



# Childbirth and Alcohol Consumption Impact of Recent Childbirth on Alcohol Consumption

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## Abstract

While the devastating effects of parental alcohol use on children's health are well known, the specific impact of childbirth on parental alcohol consumption has rarely been examined in the general population. We sought to examine patterns of alcohol use associated with childbirth. Data were drawn from the US National Epidemiologic Survey on Alcohol and Related Conditions. We compared successively the characteristics of alcohol use among females living with a child under 1 year with (i) those of females not living with children under 1 year and (ii) those of females living with an older child. Mean daily ethanol intake was lower among females living with a child under 1 than among females either not living with children under 1 year ( $p < 0.001$ ) or living with an older child ( $p < 0.01$ ). Moreover, low-to-mild drinking frequencies fell among females living with a child under 1, compared with females either not living with children under 1 year (adjusted odds ratio (AOR) = 0.56; 95% CI [0.40, 0.80] for at least once a month and AOR = 0.40; 95% CI [0.27, 0.58] for less than once a month) or living with an older child (AOR = 0.52; 95% CI [0.36, 0.75] for at least once a month and AOR = 0.66, 95% CI [0.46, 0.94] for less than a month). No significant difference was found for males. Our study suggests that childbirth, as opposed to motherhood per se, reduces several (though not all) dimensions of alcohol consumption in females, but not in males.

**Keywords** Alcohol · Childbirth · NESARC · Motherhood · Addiction

The harmful use of alcohol ranks among the top five risk factors for disease, disability and death in the world by the WHO in its 2014 *Global Status Report on Health and Alcohol* (WHO 2014). Each year, 85,000 people die from alcohol-related diseases or alcohol-related car accidents in the United States (Le Strat and Gorwood 2011). The role of genetic and

environmental factors has been described in both alcohol use and alcohol use disorders (Le Strat et al. 2008). A family history of alcohol dependence is associated with a higher risk of alcohol dependence (Sorensen et al. 2011). Among environmental factors, the risk for alcohol dependence varies across social characteristics, such as sex and marital status (Airagnes et al. 2017; Chilcoat and Breslau 1996; Christie-Mizell and Peralta 2009; Hajema and Knibbe 1998; Hoertel et al. 2014a, b; Merline et al. 2004; Staff et al. 2010).

While the devastating effects of parental alcohol use on children's health are well known (Donovan and Molina 2011; Duncan et al. 2011; Feldman et al. 2012; Foltran et al. 2011; Pearson et al. 2012), the specific impact of childbirth on parental alcohol consumption and alcohol-related disorders has rarely been examined in the general population. Research suggests that parenthood is associated with reductions in the average amount of alcohol consumed (Staff et al. 2010), heavy and binge drinking frequency (Hajema and Knibbe 1998; Maloney et al. 2010; Paradis 2011; Staff et al. 2010; Wolfe 2009) and alcohol use disorder symptoms (Chilcoat and Breslau 1996). The impact of childbirth on parental alcohol use according to sex is not clear. Some authors have found that the frequency of drinking days (Christie-Mizell and Peralta 2009)

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and the average amount of alcohol consumed each day decrease after childbirth in females, but not in males (Cho and Crittenden 2006; Fried et al. 1985). However, other studies have reported that childbirth may be associated with higher rates of alcohol-related problems in both males and females (Richman et al. 1995), and a higher incidence of alcohol dependence in men (Morrissey 1981). These discrepant results could, at least partly, be explained by a high level of heterogeneity in both the outcome of interest (alcohol use, binge drinking, heavy drinking, alcohol use disorder, etc.) and the population being studied (parents, mothers only, adolescents, etc.). Therefore, paternal and maternal patterns of alcohol use change after childbirth in the general population have yet to be properly established, even though this knowledge could help shape public health measures. In the present study, we examined the association between childbirth and parental alcohol use and alcohol-related disorders in the nationally representative sample of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).

## Method

### Participants

Data were drawn from Waves 1 and 2 of NESARC, a face-to-face survey of the US adult population conducted in 2001–2002 by the National Institute on Alcoholism and Alcohol Abuse (NIAAA) and described in detail elsewhere (Grant et al. 2003). The target population was the civilian noninstitutionalized population, aged 18 years and older, residing in the United States ( $N = 43,093$ ). The research protocol received full ethical review and approval from the US Census Bureau and Office of Management and Budget. All NESARC respondents were informed in writing about the nature of the survey, the statistical use of the survey data, the voluntary aspect of their participation, and the Federal laws that rigorously provide for the confidentiality of identifiable survey information.

### Procedure

Female and male participants were asked whether they were living with a child under age 18 in the household. Those responding positively were further asked whether the child was aged under age 1.

### Measures

#### Alcohol use characteristics

Alcohol use measures reflected use over the 12 months preceding data collection. Average daily volume of ethanol

(ounces) and drinking frequency were recorded. For each beverage type (coolers, beer, wine, and liquor), participants were asked at Wave 1 about the usual frequency of drinking, usual and largest quantities consumed, frequency of consuming the largest quantity, frequency of consuming more than 5 drinks and size of drinks (Sarsour et al. 2012). Flashcards showing life-sized photographs of different types of glasses, with various fill levels designated in ounces, were provided to help respondents report drink size (Dawson et al. 2007; National Institute on Alcohol Abuse and Alcoholism (NIAAA) 2004). The amount of ethanol in each drink was calculated by using ethanol conversion factors (i.e., the proportion of each beverage type that is pure alcohol), as detailed elsewhere (Dawson et al. 2007; National Institute on Alcohol Abuse and Alcoholism (NIAAA) 2004). Assuming that one standard drink contains 0.60 ounces of ethanol, the average daily volume has been converted to the number of drinks (Dawson et al. 2007; National Institute on Alcohol Abuse and Alcoholism (NIAAA) 2004). Four patterns of alcohol use were distinguished: (i) no alcohol use during the previous 12 months; (ii) alcohol used less than once a month but at least once; (iii) alcohol used at least once a month but less than once a week; and (iv) alcohol used at least once a week. The frequency of binge drinking was also examined. Binge drinking was defined as having at least 5 drinks in a single day for males and at least 4 drinks in a single day for females at least once in the past year (Le Strat and Gorwood 2011; National Institute on Alcohol Abuse and Alcoholism (NIAAA) 2004). Drinking-and-driving behaviours were investigated by asking whether the respondent had driven a car or another motor vehicle after having had 3 or more drinks. Respondents were categorized as followed: (i) never in the last 12 months, (ii) less than once a month but at least once in the past 12 months, (iii) at least once a month but less than once a week, and (iv) at least once a week in the past 12 months.

#### Sociodemographic characteristics

Race/ethnicity was categorized as (i) White, (ii) Black, (iii) American Indian/Alaska native, iv) Asian/Native Hawaiian/Pacific Islander and (v) Hispanic. Nativity, relating to birthplace, was defined as (i) United States of America or (ii) a foreign country. Education level was categorized as (i) less than high school, (ii) high school graduate, and (iii) some college or higher. Marital status was categorized as (i) married/cohabiting, (ii) widowed, divorced/separated, and (iii) never married. Household income was classified as (i) \$0–19,999, (ii) \$20,000–34,999, (iii) \$35,000–59,999, and (iv) \$60,000 or higher. A distinction was made between urban and rural lifestyles. Regions of residence were categorized as (i) northeastern, (ii) midwestern, (iii) southern,

and (iv) western territories of the USA. Working status was examined.

### Clinical correlates

Psychiatric diagnoses, including alcohol abuse/dependence within the previous 12 months, lifetime nicotine dependence, past-year anxiety disorders and past-year mood disorders were made according to DSM-IV criteria with the Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM IV Version (AUDADIS-IV) by trained lay interviewers during face-to-face interviews (Grant et al. 1995).

### Data Analyses

First, we divided the sample into two groups, according to the presence or absence of a child aged under one year in the household. Next, to distinguish between the effects on alcohol use of recent childbirth versus parenthood, we compared adults who lived a child under 1 year with those who lived a child aged 1–18 years. Because previous research had shown that the effect of childbirth on alcohol use may differ between males and females (Christie-Mizell and Peralta 2009; Cho and Crittenden 2006; Fried et al. 1985; Morrissey 1981; Richman et al. 1995), all analyses were stratified by sex. Weighted percentages and means were estimated to determine differences in socio-demographic characteristics, clinical correlates and alcohol consumption characteristics between the study groups. Because of the weighting and clustering used in the NESARC design, all statistical analyses were performed using the Taylor series linearization method, a design-based method implemented using SUDAAN Version 10 (RTI International, Research Triangle Park, NC). Significance tests of sets of coefficients were performed using Wald chi-square tests based on design-corrected coefficient variance-covariance matrices. To ensure that the observed differences were not due to sociodemographic correlates or psychiatric and addictive comorbidity, we adjusted for socio-demographic characteristics, alcohol abuse or dependence, lifetime nicotine dependence, and the presence of any anxiety or mood disorder in the previous 12 months. We also performed sensitivity analyses for binge drinking and drunk driving while excluding alcohol abuse and dependence from the list of adjustment factors. Logistic regression analyses were used to study the associations between binary outcomes and subgroups, and linear regression analyses were performed to assess the association between continuous outcomes and subgroups. Owing to the cross-sectional nature of the study, associations did not imply causation (Le Strat and Hoertel 2011). Statistical significance was evaluated using a two-sided design, with alpha set at 0.05.

## Results

The sample's characteristics are set out in Table 1. Out of the total sample, 278 (1.5%) males and 435 (1.8%) females had had a child aged under 1 year in their household during the previous 12 months. Asian and Hispanic men and Black, Native American and Hispanic females were more likely than their counterparts to have a child under 1 year living in their household. Childbirth during the previous 12 months was more frequent among males and females born abroad, married, or currently working, and was significantly lower among adults aged 30 years or more. Males with an annual household income above \$60,000 and those currently in work were more likely to live with a child under 1 year. Females living with a child under 1 year were more likely to have had a mood disorder within the previous 12 months. No significant difference was found in the either sex for education, region of residence, diagnosis of alcohol abuse or dependence or any anxiety disorder within the previous 12 months, or lifetime nicotine dependence.

Table 2 displays the alcohol consumption measures of females and males living with a child under 1 year versus those not living with a child under 1 year. The average daily consumption of ethanol over the previous 12 months by females living with a child under 1 year was almost half that of females who did not live a child under 1 year (0.10 ounces vs 0.18 ounces per day;  $p < 0.01$ ). This association was not significant in males, and a significant sex effect was observed ( $p < 0.01$ ). Following adjustments, females living with a child under 1 year were also found to have a lower reported drinking frequency in the at least once a month (adjusted odds ratio, AOR = 0.40, 95% CI [0.27, 0.58]) and less than once a month (AOR = 0.56, 95% CI [0.40, 0.80]) categories. A significant sex effect was observed for these drinking frequency patterns ( $p = 0.02$ ). No significant effect was found for the most frequent pattern of use. No change was found in males's drinking frequency. Following adjustments, no significant associations were found among males or females between either binge drinking or drinking-and-driving behaviours and living with a child under 1 year, compared with not living with a child under 1 year.

In the NESARC sample, 5938 (32%) males and 9502 (39%) females had at least one child aged 1–18 years. Table 3 compares the alcohol consumption characteristics of males and females living with a child under 1 year with those of adults living with an older child (1–18 years). Following adjustments for sociodemographic characteristics and clinical correlates, females living with a child under 1 year were found to have a significantly lower reported daily volume of ethanol, compared with females living with a child aged 1–18 years ( $p < 0.01$ ). An effect of sex was found for this result ( $p < 0.01$ ). Moreover, drinking frequency was reduced for the at least once a month (AOR = 0.52, 95% CI

**Table 1** Sociodemographic characteristics and clinical correlates in females and males living or not with a child under age 1 in NESARC

Sociodemographic characteristics	Males			Females			Interaction between gender and characteristic <i>p</i> -value
	Living with a child under age 1 <i>N</i> = 278 % <sup>a</sup>	Living with no child under age 1 <i>N</i> = 18,240 % <sup>a</sup>	Living with a child under age 1 vs. Living with no child under age 1 OR (95% CI)	Living with a child under age 1 <i>N</i> = 435 % <sup>a</sup>	Living with no child under age 1 <i>N</i> = 24,140 % <sup>a</sup>	Living with a child under age 1 vs. Living with no child under age 1 OR (95% CI)	
<b>Race/ethnicity</b>							
White	54.1	71.4	1.00	56.8	70.9	1.00	[Reference]
Black	7.6	10.2	0.86 (0.58–1.28)	16.0	11.9	<b>1.56 (1.22–2.00)**</b>	<b>0.01</b>
American Indian/ Alaska native	3.7	2.1	1.91 (0.89–4.12)	3.3	2.1	<b>2.66 (1.50–4.72)**</b>	0.50
Asian/Native Hawaiian/Pacific Islander	8.7	4.3	<b>2.46 (1.47–4.11)**</b>	4.3	4.3	1.06 (0.56–2.01)	<b>&lt;0.05</b>
Hispanic	25.9	12.0	<b>2.19 (1.68–2.87)**</b>	19.5	10.7	<b>2.27 (1.81–2.85)**</b>	0.85
<b>Nativity</b>							
Born in the United States	66.3	85.3	1.00	80.0	86.0	1.00	[Reference]
Born in a foreign country	33.7	14.7	<b>2.34 (1.82–3.01)**</b>	20.0	14.0	<b>1.49 (1.18–1.87)*</b>	<b>&lt;0.01</b>
<b>Age (years)</b>							
18–29	44.5	22.2	1.00	54.0	20.4	1.00	[Reference]
30–44	46.9	31.4	<b>0.77 (0.60–0.99)*</b>	37.0	30.0	<b>0.39 (0.32–0.48)**</b>	<b>&lt;0.01</b>
45–64	6.5	31.9	<b>0.11 (0.07–0.17)**</b>	8.0	31.2	<b>0.06 (0.04–0.09)**</b>	0.07
65+	2.1	14.5	<b>0.02 (0.01–0.08)**</b>	1.1	18.4	<b>0.01 (0.01–0.03)**</b>	0.30
<b>Education</b>							
Less than high school	13.0	6.3	1.00	5.5	6.0	1.00	[Reference]
High school graduate	34.9	38.3	0.73 (0.48–1.11)	41.0	39.2	1.27 (0.85–1.88)	0.06
Some college or higher	52.1	55.4	0.77 (0.51–1.15)	53.5	54.8	1.10 (0.74–1.62)	0.22
<b>Marital status</b>							
Married/cohabiting	87.3	64.0	1.00	73.5	58.8	1.00	[Reference]
Widowed	1.3	2.5	<b>0.05 (0.01–0.38)**</b>	0.3	10.5	<b>0.03 (0.01–0.10)**</b>	0.68
Divorced/separated	2.2	9.5	<b>0.07 (0.02–0.17)**</b>	8.1	12.5	<b>0.27 (0.19–0.39)**</b>	<b>&lt;0.01</b>
Never married	9.3	24.1	<b>0.26 (0.17–0.38)**</b>	18.1	18.3	<b>0.79 (0.63–0.99)*</b>	<b>&lt;0.01</b>
<b>Household income (\$)</b>							
0–19,999	14.9	17.1	1.00	28.3	25.6	1.00	[Reference]
20,000–34,999	20.3	19.8	1.26 (0.85–1.88)	20.0	20.0	0.89 (0.69–1.16)	0.16
35,000–59,999	29.2	27.2	1.43 (0.98–2.08)	26.3	24.5	0.87 (0.67–1.12)	<b>0.03</b>
60,000 or greater	35.7	35.8	<b>1.65 (1.15–2.37)**</b>	25.3	29.9	0.85 (0.65–1.10)	<b>&lt;0.01</b>
<b>Urbanicity</b>							
Urban	29.8	29.3	1.00	39.5	29.6	1.00	[Reference]
Rural	70.2	70.7	1.08 (0.84–1.39)	60.5	70.4	<b>0.70 (0.58–0.84)**</b>	<b>&lt;0.01</b>
<b>Region</b>							
Northeast	18.4	19.6	1.00	19.1	19.8	1.00	[Reference]
Midwest	24.0	23.3	1.07 (0.73–1.55)	28.5	22.9	1.26 (0.94–1.68)	0.50
South	37.1	34.9	1.09 (0.78–1.52)	35.6	35.4	1.12 (0.86–1.47)	0.89
West	20.4	22.3	0.91 (0.62–1.32)	16.8	21.8	0.83 (0.61–1.15)	0.74

**Table 1** (continued)

	Males			Females			Interaction between gender and characteristic <i>p</i> -value
	Living with a child under age 1 <i>N</i> = 278 % <sup>a</sup>	Living with no child under age 1 <i>N</i> = 18,240 % <sup>a</sup>	Living with a child under age 1 vs. Living with no child under age 1 OR (95% CI)	Living with a child under age 1 <i>N</i> = 435 % <sup>a</sup>	Living with no child under age 1 <i>N</i> = 24,140 % <sup>a</sup>	Living with a child under age 1 vs. Living with no child under age 1 OR (95% CI)	
<b>Sociodemographic characteristics</b>							
Currently working							
Yes	89.0	71.5	<b>3.98 (2.69–5.90)**</b>	53.7	57.0	<b>0.63 (0.52–0.76)**</b>	<b>&lt;0.01</b>
No	11.0	28.5	1.00	46.3	43.0	1.00	[Reference]
<b>Clinical correlates</b>							
Alcohol abuse prior to 12 month	38.4	39.3	1.03 (0.81–1.32)	22.2	17.2	1.19 (0.93–1.52)	0.42
Alcohol dependence prior to 12 month	17.3	16.3	1.15 (0.84–1.58)	9.1	7.2	1.23 (0.87–1.74)	0.79
Lifetime nicotine dependence	17.5	20.1	0.90 (0.66–1.24)	15.8	15.6	0.86 (0.65–1.14)	0.83
Any 12-month mood disorder	6.6	7.2	0.89 (0.55–1.43)	18.0	11.0	<b>1.52 (1.18–1.98)**</b>	0.05
Any 12-month anxiety disorder	6.8	7.6	1.16 (0.76–1.76)	13.4	14.3	0.93 (0.70–1.24)	0.41

Odds ratios were crude and estimated using logistic regression

Odds ratios in bold are statistically significant ( $p < 0.05$ )

NESARC National Epidemiologic Survey on Alcohol and Related Conditions, OR odds ratio, CI confidence interval

<sup>a</sup>Percentages are weighted values

\* $p < .05$ ; \*\* $p < .01$

[0.36, 0.75]) and less than once a month (AOR = 0.66, 95% CI [0.46, 0.94]) frequencies. An effect of sex was observed ( $p = 0.04$  for at least once a month and  $p = 0.03$  for less than once a month). Again, no significant effect was found for the most frequent pattern of use (at least once a week). Within the male sample, again, no significant difference was found for any alcohol consumption measure after adjustments for potential confounders. Following adjustments, no significant associations were found among males or females between either binge drinking or drinking-and-driving behaviours and living with a child under 1 year, compared with living with an older child in the household. Excluding alcohol abuse and dependence from the list of adjustment factors in sensitivity analyses did not modify our results (see Supplementary tables 1 and 2 in supplementary material).

## Discussion

This study has examined alcohol use characteristics associated with the recent birth of a child in males and females in a nationally representative sample. Results indicated that

recent childbirth was associated with a significantly lower daily volume of ethanol and a decrease in mothers' low-to-mild drinking frequency (at least once a month or less than once a month). A sensitivity analysis of this association in a subsample of females who lived an older child in the household suggests that this association was not due to the sole presence of a child. Furthermore, we found that recent childbirth was not associated with different alcohol use in males.

Several studies have addressed changes in alcohol use among females in the post-partum period, showing a significant reduction in consumption after childbirth (Laborde and Mair 2011; Muhuri and Gfroerer 2009; Vesga-Lopez et al. 2008). However, they did not consider whether this effect lasted throughout parenthood. Our study suggests that living with a child under 1 year affects alcohol consumption in females, but this effect does not last throughout motherhood. Only low-to-mild drinking frequencies decreased significantly in females living with a child under 1 year, compared with females either not living with a child under age 1 or living with an older one. Paradis et al. have suggested that motherhood is associated with a reduction in the number of drinking occasions that occur in bars and

**Table 2** Alcohol consumption characteristics in females and males living or not with a child under age 1 in NESARC

Alcohol consumption characteristics	Males				Females				Interaction between gender and characteristic	
	Living with a child under age 1 N = 278		Living with no child under age 1 N = 18,240		Living with a child under age 1 N = 435		Living with no child under age 1 N = 24,140		Unadjusted	Adjusted <sup>b</sup>
	% <sup>a</sup>	% <sup>a</sup>	OR (95% CI)	AOR <sup>b</sup> (95% CI)	% <sup>a</sup>	% <sup>a</sup>	OR (95% CI)	AOR <sup>b</sup> (95% CI)	p	p
Frequency of alcohol use										
Never	23.7	28.9	1.00	1.00	50.1	40.6	1.00	1.00	[Reference]	[Reference]
At least once a week	34.6	39.2	<b>0.63 (0.43–0.91)*</b>	0.87 (0.59–1.28)	11.0	20.8	0.93 (0.75–1.16)	1.28 (1.01–1.62)	0.07	0.06
At least once a month	20.8	15.6	0.79 (0.56–1.11)	0.85 (0.60–1.21)	10.5	14.7	<b>0.37 (0.26–0.53)**</b>	<b>0.40 (0.27–0.58)**</b>	<b>&lt;0.01</b>	<b>0.02</b>
Less than once a month	20.8	16.4	1.28 (0.88–1.85)	1.12 (0.76–1.64)	28.4	24.0	<b>0.60 (0.42–0.84)**</b>	<b>0.56 (0.40–0.80)**</b>	<b>&lt;0.01</b>	<b>0.02</b>
Binge drinking										
Never	62.8	69.4	1.00	1.00	82.4	82.9	1.00	1.00	[Reference]	[Reference]
At least once a week	12.1	13.1	<b>0.66 (0.46–0.94)*</b>	1.13 (0.78–1.65)	4.0	4.8	0.87 (0.62–1.22)	1.40 (0.97–2.01)	0.09	0.69
At least once a month	12.1	6.7	0.75 (0.47–1.20)	0.91 (0.56–1.47)	3.5	3.9	0.69 (0.37–1.26)	0.67 (0.36–1.24)	0.74	0.66
Less than once a month	13.0	10.9	1.34 (0.83–2.15)	1.39 (0.85–2.26)	10.1	8.4	0.88 (0.49–1.60)	0.82 (0.45–1.49)	0.22	0.28
Drove a motor vehicle after drinking 3 drinks or more <sup>c</sup>										
Never	80.2	77.7	1.00	1.00	90.6	91.1	1.00	1.00	[Reference]	[Reference]
At least once a week	3.1	3.8	0.95 (0.65–1.38)	1.20 (0.79–1.81)	3.0	1.1	1.64 (0.84–3.22)	<b>2.32 (1.15–4.69)*</b>	0.16	0.19
At least once a month	2.5	3.1	0.93 (0.43–2.02)	1.28 (0.57–2.87)	1.0	0.8	1.88 (0.50–7.02)	2.06 (0.54–7.85)	0.37	0.42
Less than once a month	14.2	15.3	0.69 (0.27–1.76)	0.75 (0.29–1.99)	5.4	7.0	0.79 (0.10–6.24)	0.85 (0.11–6.83)	0.91	0.87
Average daily volume of ethanol consumed in past year (ounces)	Mean (SE)	Mean (SE)	p	p <sup>d</sup>	Mean (SE)	Mean (SE)	p	p <sup>d</sup>	p	p <sup>d</sup>
	0.48 (0.07)	0.57 (0.01)	0.10	0.18	0.10 (0.02)	0.18 (0.01)	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>

Odds ratios in bold are statistically significant ( $p < 0.05$ )

NESARC National Epidemiologic Survey on Alcohol and Related Conditions, OR odds ratio, AOR adjusted odds ratio, CI confidence interval, SE standard error

<sup>a</sup>Percentages are weighted values

<sup>b</sup>Odds ratio were adjusted for sociodemographic characteristics (age, marital status, race/ethnicity, education, working status, household income, region, urbanicity, nativity) and clinical correlates (i.e., alcohol abuse or dependence prior to 12 month, lifetime nicotine dependence, any 12-month anxiety disorder and any 12-month mood disorder) and were estimated using logistic regression

<sup>c</sup>Group under study is non abstainer participants within the past year

<sup>d</sup>p-values were adjusted for sociodemographic characteristics (age, marital status, race/ethnicity, education, working status, household income, region, urbanicity, nativity) and clinical correlates (i.e., alcohol abuse or dependence prior to 12 month, lifetime nicotine dependence, any 12-month anxiety disorder and any 12-month mood disorder) and were estimated using linear regression

\* $p < .05$ ; \*\* $p < .01$

**Table 3** Alcohol consumption in females and males living with a child under age 1 vs. those living with a child aged 1–18 years in NESARC

Alcohol consumption characteristics	Males				Females				Interaction between gender and characteristic	
	Living with a child Under age 1 N = 278		Living with a child under age 1 vs. child Under age 1 to 18 years N = 435		Living with a child aged 1 to 18 years N = 9502		Living with a child under age 1 vs. Living with a child aged 1 to 18 years		Unadjusted	Adjusted <sup>b</sup>
	% <sup>a</sup>	% <sup>a</sup>	OR (95% CI)	AOR <sup>b</sup> (95% CI)	% <sup>a</sup>	% <sup>a</sup>	OR (95% CI)	AOR <sup>b</sup> (95% CI)	p	p
<b>Frequency</b>										
Never	23.7	26.5	1.00	1.00	50.1	36.7	1.00	1.00	[Reference]	[Reference]
At least once a week	34.6	37.0	0.81 (0.55–1.18)	0.89 (0.60–1.31)	11.0	18.7	<b>1.25 (1.00–1.56)*</b>	1.33 (1.04–1.69)	0.05	0.07
At least once a month	20.8	17.6	0.93 (0.66–1.32)	0.96 (0.67–1.38)	10.5	16.1	<b>0.49 (0.34–0.71)**</b>	<b>0.52 (0.36–0.75)**</b>	<b>0.01</b>	<b>0.04</b>
Less than once a month	20.8	18.9	1.25 (0.86–1.82)	1.17 (0.80–1.73)	28.4	28.5	<b>0.64 (0.45–0.90)*</b>	<b>0.66 (0.46–0.94)*</b>	<b>0.01</b>	<b>0.03</b>
<b>Binge drinking</b>										
Never	62.8	67.2	1.00	1.00	82.4	80.8	1.00	1.00	[Reference]	[Reference]
At least once a week	12.1	12.7	0.88 (0.61–1.26)	1.04 (0.72–1.52)	4.0	4.9	1.10 (0.78–1.55)	1.20 (0.83–1.72)	0.38	0.47
At least once a month	12.1	7.2	0.94 (0.59–1.51)	0.94 (0.58–1.52)	3.5	4.3	0.78 (0.42–1.44)	0.75 (0.40–1.42)	0.63	0.96
Less than once a month	13.0	13.0	1.50 (0.92–2.43)	1.41 (0.86–2.31)	10.1	10.0	0.93 (0.51–1.69)	0.86 (0.47–1.59)	0.22	0.29
<b>Drove a motor vehicle after drinking 3 drinks or more<sup>c</sup></b>										
Never	80.2	77.7	1.00	1.00	90.6	91.6	1.00	1.00	[Reference]	[Reference]
At least once a week	3.1	3.1	1.02 (0.70–1.49)	1.11 (0.73–1.69)	3.0	1.1	1.56 (0.79–3.07)	1.81 (0.89–3.68)	0.28	0.35
At least once a month	2.5	3.2	1.33 (0.60–2.94)	1.41 (0.62–3.22)	1.0	0.8	1.74 (0.46–6.59)	1.61 (0.41–6.30)	0.73	0.79
Less than once a month	14.2	16.1	0.78 (0.30–2.03)	0.77 (0.29–2.05)	5.4	6.4	0.84 (0.10–6.74)	0.77 (0.09–6.40)	0.95	0.90
Mean (SE)	Mean (SE)	Mean (SE)	p <sup>d</sup>	Mean (SE)	Mean (SE)	Mean (SE)	p	p <sup>d</sup>	p	p <sup>d</sup>
Average daily volume of ethanol consumed in past year (ounces)	0.48 (0.07)	0.49 (0.02)	0.91	0.84	0.10 (0.02)	0.16 (0.01)	<0.01	<0.01	<0.01	<0.01

Odds ratios in bold are statistically significant ( $p < 0.05$ )

NESARC National Epidemiologic Survey on Alcohol and Related Conditions, OR odds ratio, AOR adjusted odds ratio, CI confidence interval, SE standard error

<sup>a</sup>Percentages are weighted values

<sup>b</sup>Odds ratio were adjusted for sociodemographic characteristics (age, marital status, race/ethnicity, education, working status, household income, region, urbanicity, nativity) and clinical correlates (i.e., alcohol abuse or dependence prior to 12 month, lifetime nicotine dependence, any 12-month anxiety disorder and any 12-month mood disorder) and were estimated using logistic regression

<sup>c</sup>Group under study is non abstainer participants within the past year

<sup>d</sup>p-values were adjusted for sociodemographic characteristics (age, marital status, race/ethnicity, education, working status, household income, region, urbanicity, nativity) and clinical correlates (i.e., alcohol abuse or dependence prior to 12 month, lifetime nicotine dependence, any 12-month anxiety disorder and any 12-month mood disorder) and were estimated using linear regression

\* $p < .05$ ; \*\* $p < .01$

restaurants (Paradis 2011). Scarcer drinking occasions owing to the constraints of caring for a newborn may explain the decreased odds ratios we found for females with low frequency patterns. We found that males living with a child under 1 year did not differ in alcohol use measures from their male counterparts not living with a child under 1 year. This finding is in line with a previous study that showed that males's substance use, including alcohol, is not affected by their partner's pregnancy (Bailey et al. 2008). Consistent with the literature, in our study, males living with a child under 1 year were less likely than their counterparts to have drunk more than 5 drinks per occasion more than once a week during the previous year (Hajema and Knibbe 1998; Maloney et al. 2010; Paradis 2011; Staff et al. 2010; Wolfe 2009). However, when we adjusted for potential confounders, this difference ceased to be significant, and we found that recent childbirth did not affect other measures of alcohol consumption in males.

### Limitations

Our study had several limitations. First, the period of time for which alcohol consumption was investigated in NESARC necessarily covered at least 3 months of pregnancy. Accordingly, we can assume that mothers' caution during their pregnancy, induced by knowledge of the risks for the foetus, may have been responsible for the lower alcohol consumption observed among females with versus without a child under 1 year. Furthermore, alcohol use may have been underestimated, given the retrospective design of the NESARC. A desirability bias may have occurred, that is, females living with a child under 1 year may have been less likely to report their alcohol use during the previous 12 months. Another limitation was NESARC's cross-sectional design, which did not allow for the attribution of causality. We cannot eliminate a biological influence of recent pregnancy to explain the lower daily volume of ethanol and the decrease in frequency drinking in mothers with the child under age 1. Since the NESARC design doesn't allow to distinguish between biological parenthood and adoption, we couldn't address this hypothesis. Future studies would benefit in replicating our results while distinguishing between biological parenthood and adoption. In addition, all participants were asked about the number of children living in the household. Because we were not able to distinguish between grandmothers and mothers of the children among female participants, our study might not exclusively pertain to parenthood. However, the proportion of females aged more than 45 years was relatively low (i.e., 8.3%) (Supplemental Table S3), suggesting that most females were likely to be the biological or adoptive mother of the children. Also, we didn't compare participants living with a child under one year with those with no child at all,

but rather performed two sets of comparisons and examined successively differences in the characteristics of alcohol use among females living with a child under 1 year with (i) those of females not living with children under 1 year and (ii) those of females living with an older child. Moreover, NESARC only included individuals older than 18, thus excluding teenage parents. According to previous studies, childbirth is associated with increased alcohol use in teenage parents (Little et al. 2009; Maloney et al. 2010; Wolfe 2009). Lastly, we did not consider factors such as socialization and religion, which are associated with changes in substance use, and which may differ after a child's birth (Staff et al. 2010).

Despite these limitations, our study, conducted with a large, nationally representative sample, suggests that living with a child under 1 year, as opposed to motherhood itself, reduces several (i.e., daily average volume, low-to-mild drinking frequency), though not all (i.e., binge drinking frequency and high drinking frequency) dimensions of alcohol consumption in females, but not in males. High drinking frequency, which does not change during this period, should be targeted as a stepping stone for pre-emptive and therapeutic interventions directed against alcohol-related disorders (Fleming et al. 2008).

**Author Contributions** F.L. designed the study, assisted with the data analyses, and wrote the paper; Y.L.S., collaborated with the design and writing of the study; N.H., analyzed the data and wrote the paper; C.A. collaborated with the writing of the paper; C.D. collaborated in the writing and editing of the final manuscript.

### Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Paris Descartes University provided 378IRB approval for the study.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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