights were calculated to correct the age and race/ethnic distribution of the sample so that it matches the demographics of the California population.

Because this analysis examines the effects of recent motherhood on drinking behaviors, we limited the sample to women aged 18–48 ($n = 30,645$). Forty-eight was the age of the oldest new mother, as we defined that category in our sample, so we limited our comparison group to that same age range. For all included variables “don't know” or “refused” were categorized as missing. We excluded women who were missing any drinking outcome variables ($n = 2,075$) and/or were missing race, marital status or education ($n = 33$). This left us with a final sample size of 28,537. Of these women, 3,448 were classified as new mothers.

Data Variables

“New Mothers” were defined as women who resided in a household in which the youngest child was aged one (children under age one were coded as one in this dataset), and the subject had been pregnant in the last 5 years. It was not possible with this survey to determine the exact relationship of the child to the respondent, so this combination of variables narrowed it down as much as possible to women who were pregnant/gave birth and still live with a child 1 year or younger. By relying on these variables, we realize that we are potentially excluding adoptive mothers. However, because we were interested in the

transition to motherhood, it was important to study the primary female caretaker of the infant, not another female member of the household. Using this measure of pregnancy in the last 5 years was the closest proxy for identifying the relationship between the female household member and the infant, without a more concrete way to distinguish between adoptive mothers and other adult females in the household. We defined “Other Women” as anyone who did not have a child in the household aged one and/or who had not been pregnant in the past 5 years, regardless of the presence of other children under age 18. Since we were interested in the transition to motherhood, we thought the change in drinking patterns might be stronger for first time mothers. When we compared an adjusted model of first time new mothers to the final model including new mothers with other children as well there was almost no change in the results (data not shown). For this reason, we chose not to separate out first time mothers in our analysis.

We employed four drinking variables to measure drinking behaviors. All variables were dichotomized in order to facilitate comparison across measures. The first alcohol measure indicates if the respondent has had any alcohol in the past 30 days (yes/no) (Any Alcohol). From the question “How many days did you use alcohol in the past 30 days,” we created a second binary variable of drinking frequency, measuring whether participants drank more than 4 days in the past 30 days (Drink Frequently). More than 4 days in the past 30 days approximates more than 1 day a week. The third drinking measure is whether the respondent had more than four or five drinks on one or more occasions in the past month (yes/no) (Ever Binge Drink). This measure was intended to capture heavy episodic drinking. The survey changed its question from four to five drinks in 2007, so we combined the responses to include either 4 or 5 drinks. Finally, we created a fourth binary alcohol variable to capture those women who had engaged in heavy episodic drinking more than once in the past 30 days (Binge 2+ Times). Fifty-one percent of women who drank 4/5 drinks on a given day only reported this on 1 day a month, so we wanted to examine the small number of women who engaged in heavy episodic drinking more frequently.

Other individual-level characteristics included respondents' race/ethnicity, age, education, income and marital status. Race/ethnicity was broken into non-Hispanic white, non-Hispanic black, Hispanic, and other. Age was broken into five categories (18–24 years, 25–29, 30–34, 35–40 and 41–48). Education was grouped into four categories: less than 9th grade or some high school; high school graduates or GED recipients; some college, some technical school or technical school graduates; and college graduates or post-grads. Income was grouped into households earning less than \$10,000, 10,000–19,999, 20,000–34,999, 35,000–49,999, 50,000–75,000, over 75,000 and missing (including refused or don't know). We included a missing category for income since a large portion of the respondents were missing this information (4.9% for the sample overall and 5.4% for new mothers), and we did not want to reduce our sample size to such an extent. We grouped marital status into four categories: married; divorced, separated, widowed; never married; and unmarried couples.

Data Analysis

All analyses were performed using Stata version 11.0. Survey weights were used to adjust for differences between the sample and the demographics of the state of California. We first

conducted descriptive analyses to characterize the sample and explore the prevalence of alcohol use among new mothers and other women. Women who were new mothers were compared to other women on all variables and outcomes. We then performed logistic regression on the data to determine the characteristics that were associated with drinking outcomes postpartum. We chose our variables based on established associations with alcohol use in the literature. We first ran unadjusted models (data not shown), and then adjusted for all included variables. Throughout the analysis, results at the $P < 0.05$ level were considered significant.

In order to test for any interactions related to our outcomes, we first tested for any significant interactions between our four outcome variables and the other individual-level covariates at the $P < 0.20$ level in models with only one interaction term in them. We then ran models with all interaction terms that met the above criteria and retained any interaction terms that had at least one significant value at the $P < 0.10$ level in these models. All four interaction models included at least one interaction that met the above criteria.

Results

The 3,450 new mothers in our sample were disproportionately young, Hispanic, in lower income brackets, less educated and married or in an unmarried couple relationship (Table 1). They were also less likely to be employed full time and more likely to classify their employment status as homemaker. They were less likely to have had any alcohol in the past 30 days (36.7%) than other women (52.5%) and to drink frequently (8.4% vs. 17.1%). They were also less likely to ever binge drink (5.6% vs. 11.7%) and binge 2+ times (2.9% vs. 5.8%). New mothers were also less likely to report being a smoker (9.2% vs. 16.1%).

Overall in adjusted logistic regression models examining drinking behaviors, new mothers were significantly less likely to engage in all drinking outcomes (Tables 2, 3). Compared to Whites, Blacks, Hispanics, and others were all significantly less likely to engage in all drinking outcomes. Married women were less likely than others to drink (on all measures). Any alcohol and drink frequently increased with income, education and smoking status. Women who are homemakers, or out of work/retired/unable to work were significantly less likely to drink at all, to drink frequently, and to ever binge drink than those employed full time. Those who are self-employed were more likely to drink frequently and to binge drink than those employed full time (Table 2).

In the model including interactions between any alcohol and (1) race/ethnicity and (2) education we found that the difference between new mothers and other women was greater amongst Hispanic women than White women (Table 2). Those new mothers who work part time were more likely to report any alcohol than other women who work part time compared to those employed full time.

Also, there was a negative interaction between any alcohol use and having more than a high school education. There was a positive interaction between any alcohol and smoking. The model with drinking frequently showed positive interactions with most higher income cohorts compared to those earning less than \$10,000 per year.

In the logistic regression models examining binge drinking behaviors, women who were never married were the most likely to ever binge drink and to binge drink 2+ times (Table 3). Women who earned between \$50,000 and 75,000 and over \$75,000 per year were significantly more likely to ever binge drink, compared to women who earn less than \$10,000. Those earning over \$75,000 were significantly more likely to binge drink 2+ times. Older women were increasingly less likely to ever binge drink and binge drink 2+ times than younger women. Also, women who smoke had more than three times greater odds of ever binge drinking and more than four times greater odds of binge drinking 2+ times than those who did not smoke.

We found negative interactions between binge drinking 2+ times and ever binge drinking for married woman compared to those who were divorced/separated/widowed, never married, or were in an unmarried couple (Table 3). There was a positive interaction between binge drinking 2+ times and employment status for new mothers who were self employed and out of work/retired/unable to work versus those working full time.

Discussion

In this cross-sectional analysis assessing drinking behaviors among new mothers, we found motherhood to be protective against drinking behaviors, even after controlling for race/ethnicity, income, education, age, and marital status. This was true for all drinking outcomes, including drinking status, binge drinking and frequency of drinking. There are a number of factors that might contribute to this general trend, including social expectations that mothers not engage in such behaviors and the increased number of social roles mothers are expected to take on.

While it is clear from this analysis that, as a whole, mothers postpartum are less likely to drink than other women, our analysis also provides important insight into groups of new mothers who may be at a greater risk for harmful drinking behaviors. There is a positive interaction for new mothers in higher income categories and drinking frequently, for example. We also found a positive interaction between drinking frequently and new mothers who are not married. And the analysis showed a positive interaction between new mothers who are self employed and binge drinking compared with women who are employed full time. These differences among demographic subpopulations are important for prevention efforts, and indicate that an analysis that does not examine subgroup patterns might mask important differences.

Other studies have found that smoking among women postpartum is associated with risky alcohol use [14, 21]. While smoking and new motherhood were both associated with binge drinking, we found that the strength of the association between new motherhood and binge drinking did not differ by smoking status. We did find, however, that compared to women who are not new mothers, new mothers who smoke are at a greater risk for drinking any alcohol or drinking more frequently than new mothers who don't smoke.

This study draws on a large, representative sample of adult women living in California. We were able to compare a number of drinking outcomes that measured not only binge drinking

and any use of alcohol, but also the number of days drinks were consumed, which gives an additional dimension to the analysis that was not available in the other studies cited. The frequency of drinking, for example, varied significantly by both income and education, with more educated women and women with a higher income drinking more frequently. This appeared in a linear trend with each category of additional education drinking more often. The association between frequency of alcohol use and education and income were stronger than that for binge drinking and points to a different pattern of use.

Young women's drinking has changed significantly over the past 15 years, such that women are drinking more heavily [22, 23], and excessive drinking is often viewed as a positive and integral part of socializing [24]. This same trend does not appear to carry over into motherhood. It is possible that traditional notions of femininity, which have typically not encouraged heavy drinking among women, become stronger once a woman becomes a parent [10]. Drinking women are often viewed as sexually charged and rebellious [25], both of which are in opposition to conventional ideas of motherhood [10].

Longitudinal studies examining changes in drinking over the life course have suggested that entering into marriage and parenthood for many women is associated with a decrease in heavy alcohol use [11, 12]. This may be related to increased responsibility, which is incompatible with heavy drinking [12]. Also, drinking may have been largely a social activity [24] and the opportunity and acceptability of social drinking may decrease [26]. Among young gang mothers, motherhood has been found to shift the context of drinking to a more private activity that is carried out in the home, as opposed to a part of public social bonding [27]. Our findings showing a decrease in drinking for new mothers are consistent with this literature.

It is interesting to note that in comparison with other studies that assessed the rates of drinking among new mothers, we found a lower prevalence of both any drinking and binge drinking in this group. Our results showed that only 36.7% of new mothers reported having any drinks in the past 30 days and only 5.6% had engaged in heavy episodic drinking. This is compared to 15.5% of new mothers between 3 and 5 months postpartum reporting binge drinking in the NSDUH data [17]. In the Wisconsin-based sample, 11.9% of new mothers (6–12 weeks post-partum) reported binge drinking (four or more drinks on a single day) in the last month [14]. The sample we draw on is representative of the state of California, and the rates of drinking among other women (women without a child 1 year) are similar to those found in the Centers for Disease Controls and Prevention (CDC)'s Behavioral Risk Factor Surveillance System (BRFSS) survey in the years 2000–2003 [28]. One possibility to account for the differences in drinking behaviors among new mothers is that the 3,450 new mothers in our sample were disproportionately young, Hispanic, in lower income brackets, less educated and married or in an unmarried couple. Each of these characteristics is associated with lower levels of drinking and could have affected the overall rates.

We were unable to look at breastfeeding as a control variable, which contributed to lower levels of risky drinking among new mothers in other studies [14, 21, 29, 30]. We could not assess changes in the drinking behaviors of individuals, as this data is cross-sectional. There is the possibility that some women initiate alcohol use post-partum rather than resuming

previous use patterns. However, in their study of the NSDUH data, Muhuri et al. [16] did investigate this question by looking at past year initiation among their parenting group. They found that 0.9% of their parents had initiated alcohol use after pregnancy. This is a very small percentage and does not account for past 30-day use rates between pregnant and parenting women, supporting the idea that the change in drinking levels is not due to the initiation of drinking after giving birth. While we acknowledge that this data set offers an imperfect measure of new mother status, we felt that the other strengths of the data such as the variety of drinking measures and the sample size out-weighed this deficit.

This study found that new mothers are less likely to drink than other women, and indicated specific subpopulations that appear to be at higher risk of negative drinking behaviors. Future studies could further this work by investigating additional personal and demographic characteristics such as depression, indications of heavy drinking prior to pregnancy and breastfeeding, which might act as risk or protective factors in certain subpopulations. It is important to understand the social context and variation in drinking patterns and behaviors within subpopulations in order to gain a more nuanced picture of drinking cultures that may protect women or put them at risk for drinking problems.

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Table 1
Descriptive statistics (% distribution)

Variable name	All subjects (<i>n</i> = 28, 537)	New mothers (<i>n</i> = 3,448)	Other women (<i>n</i> = 24,091)	<i>P</i> value*
Race/ethnicity				
White	45.3	34.8	46.5	<0.01
Black	6.6	5.9	6.7	
Hispanic	32.9	46.4	31.0	
Other	15.2	12.9	15.5	
Age				
18–24	20.8	28.6	19.7	
25–29	15.4	27.2	13.7	
30–34	17.1	25.0	16.1	
35–40	21.3	16.5	21.9	
41–48	20.8	2.7	28.6	
Education				
<9th or some HS	16.2	24.2	15.1	<0.01
HS grad or GED cert	23.9	26.1	23.6	
Tech sch. or some college	28.6	23.1	29.4	
College or post grad	31.3	26.6	31.9	
Income				
<\$10,000	10.1	13.8	9.6	<0.01
\$10,000–19,999	15.6	20.1	15.0	
\$20,000–\$34,999	17.2	17.7	17.2	
\$35,000–\$49,999	12.9	11.3	13.2	
\$50,000–\$75,000	15.8	12.0	16.3	
Over \$75,000	23.4	19.7	24.0	
Missing ^a	4.9	5.4	4.8	
Employment status				
Employed full time (≥ 32 h/week)	40.8	24.5	43.1	<0.01
Employed part time (<32 h/week)	14.1	11.7	14.5	
Self-employed	6.5	4.4	6.8	
Out of work/retired/unable to work	10.9	14.8	10.3	
Homemaker	19.4	40.8	16.5	
Student	8.3	3.9	8.9	
Marital status				
Married	54.5	69.4	52.5	<0.01
Div/sep/widowed	12.5	5.6	13.5	
Never married	24.7	11.1	27.6	
Unmarried couple	8.2	14.0	7.4	
Smoker	15.2	9.1	16.1	<0.01
Any alcohol ^b	50.5	36.7	52.4	

Variable name	All subjects (n = 28, 537)	New mothers (n = 3,448)	Other women (n = 24,091)	P value [*]
Drink frequently ^b	16.1	8.3	17.2	
Ever binge drink ^b	10.8	5.6	11.5	<0.01
Binge 2+ times ^b	5.5	2.9	5.9	<0.01

^{*} P value compares values for new mothers versus others

^a Missing includes don't know and refused

^b Any alcohol = any alcohol, past 30 days; drink frequently = drank > 4 days, past 30 days; ever binge drink = 4/5 drinks 1 time in past 30 days; binge 2+ times = 4/5 drinks 2 time in past 30 days

Table 2
Adjusted odds of drinking behaviors (any alcohol and drink frequently) in CWHHS, with and without interactions ($n = 28,537$)

	Any alcohol ^b OR (95% CI)	+Interactions	Drink frequently ^b OR (95% CI)	+Interactions
New mothers	0.73 (0.66, 0.80)**	0.99 (0.71, 1.40)	0.68 (0.58, 0.79)**	0.19 (0.07, 0.51)**
Race/ethnicity				
White	Ref.	Ref.	Ref.	Ref.
Black	0.61 (0.54, 0.70)**	0.63 (0.55, 0.71)**	0.64 (0.54, 0.75)**	0.64 (0.54, 0.75)**
Hispanic	0.55 (0.51, 0.59)**	0.57 (0.52, 0.60)**	0.37 (0.33, 0.42)**	0.38 (0.34, 0.43)**
Other	0.39 (0.35, 0.43)**	0.40 (0.36, 0.45)**	0.32 (0.27, 0.37)**	0.32 (0.27, 0.37)**
Marital				
Married	Ref.	Ref.	Ref.	Ref.
Div/sep/widow	1.46 (1.33, 1.61)**	1.46 (1.32, 1.61)**	1.40 (1.24, 1.58)**	1.36 (1.20, 1.54)**
Never married	1.62 (1.48, 1.79)**	1.61 (1.47, 1.77)**	1.69 (1.51, 1.89)**	1.67 (1.49, 1.87)**
Unmarried couple	1.48 (1.32, 1.66)**	1.48 (1.32, 1.66)**	1.71 (1.47, 1.98)**	1.77 (1.52, 2.06)**
Age categories				
18–24	Ref.	Ref.	Ref.	Ref.
25–29	1.09 (0.97, 1.22)	1.10 (0.98, 1.23)*	1.02 (0.87, 1.19)	1.01 (0.86, 1.18)
30–34	0.85 (0.76, 0.95)**	0.86 (0.77, 0.97)**	0.89 (0.76, 1.04)	0.89 (0.76, 1.04)
35–40	0.83 (0.74, 0.92)**	0.84 (0.75, 0.94)**	0.98 (0.85, 1.14)	0.98 (0.84, 1.14)
41–48	0.86 (0.77, 0.96)**	0.87 (0.78, 0.97)**	1.18 (1.02, 1.37)**	1.19 (1.02, 1.38)**
Education				
<9th or some HS	Ref.	Ref.	Ref.	Ref.
HS grad or GED cert	1.60 (1.44, 1.77)**	1.66 (1.49, 1.86)**	1.58 (1.29, 1.93)**	1.58 (1.29, 1.93)**
Tech sch. or some college	2.12 (1.90, 2.36)**	2.23 (1.99, 2.51)**	2.04 (1.67, 2.50)**	2.04 (1.66, 2.49)**
College or post grad	2.45 (2.18, 2.75)**	2.57 (2.28, 2.90)**	2.89 (2.37, 3.56)**	2.89 (2.36, 3.55)**
Income				
<\$10,000	Ref.	Ref.	Ref.	Ref.

	Any alcohol ^b OR (95% CI)	+Interactions	Drink frequently ^b OR (95% CI)	+Interactions
\$10,000–19,999	1.12 (0.98, 1.27)	1.11 (0.98, 1.27)	0.98 (0.78, 1.23)	0.92 (0.73, 1.16)
\$20,000–\$34,999	1.50 (1.32, 1.72)**	1.50 (1.32, 1.71)**	1.28 (1.03, 1.58)**	1.19 (0.96, 1.49)
\$35,000–\$49,999	1.76 (1.53, 2.03)**	1.76 (1.52, 2.02)**	1.33 (1.07, 1.67)**	1.23 (0.99, 1.55)*
\$50,000–\$75,000	2.17 (1.88, 2.50)**	2.15 (1.87, 2.48)**	1.75 (1.41, 2.18)**	1.65 (1.32, 2.07)**
Over \$75,000	3.11 (2.69, 3.59)**	3.10 (2.67, 3.58)**	2.82 (2.27, 3.50)**	2.60 (2.09, 3.25)**
Missing ^a	1.11 (0.93, 1.34)	1.11 (0.92, 1.33)	1.11 (0.83, 1.48)	1.04 (0.77, 1.40)
Employment status				
Employed full time (≥ 32 h/week)	Ref.	Ref.	Ref.	Ref.
Employed part time (<32 h/week)	0.93 (0.85, 1.02)	0.91 (0.83, 1.00)*	1.03 (0.92, 1.62)	1.01 (0.89, 1.13)
Self-employed	1.02 (0.90, 1.14)	1.00 (0.89, 1.14)	1.29 (1.13, 1.47)**	1.28 (1.12, 1.47)**
Out of work/retired/unable to work	0.71 (0.64, 0.79)**	0.69 (0.62, 0.79)**	1.03 (0.87, 1.23)	0.79 (0.67, 0.92)**
Homemaker	0.67 (0.61, 0.72)**	0.66 (0.60, 0.72)**	0.84 (0.75, 0.93)**	0.82 (0.73, 0.92)**
Student	0.83 (0.72, 0.96)**	0.85 (0.73, 0.99)**	1.00 (0.84, 1.20)	1.01 (0.84, 1.21)
Smoker				
No	Ref.	Ref.	Ref.	Ref.
Yes	2.36 (2.16, 2.58)**	2.28 (2.08, 2.50)**	2.36 (2.13, 2.62)**	2.32 (2.09, 2.62)**
<i>Interactions with new motherhood (ref. other women)</i>				
Race/ethnicity				
White		Ref.		Ref.
Black		0.85 (0.57, 1.28)		–
Hispanic		0.80 (0.64, 1.00)**		–
Other		0.62 (0.44, 0.88)**		–
Marital				
Married		Ref.		Ref.
Div/sep/widow		–		1.91 (0.98, 3.70)*
Never married		–		1.46 (0.77, 2.77)
Unmarried couple		–		0.69 (0.34, 1.43)

	Any alcohol ^b OR (95% CI)	+Interactions	Drink frequently ^b OR (95% CI)	+Interactions
Education				
<9th or some HS	Ref.	Ref.	Ref.	Ref.
HS grad or GED cert.	0.78 (0.58, 1.05)		–	
Tech sch. or some coll.	0.68 (0.50, 0.93)**		–	
College or post grad	0.71 (0.51, 0.97)**		–	
Income				
<\$10,000	Ref.	Ref.	Ref.	Ref.
\$10,000–19,999	–		2.65 (1.00, 7.04)*	
\$20,000–\$34,999	–		2.73 (1.04, 7.15)**	
\$35,000–\$49,999	–		3.35 (1.25, 9.01)**	
\$50,000–\$75,000	–		2.30 (0.87, 6.05)	
Over \$75,000	–		3.32 (1.28, 8.60)**	
Missing ^a	–		2.84 (0.86, 9.43)*	
Employment status				
Employed full time (≥ 32 h/week)	Ref.	Ref.	Ref.	Ref.
Employed part time (<32 h/week)	1.31 (0.97, 1.77)*		1.44 (0.89, 2.32)	
Self-employed	1.16 (0.73, 1.85)		1.22 (0.60, 2.51)	
Out of work/retired	1.20 (0.73, 1.64)		1.79 (1.05, 3.04)**	
Homemaker	1.08 (0.86, 1.36)		1.33 (0.91, 1.93)	
Student	0.65 (0.37, 1.13)		0.60 (0.22, 1.68)	
Unable to work				
Smoker				
No	Ref.	Ref.	Ref.	Ref.
Yes	1.61 (1.14, 2.26)**		–	

* $P < 0.10$,** $P < 0.05$ ^aMissing includes don't know and refused

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Any alcohol = any alcohol, past 30 days; drink frequently = drank > 4 days, past 30 days; ever binge drink = 4/5 drinks 1 time in past 30 days; binge 2+ times = 4/5 drinks 2 time in past 30 days

Table 3
Adjusted odds of binge drinking (ever binge drink and binge 2+ times) in CWHHS, with and without interactions

	Ever binge drink ^b OR (95% CI)	+Interactions	Binge drink 2+ times ^b OR (95% CI)	+Interactions
New mothers	0.56 (0.47, 0.68)**	0.30 (0.15, 0.59)**	0.62 (0.46, 0.82)**	0.16 (0.05, 0.54)**
Race/ethnicity				
White	Ref.	Ref.		
Black	0.60 (0.49, 0.74)**	0.61 (0.49, 0.74)**	0.65 (0.50, 0.86)**	0.65 (0.50, 0.85)**
Hispanic	0.72 (0.63, 0.81)**	0.72 (0.63, 0.81)**	0.71 (0.60, 0.85)**	0.71 (0.60, 0.84)**
Other	0.56 (0.46, 0.68)**	0.56 (0.46, 0.68)**	0.57 (0.43, 0.74)**	0.56 (0.43, 0.74)**
Marital				
Married	Ref.	Ref.		
Div/sep/widow	1.62 (1.40, 1.88)**	1.62 (1.40, 1.88)**	1.85 (1.53, 2.25)**	1.79 (1.47, 2.18)**
Never married	2.01 (1.77, 2.29)**	2.02 (1.78, 2.30)**	2.30 (1.94, 2.71)**	2.24 (1.89, 2.66)**
Unmarried couple	1.60 (1.34, 1.89)**	1.60 (1.35, 1.90)**	1.87 (1.48, 2.36)**	1.73 (1.35, 2.20)**
Age				
18–24	Ref.	Ref.		
25–29	0.90 (0.77, 1.06)	0.91 (0.77, 1.06)	0.81 (0.66, 0.99)**	0.81 (0.66, 1.00)**
30–34	0.60 (0.51, 0.71)**	0.60 (0.51, 0.71)**	0.54 (0.44, 0.67)**	0.54 (0.44, 0.67)**
35–40	0.48 (0.40, 0.56)**	0.48 (0.41, 0.56)**	0.42 (0.34, 0.52)**	0.42 (0.33, 0.52)**
41–48	0.41 (0.35, 0.49)**	0.41 (0.35, 0.49)**	0.46 (0.37, 0.57)**	0.46 (0.37, 0.57)**
Education				
<9th or some HS	Ref.	Ref.		
HS Grad or GED Cert	1.34 (1.13, 1.61)**	1.34 (1.12, 1.60)**	1.27 (1.01, 1.61)**	1.27 (1.00, 1.61)**
Tech Sch. or some college	1.25 (1.04, 1.61)**	1.24 (1.03, 1.49)**	1.29 (1.01, 1.65)**	1.29 (1.01, 1.65)**
College or Post Grad	1.20 (0.99, 1.46)*	1.20 (0.99, 1.45)*	1.05 (0.81, 1.37)	1.06 (0.81, 1.38)
Income				
<\$10,000	Ref.	Ref.		

	Ever binge drink ^b OR (95% CI)	+Interactions	Binge drink 2+ times ^b OR (95% CI)	+Interactions
\$10,000–19,999	1.07 (0.87, 1.33)	1.02 (0.81, 1.27)	1.02 (0.78, 1.34)	0.95 (0.72, 1.26)
\$20,000–\$34,999	1.12 (0.91, 1.39)	1.09 (0.87, 1.36)	1.03 (0.79, 1.35)	0.97 (0.74, 1.29)
\$35,000–\$49,999	1.16 (0.93, 1.45)	1.08 (0.86, 1.37)	1.10 (0.82, 1.46)	0.98 (0.73, 1.32)
\$50,000–\$75,000	1.24 (1.09, 1.55)*	1.22 (0.96, 1.54)	1.06 (0.79, 1.42)	1.02 (0.76, 1.38)
Over \$75,000	1.65 (1.32, 2.07)**	1.59 (1.26, 2.00)**	1.38 (1.04, 1.84)**	1.37 (1.03, 1.83)*
Missing ^a	0.80 (0.59, 1.10)	0.79 (0.57, 1.09)	0.63 (0.41, 0.98)**	0.61 (0.39, 0.95)**
Employment status				
Employed full time (≥ 32 h/week)	Ref.	Ref.	Ref.	Ref.
Employed part time (<32 h/week)	1.06 (0.92, 1.22)	1.04 (0.90, 1.21)	0.99 (0.81, 1.21)	0.95 (0.78, 1.17)
Self-employed	0.93 (0.77, 1.12)	0.88 (0.73, 1.07)	0.99 (0.75, 1.30)	0.92 (0.69, 1.22)
Out of work/retired/unable to work	0.77 (0.65, 0.91)**	0.73 (0.61, 0.88)**	0.86 (0.69, 1.07)	0.79 (0.62, 0.99)**
Homemaker	0.66 (0.56, 0.77)**	0.65 (0.55, 0.77)**	0.65 (0.52, 0.81)**	0.71 (0.56, 0.89)**
Student	0.93 (0.77, 1.13)	0.93 (0.76, 1.12)	0.89 (0.69, 1.14)	0.89 (0.68, 0.15)
Smoker				
No	Ref.	Ref.	Ref.	Ref.
Yes	3.51 (3.14, 3.92)**	3.52 (3.15, 3.94)**	4.17 (3.60, 4.83)**	4.20 (3.63, 4.86)**
<i>Interactions with new motherhood (ref. other women)</i>				
Marital				
Married				Ref.
Div/sep/widow	–	–		2.02 (0.90, 5.38)*
Never married	–	–		1.73 (0.76, 3.94)
Unmarried couple	–	–		2.35 (1.11, 4.98)**
Income				
<\$10,000		Ref.		Ref.
\$10,000–19,999		1.69 (0.83, 3.43)		2.01 (0.77, 5.26)
\$20,000–\$34,999		1.33 (0.65, 2.73)		1.87 (0.67, 5.22)
\$35,000–\$49,999		2.19 (1.05, 4.54)**		3.66 (1.22, 10.98)**
\$50,000–\$75,000		0.95 (0.43, 2.11)		0.73 (0.18, 2.96)

	Ever binge drink ^b OR (95% CI)	Binge drink 2+ times ^b OR (95% CI)
	+Interactions	+Interactions
Over \$75,000	1.62 (0.82, 3.21)	2.47 (0.77, 7.90)
Missing ^a	1.16 (0.35, 3.87)	1.37 (0.15, 12.71)
Employment status		
Employed full time (≥ 32 h/week)	Ref.	Ref.
Employed part time (<32 h/week)	1.33 (0.73, 2.41)	1.81 (0.75, 4.38)
Self-employed	2.17 (0.95, 4.99)*	3.34 (1.00, 11.06)**
Out of work/retired/unable to work	1.69 (0.93, 3.10)*	2.31 (1.01, 5.26)**
Homemaker	1.30 (0.80, 2.11)	0.73 (0.32, 1.68)
Student	1.11 (0.45, 2.72)	0.85 (0.26, 2.80)

* $P < 0.10$,

** $P < 0.05$

^a Missing includes don't know and refused

^b Any alcohol = any alcohol, past 30 days; drink frequently = drank > 4 days, past 30 days; ever binge drink = 4/5 drinks 1 time in past 30 days; binge 2+ times = 4/5 drinks 2 time in past 30 day