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Avaliação do impacto do uso de cigarro, álcool e drogas ilegais no aborto entre as mulheres grávidas em São Paulo, Brasil*

Assessing the impact of alcohol, tobacco and illegal drugs on miscarriage among pregnant women in São Paulo, Brazil

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ABSTRACT: Prevalence of use and misuse of substances may be increasing during pregnancy in Brazil. We describe the patterns of consumption of alcohol, tobacco and illegal drugs among pregnant women attending prenatal care service and explore whether there is a negative impact of these substances on the probability of having a miscarriage. Data from 133 women attending prenatal care in the city of São Paulo, Brazil during 2010 and 2011 were analyzed. Women who consumed crack were 3.23 times more likely than pregnant users of alcohol and other drugs to have a miscarriage, even after controlling for marijuana use, age and education.

KEYWORDS: Smoking/adverse effects; Tobacco products; Street drugs/adverse effects; alcoholism; Abortion; Pregnant women

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INTRODUCTION

Prevalence of use and misuse of substances may be increasing during pregnancy in Brazil (PINHEIRO et al., 2005). In the United States, substance use and misuse have increased over the last 30 years (KEEGAN et al., 2010). Approximately 225,000 yearly infants are exposed to illicit substances while in the uterus (KEEGAN et al., 2010).

Substance use and abuse are associated with negative outcomes during pregnancy (KEEGAN et al., 2010). Tobacco use is associated with spontaneous miscarriage, fetal growth restriction, and preterm delivery (KEEGAN et al., 2010). Alcohol use and abuse cause fetal alcohol spectrum disorder (PINHEIRO et al., 2005; KEEGAN et al., 2010). Cocaine abuse is associated with fetal growth restriction and potentially catastrophic placental abruption, premature rupture of membranes and stillbirth (KEEGAN et al., 2010). Marijuana use is associated with fetal growth restriction as well, however, the impact is not as strong as with the use of other drugs (KEEGAN et al., 2010).

A recent study conducted in São Paulo, Brazil with teenage pregnant women concluded that there are mainly two risk factors related to the use of drugs during pregnancy: age under 14 years and 3 or more life sexual partners. Socioeconomic factors were not associated with higher risk of drug consumption during pregnancy (BESSA et al., 2010).

There is some evidence that drug use and misuse among young women in Brazil, especially in urban centers, are increasing (CARLINI et al., 2005). Data collected in 2009 in capitals in Brazil indicated that prevalence of tobacco use among women aged 18 years and over was 12,4% (SILVA et al., 2011). Prevalence of tobacco use was lower among younger women aged 18-29 years (11.7%), but has been increasing since 2006 (SILVA et al., 2011). A recent study indicated that 26,3% men reported being heavy drinkers in the last 12-month period, compared to 10.9% among women, with a male/female ratio of heavy drinkers of 2,4 (SILVEIRA et al., 2012). Prevalence of heavy drinking was associated with younger age and tobacco use (SILVEIRA et al., 2012). In 2005, the prevalence of cocaine use in 108 cities in Brazil among women was 1,2%; an increase from the previous 0,9% in 2001 (CARLINI et al., 2005). Prevalence of crack cocaine, a "purified, alkaloidal, extra-potent form of cocaine"(1) was 0,2% of the female population aged 12 to 65 (CARLINI et al., 2005). Prevalence rate related to marijuana use by women in Brazil was 5.1% in 2005 (CARLINI et al., 2005).

This study has two aims. First, we describe the patterns of consumption of alcohol, tobacco and illegal drugs among pregnant women attending prenatal care service and second, explore whether there is a negative impact of these substances on the probability of having a miscarriage.

METHODOLOGICAL PROCEDURES

Approval from Ethics Committee

This project was approved by the research ethics committee of the Hospital das Clínicas de Ribeirão Preto, protocol number 12627/2009.

Data from this study are derived from a larger multicenter project, which focused on the evaluation of interventions for alcohol, tobacco and or illegal drugs among pregnant women in Brazil. This cross-sectional study (POLIT et al., 1995) focused on data from pregnant women attending prenatal care services at the Amparo Maternal Hospital, located in São Paulo. In this service, prenatal care is the responsibility of nurse and midwives, teachers of the School of Nursing at the University of São Paulo (EEUSP), as well as graduate and undergraduate nursing students from both private and public institutions. The clientele consists of women of low obstetric risk, from different regions of the city of São Paulo and in some cases, other municipalities, as well as those living in the shelter located in the same institution. The average daily attendance of prenatal care is 20 women, including four to five new women per day. The study site was chosen because it is situated in a central region of São Paulo, with easy access via public transportation, which makes it sought after by a great diversity of women (KOFFMAN; BONADIO, 2005).

Data were obtained through the medical records of women attending prenatal during the period of January of 2010 to August of 2011. In the period covered by the study, 609 pregnant women attended prenatal care services at the Amparo Maternal Hospital. Medical records of women with history of alcohol, tobacco or illegal drugs were included in the analyses. Of these, 133 (22%) had records of use of alcohol, tobacco or other drugs. Three women did not provide information on the number of abortions and miscarriage and were excluded from the regression analyses. There were only four women who reported an episode of

(1) As defined by Medical Subject Headings MeSH term from the National Center for Biotechnology Information – NCBI, available in http://www.ncbi.nlm.nih.gov/mesh/68016578

induced abortion.

Variables

Demographic, social and health information were obtained from the records of the pregnant women. Data on selected variables will be used in this study: race (white, black or pardos), age (divided into age groups), marital status (single, married, live together, divorced or separated), educational level, number of pregnancies, and number of abortions/miscarriages. Records are filled by nurses from the prenatal service care, in the patient's first contact with the service. Information about drugs use (such as alcohol, tobacco or other drugs) was collected by the nurse midwives at the first prenatal consultation, and was taken from the recording sheet of the same screening.

Data analysis

We used descriptive statistics and performed multiple regression analyses. We used various statistical approaches to better fit the data (i.e. ordinary least squares, logistic regression, Poisson and negative binomial). We highlight that in the first, third and fourth model, the dependent variable is the number of abortions (miscarriages) that took place while in the second model we use a binary variable, where 0 means no abortion and 1 the presence of one or more abortions. In all analysis, we used robust standard errors (TADANO et al., 2009). All analyses were performed using the Stata 11.0 (Stata Corporation, College Station, USA).

For the selection of variables, we first performed analysis between each type of drug and incidence of miscarriage and abortion. Variables in the univariate analysis in which the p-value was smaller than 0,20 were included in the multivariate analysis (TADANO et al., 2009). The final model only included variables with p-values <0,05 and the two control variables, age and educational level.

RESULTS

Characterization of the sample

More than 50% of pregnant women who uses alcohol, tobacco and other drugs are concentrated in the range of 21 to 30 years. Only 7% of our population is younger than 15 years. Regarding skin color, most women reported being white (44%) or pardo (42%). About 30% of the women in our sample have a high school degree or higher. Concerning marital status, only 27% of women are married, 53% of them declared to be single. About 1/3 of the sample were nulliparous and only 13% had four or more pregnancies. Most women (59%) had a child. Around 30% of the population of women have suffered miscarriage or induced abortion. About a third (31%) had never smoked, 10% had smoked in the past and 54% were current smokers. The drugs most often consumed by pregnant women in our study sample were alcohol (26%) and tobacco (54%). When analyzing the data for the total of women attending the service during the study period, 5,6% of those have made use of alcohol, and 11,8% of tobacco. Among 609 women who attended the service, 3,8% reported using marijuana. Both marijuana and cocaine use was more common in women in age range from 11 to 24 years (69% of marijuana users and 61% of cocaine users). The prevalence of crack use was 72% in the age group 20-29 years (13 of 18 women). Tobacco use was more prevalent in the age group 20-24 years (33%).

Table 2 shows the distribution of substance use by educational level. The prevalence of substance use is higher among pregnant women with lower educational levels. Among women who use marijuana, more than half were illiterate or had not completed basic education. Over half (61%) of cocaine users and half of the crack users were illiterate or had not completed basic education.

Influence of drugs on the outcome of pregnancy

Table 3 shows the results of each set of univariate regressions. The variable crack was statistically significant in three of the four models. Use of crack was positively associated with miscarriage and abortion. Use of alcohol was also positively associated with miscarriage and abortion. Use of marijuana was negatively associated with miscarriage and abortion, which is an unexpected result. Next, we performed multivariate analyses that include these three substances and controlling for age and educational level. The results are in Table 4.

Again, the only variable p-value less than 0,05 in three of the multivariate models was the variable crack. All other variables, with the exception of the education variable, showed a statistical effect no different from zero. Thus, we can see that the only drug that has a significant impact on the occurrence of abortions is crack in a sample of women who use alcohol and other drugs.

Table 1- Characteristics of pregnant women attending a prenatal care service in São Paulo, 2011

Variables	n	%
Age groups		
11 to 19	33	24,8%
20 to 24	44	33,1%
25 to 29	31	23,3%
30 or more	25	18,8%
Skin color		
White	59	44%
Black	11	8%
Pardos	56	42%
Missing	7	5%
Educational level		
Illiterate or incomplete basic education	50	37,6%
Complete basic education or incomplete high-school	42	31,6%
Complete High-School or Some Higher Education	38	28,6%
Missing	3	2,3%
Marital status		
Single	70	53%
Married	7	5%
Live together	29	22%
Separated or Divorced	1	1%
Missing	26	20%
Number of pregnancies (including current)		
1	46	35%
2	31	23%
3	22	17%
4	15	11%
from 5 to 8	16	13%
Missing	3	2%
Number of alive children		
0	55	41%
1	34	26%
2	22	17%
3	11	8%
from 4 to 7	8	7%
Missing	3	2%
Number of Miscarriages/Abortions		
0	94	71%
1	30	23%
2	5	4%
5	1	1%
Missing	3	2%
Drugs used		
Alcohol	34	26%
3 or more drinks	3	2%
Alcohol (no specification)	21	16%
Alcohol socially	10	8%
Tobacco	86	54%
Never smoked	42	31,6%
Smoking currently	72	54,1%
Smoked in the past	14	10,5%
Missing	5	3,8%
Marijuana	23	17%
Cocaine	23	17%
Crack	18	14%
Ecstasy	1	1%
Heroine	1	1%
Ether Spray	4	3%
LSD	1	1%

Table 2 - Distribution of alcohol, tobacco and illegal drugs by educational level in São Paulo, 2010-2011

Educational level	Alcohol		Tobacco		Marijuana		Cocaine		Crack	
	n	%	n	%	n	%	n	%	n	%
Illiterate or incomplete basic education	15	44,1%	24	33,3%	12	52,2%	14	60,9%	9	50,0%
Complete basic education or incomplete high-school	10	29,4%	30	41,7%	5	21,7%	5	21,7%	3	16,7%
Complete high-school or some higher education	7	20,6%	17	23,6%	6	26,1%	3	13,0%	6	33,3%
Missing	2	5,9%	1	1,4%	0	0%	1	4,3%	0	0%
Total	34	100%	72	100%	23	100%	23	100%	18	100%

Table 3 - Coefficients. Odds-ratios and p-values of univariate regressions for the models adopted. São Paulo, 2011

Univariate Analysis	Model	OLS	LOGIT*	POISSON	NEGATIVE BINOMIAL
Alcohol	Coefficient	0,1335	**2,4762**	0,4139	0,4139
	p-value	0,260	**0,043**	0,252	0,252
Tobacco	Coefficient	0,1122	1,7211	0,4046	0, 4046
	p-value	0,325	0,262	0,351	0,351
Marijuana	Coefficient	**(0,1998)**	0,4389	(0,9288)	(0,9288)
	p-value	**0,044**	0,213	0,108	0,108
Cocaine	Coefficient	(0,0939)	0,6478	(0,3591)	(0,3591)
	p-value	0,456	0,467	0,500	0,500
Crack	Coefficient	**0,3679**	**3,2364**	**0,9212**	**0,9212**
	p-value	**0,054**	**0,028**	**0,015**	**0,015**

Note: Numbers in parenthesis are negative. Bold and underlined = p<0,05. * Odds-ratio.

Logistic regression was used to assess the effect of crack on the odds of spontaneous abortion (miscarriage). Table 4 presents the odds-ratios related to crack and marijuana in univariate and multivariate models. Results indicated that pregnant women who consumed crack were 3,23 times more likely than pregnant users of alcohol and other drugs to have a miscarriage, even after controlling for the effects of marijuana use, age and education.

Table 4 - Multivariate variables for marijuana and crack, with controls for age and education in São Paulo, 2010-2011

Multiple analysis	Model	OLS	LOGIT*	POISSON	NEGATIVE BINOMIAL
Crack	Coefficient	0,3553	**3,4893**	**0,9507**	**0,9618**
	p-value	0,068	**0,024**	**0,012**	**0,012**
Marijuana	Coefficient	(0,1623)	0,4608	(0,8384)	(0,8906)
	p-value	0,080	0,221	0,102	0,080
Alcohol	Coefficient	0,1099	2,3754	0,3768	0,4545
	p-value	0,398	0,088	0,338	0,207
Age	Coefficient	0,0146	1,0459	**0,0493**	**0,0500**
	p-value	0,151	0,258	**0,043**	**0,059**
Schooling	Coefficient	(0,195)	0,8288	(0,0271)	(0,0313)
	p-value	0,760	0,531	0,892	0,875
Constant	Coefficient	(0,0667)	-	**(2,6127)**	**(2,6406)**
	p-value	0,754	-	**≤0,001**	**≤0,001**

Note: Multivariate regressions include age and education as control variables. * Odds-ratio

DISCUSSION

Women in our sample had higher prevalence of miscarriage (39 out of 133, 30%), and four of these were induced abortion. The prevalence of abortion and miscarriage among women in the general population is considerably lower at 16,4% (CECATTI et al., 2010). However, given the fact that induced abortion suffers the consequences of blind social desirability, we believe that both estimates may be underestimated as people tend to deny or under report habits that are condemned by the society (GAN et al., 2006; DE TORRES et al., 2009; CECATTI et al., 2010). Women in this study reported higher levels of drug use of all substances, except for alcohol, than those reported by pregnant women in the II National Household Survey on the use of psychotropic drugs in Brazil, conducted in 2005 (CARLINI et al., 2005). Crack cocaine users had higher risks for miscarriage and abortion even when compared with women consuming other drugs and substances. Our findings are consistent with previous literature that indicated that cocaine use is associated with placental abruption and premature rupture of membrane (ADDIS et al., 2001). Even though we do not have data, previous studies have shown that cocaine use is also associated with prematurity, decreased fetal growth and other perinatal changes (ADDIS et al., 2001). Children of cocaine user mothers who are born alive may have mental retardation or other mental and behavioral disorders that will bring serious consequences for their lives (ADDIS et al., 2001).

The schooling level of the studied population is very low (38% of women without basic education) when compared to national average. Individuals of low socioeconomic status are more likely to develop the use and dependence (VAN GELDER et al., 2010). Education influences the degree of social and political participation. Data from the Brazilian Census Bureau (IBGE) show that those with 11 or more years of study are three times more likely than those with low education (no education or with less than four years study) to be socially and politically engaged (IBGE, 1997). Thus, important preventive and educational actions that are often disseminated in schools and other political and social venues, fail to reach these women, increasing the likelihood that they become vulnerable to several risk behaviors, including the use of drugs and alcohol during pregnancy (IBGE, 1997).

Most women attending this prenatal care reported having no marital relationship with the father of the child or any other partner, which makes their children more socially vulnerable. Children and adolescents raised in single parent families are more vulnerable to drug use, we can say that the children of these women also find themselves in a situation of great social vulnerability (MARTINS; PILLON, 2008).

Limitations of the Study

The data on drug use was collected from existing medical records and based on a single question “Do you use drugs?”, with the possibilities of answering “yes” or “no” and a space to answer “Which”. Consumption of tobacco and alcohol may be underestimated given this protocol as most of the population may not consider alcohol or tobacco to be drugs. Furthermore, this study does not allow generalizations, since the data were collected in only one prenatal health unit.

Future Studies

Medical records and admittance files lack adequate information about use of tobacco, alcohol and other drugs, which can impair future studies. Prenatal services should implement a more accurate data collection regarding drug use and misuse, with specific questions about alcohol consumption, specifying that the consumption of beverages most commonly used and most accepted socially (such as beer and wine) should also be reported. Detailed data on tobacco and drug use should also be included. Future studies should include larger number of participants from various prenatal services in different geographic areas.

CONCLUSIONS

Consumption of crack increases the chances of spontaneous abortion for the population of pregnant women who use alcohol and other drugs, resulting in negative pregnancy outcome, confirming our initial hypothesis. It was not possible with the available data to find associations and other impacts of drug use during pregnancy. Actions aimed at preventing drug use are needed, so that complications are avoided during pregnancy. Furthermore, we must pay attention to the fact that preventive measures only in schools may not reach the entire population, being necessary actions to reach, sometimes, hard to reach population groups.

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