

Alcohol intake during pregnancy among parturients in southern Brazil

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Abstract

Objectives: to assess alcohol intake prevalence and identify associated factors among pregnant women in the municipality of Rio Grande, RS, Brazil.

Methods: this was a cross-sectional study which included all parturient women residing in the municipality who gave birth in 2013. Two outcomes were characterized: alcohol intake during pregnancy and excessive alcohol intake during pregnancy. In the analysis, proportions were tested using the Chi-square test, whilst Poisson regression was used in the multivariate analysis.

Results: 9.4% (CI95%= 8.2-10.5) of the 2,685 parturient women studied reported having consumed alcohol during pregnancy, with beer being most common beverage. Following adjustment, the factors associated with alcohol intake in pregnancy were: age ≥ 30 years, brown skin colour, living without a partner, low schooling, tobacco smoking and illicit drug use, having had more children and late onset of prenatal care. Excessive alcohol intake was found in 12.7% (CI95%= 8.6-16.9) of those who reported drinking during pregnancy and the factors associated with this practice were age ≥ 30 years, lower schooling and illicit drug use.

Conclusions: this study found high alcohol intake during the gestation period and identified women more susceptible to this practice. There is an evident need for health professionals to work on preventing and handling alcohol intake among pregnant women in the municipality

Key words *Alcohol drinking, Pregnancy, Prevalence, Risk factors*

Introduction

Alcohol intake is a worldwide habit involving diverse cultures. It is considered to be a licit drug and is easy to access.¹ There are various definitions of alcohol intake patterns, but all of them take into consideration the amount consumed, intake frequency and its occurrence according to the person's sex.^{1,2}

Moderate alcohol intake (one drink a day for women and two drinks a day for men) does not represent a health problem for the general population. In the case of pregnant women, however, safe levels of exposure to alcohol have not been set, since even moderate intake can cause harm to the fetus. As such, any pattern of alcohol intake during pregnancy is considered to be a risk, and abstinence is recommended for pregnant women and women who intend to become pregnant.^{3,4}

Harm arising from fetal exposure to alcohol varies depending on the amount consumed, the pregnant mother's nutritional status and the metabolic capacity of mother and fetus, in addition to stage of pregnancy.⁵ In the first trimester of pregnancy there is a greater risk of physical abnormalities, whilst in the second trimester there is an increased risk of miscarriage. In the third trimester, fetal growth may be restricted, particularly head circumference.⁶ One of the complications resulting from alcohol intake during pregnancy is fetal alcohol syndrome (FAS), which is characterized by craniofacial abnormalities, intra uterine growth retardation and central nervous system dysfunctions.⁷

Despite potential risks to the health of fetuses and pregnant women, few studies assess alcohol intake prevalence during pregnancy. Furthermore, the use of different definitions and instruments to assess this outcome hinders result comparability. Studies assessing alcoholic drink intake during pregnancy report prevalence varying between 10.8% and 29.0%,⁸⁻¹¹ with most frequent intake among pregnant women aged over 30 years,^{8,11} tobacco smokers,¹⁰ illicit drug users,^{10,12} women with depression¹³ and those having fewer prenatal care attendances.¹¹

In view of the risks to which fetuses and pregnant women are exposed, owing to alcohol intake during pregnancy, as well as the scarcity of studies on this subject in Brazil, the purpose of this paper is to assess alcohol intake prevalence and associated factors during pregnancy, as well as excessive intake and types of drink consumed during pregnancy, among parturient women in the municipality of Rio Grande-RS in the year 2013.

Methods

This paper refers to the 2013 Perinatal Study, a cross-sectional population-based study conducted every three years in the city of Rio Grande. This is a port city located in the far south of the state of Rio Grande do Sul. In 2013 the city had a population of approximately 205,000 inhabitants.

Given that the 2013 Perinatal Study included all pregnant women resident in the municipality, only the sample size calculations performed a posteriori in order to examine possible factors associated with alcohol intake in pregnancy are presented here. The following parameters were used: minimum statistical power of 80%, 95% confidence level, unexposed: exposed ratio of between 1:5 and 9:1, 5% outcome prevalence among the unexposed, and a prevalence ratio of 2.0. In addition, sample size was increased by 15% to control for confounding. Based on these parameters, this study should have comprised at least 2,680 pregnant women. It was possible to achieve this number since the Perinatal Study involved 2,685 parturients.

Data collection took place between January 1st and December 31st 2013 and included all parturient women resident in the municipality (both urban and rural areas) who gave birth to their children in either of the city's two maternity hospitals, namely the Dr. Miguel Riet Corrêa Jr. University Hospital, part of the Federal University of Rio Grande (UFRG), which provides services only to Unified Health System (Sistema Único de Saúde- SUS) users, and the Rio Grande Santa Casa de Misericórdia, which provides services to SUS, private health insurance and private patients. Parturient women were interviewed only once. Women who were excluded were not resident in Rio Grande, as well as those whose babies were born prior to the twentieth week of pregnancy or had birth weight below 500 grams, as this characterizes miscarriage.

A pre-coded questionnaire with mostly closed-ended questions was administered with mothers up to 48 hours after childbirth. The interviewers underwent 40-hour training which finished with a pilot study with parturient women admitted to hospital in the month prior to the start of data collection.

Two outcomes were characterized for this study. The first outcome, alcohol intake during pregnancy, was investigated by asking the question "Did you use to drink alcohol when you were pregnant?" Interviewees who replied positively were considered to be cases and were then asked about the kind of drink (wine, beer or distilled drinks) they had drunk

in each trimester of pregnancy, as well as the type of drinking vessel (100 mL glass/wine glass/goblet, ordinary beaker, tin, small bottle, and 600-720 mL bottle) and the number of measures of drink per week.

The second outcome, excessive intake, was established as follows: first of all a standard measure of alcohol was defined according to the kind of vessel and type of drink; a standard measure was therefore equivalent to 330 mL of beer, 100 mL of wine and 30 mL of distilled drink; in this way the drinking vessels reported in answer to the questionnaire (ordinary 200 mL beaker, 100 mL glass/wine glass/goblet, 350 mL tin, small 300 mL bottle and 600 mL bottle) were divided by the standard measure equivalent to each type of drink [(beer (330 mL), wine (100 mL) and distilled drinks (30 mL)]; the number of measures equivalent to each vessel was then multiplied by the number of days per week when alcohol was drunk and by the number of vessels drunk daily; the result, i.e. the total number of measures drunk in a week, was divided by seven to estimate the number of standard measures drunk per day in each trimester of pregnancy. Parturient women who reported drinking more than one standard dose per day in any trimester of pregnancy were considered to be excessive alcohol intake cases.²

The independent variables were maternal age (up to 19 years, 20-29 years and 30 years or more), observed skin colour (white, brown, black, other), whether living with a partner, schooling in years (0-8 years, 9-11 years and 12 years or more), tobacco smoking (never; former smoker, smoker), illicit drug use during pregnancy (cocaine, marijuana, crack), self-reported depression during pregnancy, number of children given birth to (alive or dead), gestational age when starting prenatal care (in trimesters) and, having had a miscarriage or an abortion at any time in the past.

Every day at the two maternity hospitals, the interviewers checked the birth registry book to check the mothers' place of abode. When it was confirmed that a parturient woman lived in the urban or rural area of Rio Grande, the interviewers explained the study to her and invited her to take part. In case of agreeing, a Free and Informed Consent Form was signed by them. A copy of the form was kept by each mother.

Analysis was conducted using STATA 14.¹⁴ Firstly, the proportions of all variable categories of interest were calculated. The prevalence of each outcome was then calculated according to the independent variables, followed by the calculation

of the crude prevalence ratios and prevalence ratios adjusted using Poisson regression with robust variance. The Wald linear trend statistical test was used for ordinal exposures and the Wald heterogeneity test for dichotomous/polytomous exposures.

Multivariate analyses with backward selection were performed according to a hierarchical analysis model comprised of three levels: the first level contained socio-demographic variables (age, skin colour, marital status and schooling); the second level contained behavioural and morbidity variables (tobacco smoking, illicit drug use and self-reported depression); the third level contained variables relating to reproductive history and antenatal care (number of children given birth to, miscarriage/abortion and trimester in which antenatal care was begun). Variables having a p -value ≤ 0.20 were kept in the model. Variables with a p -value ≤ 0.05 were considered to have significant association.

Prevalence of intake of different kinds of alcoholic drink (wine, beer, distilled drinks) was also calculated according to the trimester of pregnancy in which the interviewees stated having drunk alcohol. The Chi-square linear trend test was performed to assess whether there had been significant change in the proportions of pregnant women drinking alcohol during the three trimesters of pregnancy for the different types of drink assessed.

Quality control was performed by means of 7% partial repetition of interviews with mothers by telephone or household visits. In the case of variables assessed that included, for instance, "age", "skin colour", "age when antenatal care begun", "number of antenatal sessions attended", the *Kappa* coefficient varied from 0.63 to 0.78, showing moderate to satisfactory agreement.

The study project was approved by the Federal University of Rio Grande Health Research Ethics Committee (CEPAS/UFRG) and by the Research Ethics Committee of the Santa Casa do Rio Grande Association (ACSCRG), as per approval protocol No. 2623/2012-67. All ethical principles established by Brazilian National Health Council Resolution 466/12 were respected.

Results

According to the Live Birth Information System, in 2013 there were 2,713 parturient women eligible for inclusion in the 2013 Perinatal Study.¹⁵ Of this total, 2,685 women were interviewed, including 32 stillborn baby cases.

Table 1 shows that around 17% of parturients were adolescents and that over 50% were aged 20-29. The majority had white skin colour, lived with a partner and had up to 11 years of schooling. At least one in six (16%) smoked tobacco. Almost 2% said they had used some sort of illicit drug during pregnancy and 10% reported depression during pregnancy. Almost half (47.3%) were primiparous,

eight in ten (78.6%) began prenatal care in the first trimester of pregnancy and 15.3% reported miscarriage or abortion. Overall prevalence of alcoholic drink intake during pregnancy was 9.4% (CI95%= 8.2-10.5).

Adjusted analysis showed that among all the variables included in the model, only the miscarriage/abortion variable lost statistical

Table 1

Characteristics of pregnant women and prevalence of alcohol intake during pregnancy among women resident in the municipality of Rio Grande-RS, 2013 (N=2685).

Variables	N	%	Alcohol intake during pregnancy %
Maternal age (years)			
≤ 19	464	17.3	9.5
20-29	1,355	50.5	9.3
≥ 30	866	32.2	9.4
Observed skin colour			
White	1,774	66.1	7.8
Brown	598	22.3	12.7
Black	313	11.6	11.5
Marital status			
Has a partner	2,303	85.8	8.3
Does not have a partner	382	14.2	15.5
Schooling (years)			
≤ 8	1,064	39.6	13.7
9-11	1,201	44.8	6.9
≥ 12	420	15.6	5.2
Tobacco smoking			
Never	1,925	71.7	5.7
Former smoker	321	12.0	13.7
Smoker	439	16.3	22.1
Illicit drug use			
No	2,642	98.4	8.8
Yes	43	1.6	44.2
Depression during pregnancy			
No	2,419	90.1	8.4
Yes	266	9.9	18.1
Number of children			
None	1,271	47.3	5.9
1	795	29.6	10.6
2 or more	619	23.1	14.9
Prenatal care started+			
1 st trimester	2,054	78.6	7.6
2 nd trimester	511	19.6	13.9
3 rd trimester	48	1.8	22.9
Miscarriage/abortion			
No	2,274	84.7	8.3
Yes	411	15.3	15.3
Alcohol intake during pregnancy			
No	2,434	90.6	-
Yes	251	9.4	-

+ N= 2613, 71 pregnant women had no prenatal care, 1 pregnant woman with no information on trimester in which prenatal care began.

significance with alcohol intake in pregnancy. The maternal age variable showed direct linear association with the outcome, with women aged 30 or over being more likely to intake alcohol during pregnancy (PR=1.46; CI95%=1.02-2.10). Parturients with brown skin colour (PR=1.42; CI95%=1.09-1.86), without a partner (PR=1.65; CI95%= 1.23-2.22), with less schooling (PR=2.56; CI95%= 1.62-4.04), tobacco smokers (PR=2.78; CI95%= 2.07-3.72), illicit drug users (PR=1.97; CI95%= 1.37-

2.84) and who reported depression (PR=1.50; CI95%= 1.12-2.02) had greater likelihood of consuming alcohol during pregnancy. The “number of children” and “trimester in which prenatal care began” variables showed direct linear association with the outcome (Table 2).

Out of the 251 mothers who consumed alcohol during pregnancy, 12.7% (CI95%= 8.6-16.9) drank more than one standard measure a day throughout at least one trimester of

Table 2

Crude and adjusted analysis of factors associated with alcohol intake during pregnancy in women resident in the municipality of de Rio Grande - RS, 2013 (N=2685).

Level	Variables	Crude analysis			Adjusted analysis		
		PR ⁺⁺	CI95%	<i>p</i>	PR ⁺⁺	CI95%	<i>p</i>
1	Maternal age (years)			0.96*			0.05*
	≤ 19	1	-		1	-	
	20 – 29	0.98	0.71 – 1.36		1.38	0.99 – 1.92	
	≥ 30	0.99	0.70 – 1.40		1.46	1.02 – 2.10	
	Observed skin colour			<0.01**			0.04**
	White	1	-		1	-	
	Brown/Mulatto	1.62	1.25 – 2.11		1.42	1.09 – 1.86	
	Black	1.47	1.04 – 2.08		1.17	0.82 – 1.67	
	Marital status			<0.001**			0.001**
	Does not have a partner	1.85	1.41 – 2.43		1.65	1.23 – 2.22	
	Has a partner	1	-		1	-	
	Schooling (years)			<0.001*			<0.001*
	≤ 8	2.62	1.70 – 4.04		2.56	1.62 – 4.04	
	9 – 11	1.32	0.84 – 2.08		1.31	0.83 – 2.08	
≥ 12	1	-		1	-		
2	Tobacco smoking			<0.001**			<0.001**
	Never	1	-		1	-	
	Former smoker	2.40	1.73 – 3.33		2.16	1.53 – 3.03	
	Smoker	3.87	3.00 – 4.98		2.78	2.07 – 3.72	
	Illicit drug use			<0.001**			<0.001**
	No	1	-		1	-	
	Yes	5.03	3.52 – 7.20		1.97	1.37 – 2.84	
	Depression during pregnancy			<0.001**			0.007**
	No	1	-		1	-	
	Yes	2.15	1.61 – 2.87		1.50	1.12 – 2.02	
3	Number of children			<0.001*			0.01*
	None	1	-		1	-	
	1	1.79	1.33 – 2.41		1.63	1.15 – 2.30	
	2 or more	2.52	1.89 – 3.36		1.66	1.14 – 2.45	
	Prenatal care started ⁺			<0.001*			0.04*
	1 st trimester	1	-		1	-	
	2 nd trimester	1.83	1.41 – 2.38		1.24	0.94 – 1.63	
	3 rd trimester	3.02	1.76 – 5.18		1.56	0.95 – 2.55	
	Miscarriage/abortion			<0.001**			0.09**
	No	1	-		1	-	
Yes	1.85	1.42 – 2.42		1.28	0.96 – 1.71		

+ N= 2613, 71 pregnant women had no prenatal care, 1 pregnant woman with no information on trimester in which prenatal care began.

** Prevalence ratio; * Wald linear trend test; ** Wald heterogeneity test.

pregnancy, thus characterizing excessive alcohol use. According to the adjusted analysis, the following variables remained significantly associated with excessive alcohol intake: age ≥ 30 years (PR=5.16; CI95%= 1.18-22.6); 8 years of schooling or less (PR=2.98; CI95%=1.32-6.72); and illicit drug use during pregnancy (PR=4.86; CI95%= 2.42-9.72) (Table 3).

Beer was the most commonly consumed beverage during pregnancy. This was the only kind

of drink with a reduced intake trend, varying between 84.1% and 70.1% in the first and third trimesters, respectively. Around 15% of parturients reporting alcohol intake during pregnancy drank wine and less than 10% drank distilled drinks. There was no significant reduction in the proportion of pregnant women who drank wine and/or distilled drinks between the trimesters of pregnancy (Figure 1).

Table 3

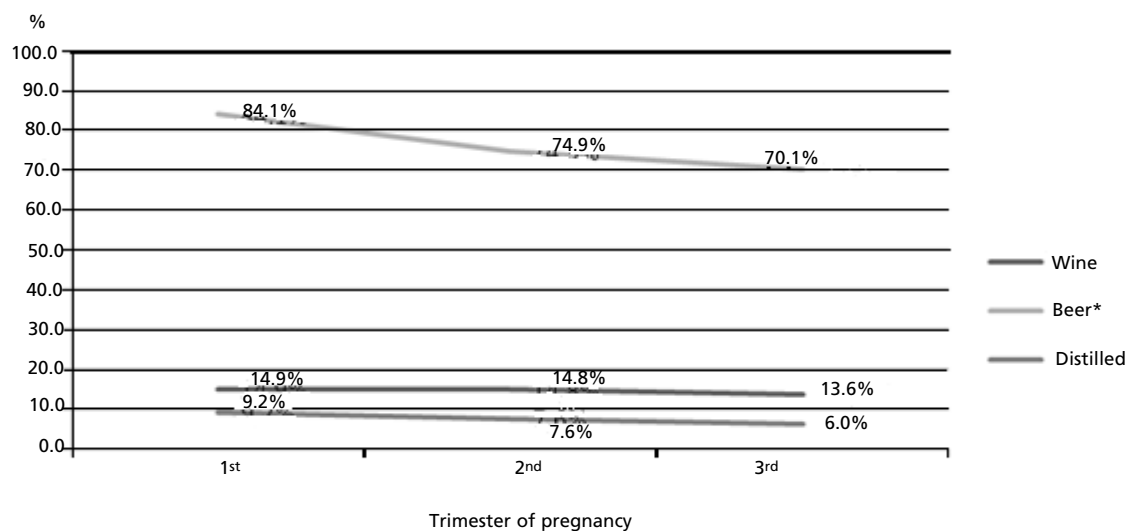
Prevalence, crude and adjusted analysis of factors associated with excessive alcohol intake (>1 standard measure per day) in any trimester of pregnancy among pregnant women in Rio Grande, RS, 2013. (N=251).

Level	Variables	N	Excessive alcohol intake (%)	Crude analysis			Adjusted analysis		
				PR ⁺⁺	CI95%	ρ	PR ⁺⁺	CI95%	ρ
1	Maternal age (years)								
	≤ 19	44	4.6	1	-				0.02*
	20 – 29	126	11.9	2.62	0.62-11.0		3.63	0.82-16.1	
	≥ 30	81	18.5	4.07	0.97-17.1		5.16	1.18-22.6	
	Observed skin colour								0.8**
	White	139	11.5	1	-		1	-	
	Brown	76	14.5	1.26	0.61-2.57		1.20	0.60-2.39	
	Black	36	13.9	1.21	0.47-3.08		1.04	0.42-2.55	
	Marital status								0.3**
	Does not have a partner	59	16.9	0.68	0.34-1.35		1	-	
Has a partner	192	11.5	1	-		1.63	0.83-3.17		
Schooling								<0.02*	
≤ 8 years	146	17.1	2.57	1.15-5.72		2.98	1.32-6.72		
9 years or more	105	6.7	1	-		1	-		
2	Tobacco smoking								0.001**
	Never	110	5.5	1	-		1	-	
	Former smoker	44	6.8	1.25	0.33-4.79		1.13	0.32-4.03	
	Smoker	97	23.7	4.35	1.84-10.2		2.21	0.81-6.00	
	Illicit drug use								<0.001**
	No	232	9.1	1	-		1	-	
	Yes	19	57.9	6.40	3.65-11.21		4.86	2.42-9.72	
	Depression during pregnancy								0.005**
No	203	9.9	1	-		1	-		
Yes	48	25.0	2.54	1.33-4.83		1.33	0.70-2.54		
3	Number of children								<0.002*
	None	92	5.3	1	-		1	-	
	1	84	8.3	1.56	0.47-5.14		1.43	0.58-3.49	
	2 or more	75	22.8	4.28	1.53-11.96		2.42	0.82-7.19	
	Prenatal care started ⁺								0.01*
	1 st trimester	156	7.7	1	-		1	-	
	2 nd trimester	71	12.7	1.65	0.73-3.74		1.17	0.53-2.61	
	3 rd trimester	11	36.4	4.73	1.82-12.3		1.81	0.45-7.24	
	Miscarriage/abortion								0.001**
	No	188	8.5	1	-		1	-	
Yes	63	25.4	2.98	1.58-5.62		1.32	0.57-3.08		
Excessive alcohol intake	32	12.7	-	-	-	-	-	-	-

* Wald linear trend test; ** Wald heterogeneity test; + N= 238: 13 pregnant women had no prenatal care; ++ Prevalence ratio.

Figure 1

Prevalence of consumption of different alcoholic drinks according to trimester of pregnancy among pregnant women in Rio Grande-RS, who consumed alcohol during pregnancy; 2013 (N=251).



* Chi square linear trend test: $p < 0.001$.

Discussion

This study found high alcohol intake prevalence during pregnancy. It also showed that being older, having brown skin colour, living without a partner, having less schooling, using illicit drugs, having self-reported depression during pregnancy, higher parity and beginning prenatal care late are all associated with the outcome. Beer was the most frequently consumed beverage, with a tendency of intake reducing between the first and third trimesters of pregnancy. Among mothers who drank alcohol during pregnancy, those who were older, had less schooling and used illicit drugs were found to have a greater propensity to consuming larger quantities of alcohol.

Alcohol intake prevalence during pregnancy in Rio Grande is similar to that reported in one study conducted in a public maternity hospital in Rio de Janeiro city.¹² Notwithstanding, it is lower than the prevalence reported by another study also conducted in public maternity hospitals in Rio de Janeiro city.¹⁶ These two studies only included Unified Health System users. As such, the parturients assessed may not represent the entire population of pregnant women in Rio de Janeiro city. In addition, different instruments and different definitions of alcohol intake may also explain the variability in the findings.

Studies conducted in the United States and Canada show prevalence rates of alcohol intake during pregnancy similar to those found in Rio Grande, i.e. 10.4% and 10.8%, respectively.^{17,18} Although socio-economic and methodological differences prevent more in-depth comparison, it is evident that despite abstinence from alcohol during pregnancy being recommended, at least one in ten pregnant women uses this substance at some time during pregnancy. It is therefore a frequent problem occurring in countries/regions with great differences in relation to levels of economic development and population and cultural differences.

Women aged 30 or over are more likely to drink alcohol during pregnancy and also drink excessively. This finding may arise from the fact that older women are more subject to behaviours that become established over the course of life, such as, for instance, tobacco smoking. Moreover, these women have higher parity, which may give them a false sense of security about the outcome of their pregnancy, whereby they take on risk behaviours.^{10,11}

Women with brown skin colour have higher prevalence ratio for alcohol intake during pregnancy owing to their being more subject to worse living conditions than women with white skin colour, and this may increase the potential of their vulnerability to alcohol.^{10,12,19-22}

Several studies show that living without a partner is a risk factor for alcohol intake during pregnancy.^{12,16,20,21} This is due to the fact that pregnancy among single women is frequently related to factors associated with drinking alcohol, including low socio-economic status, stress because of being the main/only family breadwinners and the occurrence of unplanned or unwanted pregnancy.^{12,13,23}

Diverse studies have shown that alcohol use is more prevalent among women with low levels of schooling.^{10,20,23,24} This may be the result of less access to information and greater propensity to behaviours associated with alcohol consumption, including tobacco smoking and illicit drug use. It has also been found that the prevalence of alcohol intake among tobacco smokers is twice that found among non-smokers^{25,26} and up to five times higher among illicit drug users, thus providing evidence that these are behaviours associated with alcoholic drink intake.^{19,21}

According to the literature, self-reported depression increases the likelihood of alcohol use as mental morbidities are commonly associated with the use of substances such as alcohol, cigarettes and other illicit drugs. The possibility of reverse causality exists in this study, given that self-reported depression is susceptible to the outcome studied here. Notwithstanding, screening psychiatric symptoms during pregnancy can help to identify alcohol use, as well as the use of tobacco and illicit drugs.¹³

The pregnant women who began prenatal care late are, probably, women from settings with poor living conditions and difficult access to health services, and this may also favour alcohol intake. In addition, women who use alcohol have characteristics and behaviours that may lead them to use health services less, thus resulting in a late start

to prenatal care.

In addition to maternal age, schooling and illicit drug use were also variables strongly associated with excessive alcohol use among parturients reporting alcohol intake during pregnancy. These results show that women with these characteristics are even more susceptible to consuming alcoholic drinks and, therefore, need greater care from health professionals and health services.

This study has some limitations. One of them relates to self-reported alcohol intake. It is possible that prevalence reported in this study may be underestimated owing to the fact that some interviewees may have answered the questionnaire negatively for fear of being criticized. Moreover, a standardized/validated instrument was not used to assess alcohol consumption. In addition, there may be memory recall error in relation to the number of drinks consumed in the different stages of pregnancy assessed. With regard to the analysis of factors associated with excessive intake, the “tobacco smoking” and “parity” variables probably lost statistical significance in their association with the outcome owing, fortunately, to the low number of pregnant women reporting this practice.

This study provides a description of parturient women in Rio Grande who consumed alcoholic drink during pregnancy, showing which of them are more vulnerable to a risk factor that is extremely harmful to maternal and fetal health. It is important to stress the need for early identification by prenatal care services of women who consume alcohol during pregnancy. Health professionals also need to be trained in order to be able to deal with this problem which often goes unnoticed during routine appointments. In addition, campaigns are needed to guide women of child-bearing age and who intend to become pregnant about the importance of abstaining from alcohol intake during pregnancy.

References

1. World Health Organization. Global status report on alcohol and health 2014. Luxemburgo; 2014.
2. 2015-2020 Dietary Guidelines. U.S. Department of Health and Human Services / Department of Agriculture; 2015.
3. Andersen AM, Andersen PK, Olsen J, Gronbaek M, Strandberg-Larsen K. Moderate alcohol intake during pregnancy and risk of fetal death. *Int J Epidemiol.* 2012; 41 (2): 405-13.
4. Federação Brasileira das Associações de Ginecologia e Obstetrícia. Manual de assistência pré-natal. São Paulo: FEBRASGO; 2014.
5. Dawson DA, Das A, Faden VB, Bhaskar B, Krulewitch CJ, Wesley B. Screening for high and moderate risk drinking during pregnancy: a comparison of several TWEAK-based screeners. *Alcohol Clin Exp Res.* 2001; 25 (9): 1342-9.
6. Kaup ZOL, Merighi MAB, Tsunehiro MA. Avaliação do Consumo de Bebida Alcoólica Durante a Gravidez/Evaluation of Alcohol Consumption during Pregnancy. *Rev Bras Ginecol Obstet.* 2001; 23 (9): 575-80.
7. Hoyme HE, May PA, Kalberg WO, Kodituwakku P, Gossage JP, Trujillo PM, Buckley DG, Miller JH, Aragon AS, Khaole N, Viljoen DL, Jones KL, Robinson LK. A practical clinical approach to diagnosis of fetal alcohol

- spectrum disorders: clarification of the 1996 institute of medicine criteria. *Pediatrics*. 2005; 115 (1): 39-47.
8. Maloney E, Hutchinson D, Burns L, Mattick RP, Black E. Prevalence and predictors of alcohol use in pregnancy and breastfeeding among Australian women. *Birth*. 2011; 38 (1): 3-9.
 9. McLafferty LP, Becker M, Dresner N, Meltzer-Brody S, Gopalan P, Glance J, Victor GS, Mittal L, Marshalek P, Lander L, Worley LL. Guidelines for the Management of Pregnant Women With Substance Use Disorders. *Psychosomatics*. 2016; 57 (2): 115-30.
 10. Moraes CL, Reichenheim ME. Screening for alcohol use by pregnant women of public health care in Rio de Janeiro, Brazil. *Rev Saúde Pública*. 2007; 41 (5): 695-703.
 11. Walker MJ, Al-Sahab B, Islam F, Tamim H. The epidemiology of alcohol utilization during pregnancy: an analysis of the Canadian Maternity Experiences Survey (MES). *BMC Pregnancy Childbirth*. 2011; 11: 52.
 12. Freire K, Padilha Pde C, Saunders C. Factors associated to alcohol and smoking use in pregnancy. *Rev Bras Ginecol Obstet*. 2009; 31 (7): 335-41.
 13. Havens JR, Simmons LA, Shannon LM, Hansen WF. Factors associated with substance use during pregnancy: Results from a national sample. *Drug and Alcohol Depend*. 2009; 99 (2009): 89-95.
 14. Stata. *Stata Statistical Software: Release 14*. College Station, TX: StataCorp LP. 2015.
 15. Dias-Damé JL, Cesar JA. Disparities in Prevalence of Smoking and Smoking Cessation during Pregnancy: A Population-Based Study. *BioMed Res Int*. 2015; 2015.
 16. Moraes CL, Reichenheim ME. Rastreamento de uso de álcool por gestantes de serviços públicos de saúde do Rio de Janeiro. *Rev Saúde Pública*. 2005; 41 (5): 695-703.
 17. Alshaarawy O, Breslau N, Anthony JC. Monthly Estimates of Alcohol Drinking During Pregnancy: United States, 2002-2011. *J Stud Alcohol Drugs*. 2016; 77 (2): 272-6.
 18. Walker MJ, Al-Sahab B, Islam F, Tamim H. The epidemiology of alcohol utilization during pregnancy: an analysis of the Canadian Maternity Experiences Survey (MES). *BMC Pregnancy Childbirth*. 2011; 11 (52).
 19. Cameron CM, Davey TM, Kendall E, Wilson A, McClure RJ. Changes in alcohol consumption in pregnant Australian women between 2007 and 2011. *Med J Aust*. 2013 Sep 2; 199 (5): 355-7.
 20. Mesquita MA, Segre CAM. Frequência dos efeitos do álcool no feto e padrão de consumo de bebidas alcoólicas pelas gestantes de maternidade pública da cidade de São Paulo. *Rev Bras Crescimento Desenvolv Hum*. 2009; 19 (1): 63-77.
 21. O'Keefe LM, Kearney PM, McCarthy FP, Khashan AS, Greene RA, North RA, Poston L, McCowan LME, Barker PN, Dekker GA, Walker JJ, Taylor R, Kenny LC. Prevalence and predictors of alcohol use during pregnancy: findings from international multicentre cohort studies. *BMJ Open*. 2015; 5 (7): e006323.
 22. Santos MM, Porto PN, Oliveira JFd, Pires CGdS, Araújo AJdS. Associação entre características sociodemográficas e frequência de uso de álcool por gestantes. *Rev Baia Enf*. 2016; 30 (2).
 23. Leonardson GR, Loudenburg R. Risk factors for alcohol use during pregnancy in a multistate area. *Neurotoxicol Teratol*. 2003; 25 (6): 651-8.
 24. Li Q, Hankin J, Wilsnack SC, Abel EL, Kirby RS, Keith LG, Obican SG. Detection of alcohol use in the second trimester among low-income pregnant women in the prenatal care settings in Jefferson County, Alabama. *Alcohol Clin Exp Res*. 2012; 36 (8): 1449-55.
 25. Comasco E, Hallberg G, Helander A, Orelund L, Sundelin-Wahlsten V. Alcohol consumption among pregnant women in a Swedish sample and its effects on the newborn outcomes. *Alcohol Clin Exp Res*. 2012; 36 (10): 1779-86.
 26. Lanting CI, van Dommelen P, van der Pal-de Bruin KM, Bennebroek Gravenhorst J, van Wouwe JP. Prevalence and pattern of alcohol consumption during pregnancy in the Netherlands. *BMC Public Health*. 2015; 15: 723.

Received on February 8, 2017

Final version presented on July 4, 2017

Approved on September 19, 2017