Characteristics of pregnant women who engage in binge alcohol consumption

Evidence

Études

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Abstract

Objective: To characterize pregnant women who engage in binge drinking and to identify other risk behaviour that these women engage in.

Design: Observational study based on retrospective review of records.

Setting: A telephone and outpatient counselling service in Toronto that advises pregnant women about exposure to drugs, chemicals, radiation and infections during pregnancy and lactation.

Participants: All pregnant women who sought counselling concerning fetal risk of exposure to binge drinking from 1985 to 1994 as well as those counselled by telephone from 1993 to 1994, and an equal number of control women who sought counselling.

Outcome measures: Information about binges, demographic factors, history of elective and spontaneous abortion, and use of psychotropic drugs and cigarettes as well as marijuana, cocaine and other illicit drugs.

Results: Of the 3800 women seen in the clinic, 119 (3.1%) reported binge drinking during pregnancy; of the 19 991 women counselled by telephone, 153 (0.8%) reported binge drinking during pregnancy. The mean number of drinks per binge was 7.2 (standard deviation 2.5). None of the women was an alcoholic; 83.1% had binged fewer than 10 times during their pregnancy. A large majority (84.0%) of the women had a binge early in the first trimester (before 6 weeks' gestation). In comparison with control women, the women who had engaged in binge drinking were significantly younger (mean 30.0 v. 27.9 years, $p < 0.0001$) and more likely to be single (12.2% v. 54.6%, $p < 0.0001$), to be white (69.2% v. 92.9%, $p < 0.004$), to smoke (19.3% v. 57.1%, $p < 0.0001$) and to use cocaine (1.1% v. 11.0%, $p < 0.0001$), marijuana (3.0% v. 19.3%, $p < 0.0001$) and other illicit drugs (0.7% v. 9.2%, $p < 0.0001$).

Conclusions: Pregnant women who report binge alcohol consumption often report use of cigarettes, cocaine, marijuana and other illicit drugs as well, all of which represent a significant risk to the fetus. Rigorous efforts should be made to prevent the socially accepted binge consumption of alcohol among young, sexually active women.

Résumé

Objectif : Caractériser les femmes enceintes qui ont des épisodes de consommation excessive d'alcool et définir d'autres comportements à risque de leur part.

Conception : Étude par observation fondée sur un examen rétrospectif des dossiers.

Contexte : Service de counselling téléphonique et externe à Toronto qui conseille les femmes enceintes au sujet de l'exposition aux drogues, aux agents chimiques, aux rayonnements et aux infections pendant la grossesse et la lactation.

Participantes : Toutes les femmes enceintes qui ont demandé conseil au sujet du risque que représentent pour le foetus des épisodes de consommation excessive d'alcool, de 1985 à 1994, ainsi que celles qui ont demandé conseil par téléphone, de 1993 à 1994, et nombre égal de femmes témoins qui ont demandé conseil.

Mesures des résultats : Information sur les épisodes de consommation excessive, facteurs démographiques, antécédents d'avortement au choix et spontané et

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consommation de psychotropes et de cigarettes, ainsi que de marijuana, de cocaïne et d'autres drogues illicites.

Résultats : Sur les 3800 femmes accueillies à la clinique, 119 (3,1 %) ont signalé avoir eu des épisodes de consommation excessive d'alcool au cours de la grossesse, et les 19 991 femmes qui ont reçu des conseils par téléphone, 153 (0,8 %) ont signalé en avoir eu. Le nombre moyen de consommations par épisode s'est établi à 7,2 (écart type de 2,5). Aucune des femmes n'était alcoolique, et 83,1 % avaient eu moins de 10 épisodes de consommation excessive d'alcool au cours de la grossesse. Une majorité importante (84,0 %) de femmes avaient eu un épisode au début du premier trimestre (avant 6 semaines de gestation). Comparativement aux femmes témoins, les femmes qui avaient eu des épisodes de consommation excessive d'alcool étaient beaucoup plus jeunes (âge moyen de 30,0 ans c. 27,9, $p < 0,0001$) et plus susceptibles d'être célibataires (12,2 % c. 54,6 %, $p < 0,0001$), d'être Blanches (69,2 % c. 92,9 %, $p < 0,004$), de fumer (19,3 % c. 57,1 %, $p < 0,0001$) et de consommer de la cocaïne (1,1 % c. 11,0 %, $p < 0,0001$), de la marijuana (3,0 % c. 19,3 %, $p < 0,0001$) et d'autres drogues illicites (0,7 % c. 9,2 %, $p < 0,0001$).

Conclusions : Les femmes enceintes qui signalent avoir consommé de l'alcool irrégulièrement déclarent aussi avoir fumé et consommé de la cocaïne, de la marijuana et d'autres drogues illicites. Tous ces agents représentent un risque important pour le foetus. Il faudrait faire des efforts rigoureux pour prévenir les épisodes de consommation excessive d'alcool qui sont acceptés socialement chez les jeunes femmes actives sexuellement.

Alcohol is a legal, socially acceptable drug. Its use is part of the lives of most Canadian women of reproductive age; in a national survey, 78% of female Canadians 15 to 44 years of age reported consuming alcohol in the past year.[1] Of women who drank, 37% had had 1 to 7 drinks in the previous week, and 6% had had more than 8 drinks in the previous week. Alcohol is the most widely used human teratogen, with many more consumers than any other teratogenic compound. The teratogenic effects of alcohol span a wide range and include growth deficiency, central nervous system dysfunction, craniofacial anomalies and pathologic organ and skeletal conditions. Full expression of fetal alcohol syndrome is generally seen in children of women who drink heavily, although the alcohol-consumption threshold at which the syndrome occurs has not yet been well defined.[2]

Recent research has emphasized determining the threshold or dose dependence for alcohol's teratogenic effects.[3] Only recently have researchers working with animal and human models begun to direct attention toward patterns or styles of drinking rather than daily or weekly total alcohol consumption. One such pattern receiving attention is binge drinking — the sporadic intake of large quantities of alcohol. Binge drinking is generally defined as the consumption of 5 or more standard drinks per occasion.[4] Because the resulting alcohol-exposure episodes are isolated, binge drinking is distinguished from the chronic, heavy alcohol exposure associated with fetal alcohol syndrome.

It has been suggested that gestational exposure to a single or intermittent dose of alcohol that produces high blood alcohol concentrations (i.e., binges) can produce observable deficits in offspring.[5] Studies in rats have shown that the peak blood alcohol concentration attained, rather than the total volume consumed, is the best predictor of teratogenic effects.[6,7] Data from research involving primates and humans suggest that subtle behaviourial and cognitive effects in offspring can be related to gestational exposure to binge drinking, and that these deficits may occur with or without physical abnormalities.[8–11]

Binge drinking during pregnancy is an important public health issue. The scope of the problem is highlighted by the following trends.

(1) The early age at which young women start binge drinking: 58% of young Canadian women 15 to 24 years of age reported at least 1 binge during the previous 12 months.[12]
(2) The high incidence of binge alcohol consumption in women of reproductive age: 26% of women in Hamilton, Ont., reported at least 1 binge during the past year.[13]
(3) The change in attitudes toward intoxication: 34% of US female college students surveyed in 1989 (compared with 10% of those in 1977) stated that the desire for intoxication was their main reason for drinking.[14]
(4) The increase in the volume consumed during binges: the mean binge volume reported in 1985 was 27% higher than that reported in 1977.[15]

There is little clear information about pregnant

women who engage in binge drinking. In particular, we hypothesized that pregnant binge drinkers may engage in other behaviour, unrelated to alcohol drinking, that may affect pregnancy outcome and increase fetal risks. This controlled observational study was designed to examine the characteristics of and other reproductive risk factors affecting pregnant women who contacted the Motherisk Program at the Hospital for Sick Children, Toronto, and who had engaged in binge alcohol consumption during pregnancy.

Methods

All women who were either counselled at the clinic of the Motherisk Program between 1985 and 1994 or counselled by telephone by the program between 1993 and 1994 were included in our search for patients with sporadic heavy consumption of alcohol. The Motherisk Program is a large teratogen-information service. The staff counsels more than 100 callers per day about drug, chemical, radiation and infection exposure during pregnancy and lactation. A detailed description of the program has appeared elsewhere.[16] In brief, women are referred by their physicians or are self-referred because of concerns about exposures during pregnancy or lactation. At each consultation, information concerning potential reproductive risks, maternal demographic characteristics and obstetric history are recorded.

We retrieved and reviewed the records of all pregnant women who reported binge alcohol consumption. The records were made after pregnancy was diagnosed but before the outcome was known; therefore, there was no possibility of selection or reporting bias. Information about the volume of alcohol consumed during binges, the frequency of binges and their pattern and timing was extracted from the records as well as documentation of the use of cigarettes and of marijuana, cocaine and other illicit drugs. Sociodemographic characteristics, including the age, marital status, ethnic background, obstetric history and occupation of the woman and the occupation of her male partner were recorded. Socioeconomic status was determined with the use of occupational status titles and the scale created by Blishen, Carroll and Moore[17] for the women attending the clinic but not for those counselled by telephone.

The control group consisted of pregnant women who attended the clinic or were counselled by telephone just before a patient who had engaged in drinking binges. This selection criterion controlled for the month and year of counselling. If the previous patient was deemed unsuitable because she had also engaged in drinking binges, then the woman who followed the 2 binge-drinking cases was selected.

The demographic characteristics of the 2 groups were compared with the use of the unpaired, 2-tailed Student's *t*-test for continuous variables and the χ^2 test for categorical variables. Information was not available for each characteristic for every woman; therefore, the denominator ranged from 85 to 271.

Results

Of the 3800 women seen in the clinic, 119 (3.1%) reported binge alcohol consumption. Of the 19 991 women counselled by telephone (but not seen in the clinic), 153 (0.8%) reported binge drinking during pregnancy. Characteristics of these patients and of the 272 control patients are presented in Table 1. The characteristics of the women who were counselled by telephone did not differ from the characteristics of those counselled in the clinic.

The group that had engaged in binge drinking contacted the Motherisk Program significantly earlier in their pregnancy than the control women; the mean gestational age at the time of the consultation was 8.4 weeks for the binge-drinking group compared with 10.9 weeks for the control group ($p < 0.0001$). The binge-drinking women were significantly younger than the control women (mean age 27.9 v. 30.0 years, $p < 0.0001$). The binge-drinking women were also significantly more likely to be single (54.6% v. 12.2%, $p < 0.0001$) and white (92.9% v. 69.2%, $p < 0.004$) than the controls.

There was no significant difference in gravidity or parity between the 2 groups; however, the binge-drinking group had a significantly higher rate of previous therapeutic abortions (mean 0.34 v. 0.19 per woman, $p < 0.009$).

There was no significant difference in the socioeconomic status scores of the mother (44.3 v. 44.1, $p = 0.67$) or her male partner (43.8 v. 45.8, $p = 0.33$) between the 2 groups. However, there was a significant difference in the distribution of the occupational titles of the male partners; the partners of binge-drinking women were more likely to be skilled labourers and less likely to be either unskilled labourers or professionals. There was also a higher proportion of students in the binge-drinking group (11.9% v. 5.3%).

In terms of exposure to other drugs (Table 2), the women in the binge-drinking group were significantly more likely to smoke cigarettes (57.1% v. 19.3%, $p < 0.0001$) and to use marijuana (19.3% v. 3.0%, $p < 0.0001$), cocaine (11.0% v. 1.1%, $p < 0.0001$) and other illicit drugs (9.2% v. 0.7%, $p < 0.0001$) than the women in the control group. There was no significant difference between the groups in the use of psychotropic drugs.

None of the women in the binge-drinking group was considered to be an alcoholic (Table 3). Most (83.1%) re-

ported less than 10 binges at the time of contact, and 62.0% of the women had binged 3 or fewer times. Most of the binges (67.7%) were reported to be isolated incidents; however, a substantial proportion (21.4%) of the binge drinkers engaged in binges once or twice weekly. The mean number of drinks per binge was 7.2 (standard deviation 2.5). Those who binged once or twice weekly consumed a higher volume per binge than those whose binges were isolated incidents (7.7 v. 7.1 drinks, $p = 0.12$). A considerable proportion of the women (34.6%) had 8 or more drinks per binge, on average. The women with the highest mean volume per binge were students (mean 8.6 drinks) and illicit-drug users (mean 10.2 drinks). A large majority (84.0%) of the women had a binge early in the first trimester (before 6 weeks' gestation).

Discussion

This is the first study in Canada describing the characteristics of pregnant women who engage in binge alcohol consumption in Canada. From 1985 to 1994, 3.1% of the patients seen at the Motherisk Program reported binge alcohol consumption during pregnancy, as did 0.8% of the women counselled over the telephone by Motherisk from 1993 to 1994. The difference in the rate between the patients who visited the clinic and those who telephoned is not surprising. The patients invited to visit the clinic are selected from those who telephone our program, and whenever the counsellors perceive a reproductive risk they suggest a clinic visit. Hence, the women seen in the clinic have higher rates of reproductive risks

Table 1: Demographic characteristics of pregnant women attending or contacting the Motherisk Program and, for socioeconomic status, their male partners

Characteristic	Group: Binge drinkers *n = 272**	Group: Control women *n = 272**	*p* value
Mean age, yr (and standard deviation [SD])	27.9 (5.6)	30.0 (5.1)	< 0.0001
Single, no. (and %)	59 (54.6)	13 (12.2)	< 0.0001
Ethnic background, no. (and %)	*n = 85*	*n = 91*	< 0.004
White	79 (92.9)	63 (69.2)	
Oriental	2 (2.4)	9 (9.9)	
East Indian	1 (1.2)	8 (8.8)	
Black	2 (2.4)	8 (8.8)	
Hispanic	1 (1.2)	1 (1.1)	
Other	0	2 (2.2)	
Mean gravidity (and SD)	2.14 (1.3)	2.10 (1.4)	0.73
Mean parity (and SD)	0.57 (0.9)	0.68 (0.9)	0.14
Mean no. of previous abortions per woman (and SD)			
Elective	0.34 (0.7)	0.19 (0.5)	< 0.009
Spontaneous	0.23 (0.6)	0.27 (0.7)	0.51
Mean gestational age at contact, wk (and SD)	8.4 (6.2)	10.9 (8.3)	< 0.0001
Socioeconomic status, no. (and %)			
Women	*n = 109*	*n = 113*	0.35
Student	13 (11.9)	6 (5.3)	
Housewife	22 (20.2)	32 (28.3)	
Unskilled labourer	14 (12.8)	13 (11.4)	
Skilled labourer	40 (36.7)	42 (37.2)	
Professional	20 (18.4)	20 (17.7)	
Male partners	*n = 109*	*n = 106*	< 0.0007
Student	7 (6.3)	3 (2.8)	
Unemployed	7 (6.3)	6 (5.7)	
Unskilled labourer	26 (23.9)	32 (34.9)	
Skilled labourer	42 (38.5)	16 (15.1)	
Professional	27 (24.8)	44 (41.5)	

*Information was not available for each woman in every category. The denominator varied from 85 to 270. Denominators are supplied for some rates.

than those counselled by telephone only. The 272 women who reported binge alcohol consumption during pregnancy and sought prenatal counselling represented a unique risk group with a clustering of other risk factors: they were significantly younger, were more likely to be single and had a higher rate of previous elective abortion than the general population of women attending the clinic. In addition, they were significantly more likely to use cigarettes as well as marijuana, cocaine and other illicit drugs. By selecting a control group of women with similar patterns of referral to the same clinic we sought to avoid selection and reporting bias. By matching women by the date of the call we wished to obviate possible differences in public knowledge about teratogenic and perinatal risks at different times while maintaining random selection. We have recently shown that the women seen at the Motherisk Program have characteristics similar to those of the general population of women in Toronto.[2] However, women who use the medical system voluntarily may have characteristics (other than those we examined) that differ from those of the general population.

Table 2: History of use of various substances by pregnant women*

Substance	Group; no. (and %) of women		p value
	Binge drinkers	Control women	
Cigarettes	152 (57.1)	52 (19.3)	< 0.0001
Marijuana	51 (19.3)	8 (3.0)	< 0.0001
Cocaine	29 (11.0)	3 (1.1)	< 0.0001
Other illicit drugs	24 (9.2)	2 (0.7)	< 0.0001
Psychotropic drugs	32 (12.1)	36 (13.4)	0.65

*Information was not available for each woman in every category. Therefore, the denominator ranged from 261 to 271 for the various characteristics.

Table 3: Characteristics of binge alcohol consumption by 272 pregnant women*

Characteristic	No. (and %)† of women
Mean no. of drinks per binge *n = 240*	
5	67 (27.9)
6–7	90 (37.5)
8–9	34 (14.2)
10–14	43 (17.9)
≥ 15	6 (2.5)
No. of binges before contact *n = 266*	
1	92 (34.6)
2–3	73 (27.4)
4–6	38 (14.3)
7–9	18 (6.8)
10–19	33 (12.4)
≥ 20	12 (4.5)
Pattern of binges *n = 266*	
Isolated incidents	180 (67.7)
Once a week	31 (11.7)
Twice a week	26 (9.8)
Lasting 3 to 6 consecutive days	29 (10.9)
Time period of binges, no. of weeks after conception *n = 237*	
Up to 2	14 (5.9)
Up to 3	58 (24.5)
Up to 5	85 (35.9)
Up to 7	42 (17.7)
Up to 9	16 (6.8)
Up to 13	12 (5.1)
Up to 19	10 (4.2)

*Information was not available for each woman for every characteristic.
†Percentages may not sum to 100 because of rounding.

Other Canadian studies of pregnant women reporting binge alcohol consumption have found higher rates: 6.2% of women in an Ottawa cohort[12] and 12% of women in a northern Canadian population[15] reported binge drinking during pregnancy. Percentages of women reporting binges during pregnancy in US studies range from 1% to 37%, depending on the mean age and socioeconomic status of the cohort as well as the study location.[3,18–20]

Since our sample consists of a motivated, self-selected group of women, it may have a selection bias. Therefore, our study cannot be used to estimate the prevalence of binge drinking during pregnancy in Toronto.

In most studies, exposure to teratogens is retrospectively documented through questionnaires completed during prenatal visits. Such studies are subject to recall and participation bias. Our study is unique in that we characterized a cohort of pregnant women who sought counselling. In the Motherisk Program, we rely on self-reporting to determine the degree and timing of exposure to teratogens. We believe that bias can be ruled out and that the exposure histories are accurate because the women contact Motherisk voluntarily, usually during the first trimester shortly after learning that they are pregnant. We have previously shown that, when this cohort of women is subsequently interviewed after the outcome of the pregnancy is known, serious bias is created.[21]

Studies have shown that binge drinking results in an increase in the frequency of unplanned and unprotected sexual activity.[14,18–20] US college students who were frequent binge drinkers were 7 times more likely than other students to engage in these activities.[20] The concern is that women who engage in binge drinking may increase their likelihood of unplanned pregnancy and may subsequently expose the fetus to repeated binges until the pregnancy is discovered. This pattern was evident in our cohort; the mothers who had engaged in binge drinking contacted the Motherisk Program significantly earlier in their pregnancies than the control group, and a large majority had engaged in 1 or more binges early in the first trimester. Therefore, much more rigorous efforts should be made to prevent the socially accepted binge consumption of alcohol among young, sexually active women. Strategies to identify women who are binge drinking and to encourage

abstinence, reduction in consumption or modification of drinking patterns should be explored.

Given the high rate of the use of other drugs in addition to binge alcohol consumption in our cohort, women should be counselled concerning the clustered risk of all drugs and should be made to realize that these additional exposures may adversely affect pregnancy outcome and fetal growth and development. The multitude of confounding factors in our cohort need to be appropriately addressed in future studies that attempt to determine the neurotoxic effects of binge alcohol consumption. We are following up the women in our study to document the course of pregnancy and the fetal outcome and to assess the long-term neurodevelopment of the children.

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