Marijuana, tobacco, alcohol and cocaine use during pregnancy in 2013 and 2016. A self-report study in Montevideo, Uruguay

Autodeclaración del consumo de marihuana, tabaco, alcohol y derivados de cocaína en embarazadas en 2013 y 2016, Montevideo, Uruguay

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Abstract

Background: Uruguay passed Law 19.172 on December 20, 2013, thus enabling the State to regulate the production, distribution, sale, and consumption of cannabis. *Objectives*: to determine the change in maternal self-report of marijuana, tobacco, alcohol, and cocaine use during pregnancy between 2013 and 2016. *Methods*: cross-sectional, descriptive, analytical study between 2013 and 2016. The sample consists of pregnant woman who delivered and received immediate postpartum care at the Centro Hospitalario Pereira Rossell in Montevideo, Uruguay. The instrument was a protocolized survey that assessed outcomes such as sociodemographic level, years of formal education, data on pregnancy, childbirth, newborn, and substance use before and during pregnancy. *Results*: the sample consisted of 577 pregnant women, 319 corresponding to interviews conducted in 2013 and 258 in 2016. Regarding alcohol intake, 76 (23.82%) women reported drinking while pregnant in 2013, whereas in 2016, 91 (35,3%) (p=.003) did so. As for tobacco, 59 (43%) quit smoking when they found out about their pregnancy in 2013, and 69 (60%) quit in 2016 (p=0,008). In 2013, 41 women (12.85%) smoked marijuana until they discovered their pregnancy, and 79 (30%) did so in 2016 ($p < .001$). The use of cocaine and its derivatives did not change significantly between 2013 and 2016. *Conclusions*: between 2013 and 2016, there was a significant increase in the self-report of marijuana and alcohol consumption before and during pregnancy. The consumption of cocaine and cocaine base paste remained stable during this period. Tobacco use decreased significantly in pregnant women.

Key Words: Cannabis; Tobacco; Alcohol; Pregnancy; Self-report.

Resumen

Introducción: Uruguay es el primer país en modificar la legislación sobre el consumo recreativo de cannabis, mediante la Ley 19.172 del 20 de diciembre de 2013, otorgando al Estado la potestad de regular su producción y comercialización. *Objetivo*: evaluar las prevalencias de la autodeclaración del consumo de marihuana, tabaco, alcohol, cocaína y derivados y su evolución temporal en embarazadas para los años 2013 y 2016. *Metodología*: estudio descriptivo, transversal y analítico, durante dos períodos de tiempo, en 2013 y 2016. Se incluyeron mujeres que tuvieron su parto y puerperio inmediato en el Centro Hospitalario Pereira Rossell (CHPR) de Montevideo, Uruguay. Se realizó una encuesta protocolizada sobre su nivel sociodemográfico, años de educación formal, datos del embarazo, parto, recién nacido y consumo de sustancias antes y durante la gestación. *Resultados*: en la investigación participaron 577 mujeres, 319 correspondientes a las entrevistas realizadas en el año 2013 y 258 en 2016. Respecto al alcohol, 76 (23,82%) mujeres declaran su consumo durante el embarazo en 2013, mientras que, en 2016, 91 (35,3%) (p=0,003). En cuanto al tabaco, 59 (43%) dejaron de fumar al enterarse del embarazo en 2013 y 69 (60%) en 2016 (p=0,008). En 2013, 41 mujeres (12,85%) fumaron marihuana hasta saber del embarazo y 79 (30%) en 2016 (p<0,001). Durante la gestación, en 2013 declararon fumar marihuana 5 mujeres (1,57%), mientras que en 2016 fueron 28 (10,85%) (p<0,001). El uso de cocaína y pasta base de cocaína (PBC) no cambió significativamente entre 2013 y 2016. *Conclusiones*: Entre los años 2013 y 2016 se observó un aumento significativo en la autodeclaración del consumo de marihuana y alcohol antes y durante el embarazo. El consumo de cocaína y pasta base de cocaína se mantuvo estable en ese periodo. El consumo de tabaco disminuyó significativamente en mujeres embarazadas.

Palabras clave: Cannabis; Tabaco; Alcohol; Embarazo; Autodeclaración.

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In Uruguay, a change in the legislation on substance consumption for recreational use, specifically tobacco, alcohol, and cannabis, is taking place. Law 18.256 was passed in 2008, regulating the marketing and consumption of tobacco in public spaces. This law prohibits smoking or holding lighted tobacco in enclosed public or private spaces and all forms of advertising, promotion, and sponsorship of tobacco products. Currently, steps are being taken to regulate the consumption of alcoholic beverages. Uruguay is the first country to amend legislation on the recreational use of cannabis, through Law 19.172, which gives the State the power to regulate its production and marketing, allowing the planting, cultivation, and sale of psychoactive cannabis under the supervision of the regulatory bodies of the Uruguayan State. The consumption of recreational legal and illegal substances during pregnancy has a negative impact on the health of the woman and on fetal development (Ko, Farr, Tong, Creanga & Callaghan, 2015). It is important to understand the characteristics of consumption in the population in order to guide health policy with the aim of encouraging healthy behaviors.

According to "Junta Nacional de Drogas de Uruguay" (National Board of Drugs of Uruguay), 62.2% of Uruguayan women consumed alcoholic beverages in the past year, with a peak of incidence between 26 and 35 years old, a period that coincides with women's sexual reproductive age (National Board of Drugs of Uruguay, 2016). This behavior during pregnancy determines an increase in the probability of the emergence of the Fetal Alcohol Syndrome (FAS) and its developmental alterations, persistent throughout life, grouped under the denomination of Fetal Alcohol Alterations Spectrum (Valentine et al., 2017; Myers et al., 2017).

Although the prevalence of smoking in Uruguay decreased as a result of the implementation of the bans, 24.9% of Uruguayan women are smokers. Both active and passive smoking during gestation determine an increase in the prevalence of fetal complications such as low birth weight and Sudden Infant Death Syndrome (SIDS) (Berrueta et al., 2016; Cooper et al., 2017).

We are witnessing a worldwide increase in the consumption of marijuana for recreational purposes, with greater social acceptance and changes in the legislation governing it. Exposure to cannabis during pregnancy increases the risk of anemia in women and the newborn's probability of admission to a Neonatal Intensive Care Unit (Emery, Gregory, Grace & Levine, 2016; Gunn et al., 2016). The use of cannabis during pregnancy does not determine birth defects and, at present, no characteristic phenotype is recognized (Warner, Roussos-Ross & Behnke, 2014). It is associated with a decrease in weight and cephalic circumference at birth. This alteration of fetal growth is dose-dependent (Conner et al., 2015). No relationship between the consumption of marijuana during pregnancy and IQ were observed, but the executive functions such as attention, short-term memory, and verbal processing are affected (Goldschmidt, Richardson, Larkby & Day, 2016; Goldschmidt, Richardson, Willford & Day, 2008). These changes may be related to the anatomical changes in the cerebral cortex described in nuclear magnetic resonance (El Marroun et al., 2016; Grant, Petroff, Isoherranen, Stella & Burbacher, 2017).

Cocaine and its derivatives has a marked impact on maternal and fetal health, in addition to legal consequences, so it is essential to identify those cases of consumption for an adequate follow-up of the exposed neonate (García, Campistol, López-Vilchez, Morcillo & Mur, 2017). Its consumption causes maternal hypertension, vasoconstriction, and decreased uterine flow, determining a lower supply of oxygen and nutrients to the fetus. It increases the risk of prematurity and stillbirth. Higher incidence of neuro-excitability has been described but the presence of a clear abstinence syndrome has not been observed. In terms of growth, it is associated with lower weight, length, and head circumference at birth. During childhood, alterations in IQ and attention, with higher incidence of attentional deficits and hyperactivity, are observed (Smith & Santos, 2016). In Uruguay, the consumption and possession of illegal substances for personal use is not punishable by law.

It is relevant to know the evolution of self-reported consumption of substances for recreational use in pregnant women, in the context of the changes in health policy. The consumption of psychoactive substances has adverse effects on the health of the mother and her children. The behavior of substance consumption and negligent acts by pregnant women can violate the rights of their children. It is important to evaluate how changes in health policies can influence substance consumption in pregnant women, either positively or negatively.

The objective of the present study is to assess the prevalence of self-reports of the consumption of marijuana, tobacco, alcohol, cocaine, and derivatives and its temporal evolution during the years 2013 and 2016.

Material and methods

A descriptive, cross-sectional, and analytic study was performed during two time intervals, in 2013 and 2016. We included women who had given birth and undergone immediate postpartum care at the Centro Hospitalario Pereira Rossell (CHPR [Hospital Center Pereira Rossell]) of Montevideo, Uruguay. The CHPR is a reference public hospital in Montevideo and the metropolitan area in the support of children, women, and pregnant women, whose population typically comes from the most vulnerable sectors of society. The sample size was estimated with reference to the substance of lower expected consumption, cocaine and its derivatives. Using this calculation, we included 252 wo-

men, for a population of 8000 annual births in the CHPR with an expected ratio of 6.5%, a confidence level of 95% and an accuracy of 3% (range 3.5% - 9, 5%) (Moraes, Sosa, Umpiérrez & González, 2014). The calculated sample size and method of randomization were aimed to ensure the representativeness of the sample.

Specific exclusion criteria were: neonate less than 35 weeks of gestational age, multiple pregnancy, congenital infection of the central nervous system, major congenital malformations, and newborn exposed to infection by the Human Immunodeficiency Virus (HIV), or with low birth weight. these exclusion criteria were chosen because these factors have a negative influence on long-term child development, and the authors considered assessing the effects of substance consumption on child development in a second stage.

To ensure that the sample representative was of the entire population, we employed probabilistic sampling using a randomization computer program that selected the case study based on the number of births in the last 24 hours. In the event that the participant should be excluded or did not sign the informed consent, the program assigned an alternative case.

After obtaining the informed consent of the selected case, a protocolized survey of their sociodemographic level, data about the pregnancy and birth, the newborn, and substance consumption before and during pregnancy was performed. Subsequently, their medical history was analyzed to corroborate this information.

The survey was structured with a clear, unambiguous design. Prior to the start of the study, in 2013 and 2016, a pilot study was conducted, interviewing 20 women each year in order to recognize their strengths and weaknesses, after which the team validated the final form.

The interviews were conducted by four members of the research team previously trained for this purpose. Each participant was identified with a sequential three-digit number at the time of the interview. Thus, no personal information was requested, and confidentiality was maintained throughout the process.

The following demographic information was obtained: mother's name, date of birth of mother, ethnicity, marital status, whether she lied with her partner, educational level, work, household composition, income, pregnancy planning. The definition of the "Instituto Nacional de Estadística" (INE- National Institute of Statistics) of Uruguay of the situation of indigence of households whose income cannot cover their basic needs of food was used for the categorization of income.

In terms of the consumption of tobacco, alcohol, cocaine, marijuana, and cocaine base paste (CBP), the questions included: "Have you ever smoked/taken...?" "For how many years?" "How many per day?" "Per month?" "How many after knowing you were pregnant?" "Does your partner consume...?" "Does he consume it in the same room?" "When did you stop consuming?" For this study, active consumption was considered any consumption during pregnancy (consumption before knowing she was pregnant) and consumption after knowing she was pregnant).

Regarding childbirth and the newborn: birth channel, sex, birth weight, APGAR, gestational age, place of admission, characteristics of the physical examination.

Data were loaded into a ACCESS® database and were subsequently analyzed with the statistical package STATA v11. Firstly, we performed a univariate analysis to identify outlier values. In that case, the principal investigator compared these data with the original survey to validate or correct them.

The qualitative variables (age, marital status, family income, educational level) are presented in absolute numbers and, in the corresponding percentages, the Chi-square test was used to contrast the hypotheses. In all cases, the minimum level of significance considered was $p < .05$.

The individuals' personal identification was confidential, and it is not possible to identify them in the report or in the publications. The questionnaires were eliminated after their incorporation into the database and their subsequent validation.

This study was approved by the Committee of Ethics of the Pereira Rossell Hospital Center prior to its initiation.

Results

The research involved 577 women, 319 corresponding to the interviews of the year 2013, and 258 of 2016.

The sociodemographic characteristics of the sample are shown in Table 1. With the exception of the variable level of family income, we found no statistically significant differences between the two groups. Of the group interviewed in 2013, we highlight that, of the total (319), 267 were over 18 years of age (83.65%), with a mean age of 24.67 years, a maximum age of 42 and a minimum of 13 years. In the variable education, 123 women (38.56%) had less than six years of schooling. Of the total number of interviewees in 2016 (258), 210 were older than 18 years (86.82%), with a mean age of 24.09 years, and a maximum and minimum age of 42 and 13 years, respectively. In reference to the socioeconomic level, 18 women (5.6%) in 2013 were above the poverty line, and 157 (47%) reported family income levels within the range of indigence, the most frequent occupation of the head of the household (60.8%) was informal work for short periods of time. Of the data from 2016, 5 participants reported income above the poverty level (1.94%) and 110 (42.6%) reported levels of indigence. These differences between the 2013 and 2016 surveys were statistically significant. Unplanned pregnancy was the most frequent situation in both periods, 182 cases (57%) in 2013, and 156 (60.5%) in 2016.

Table 1. *Sociodemographic characteristics of the sample in the years 2013 (N = 319) and 2016 (N = 258).*

Sociodemographic data	Values N (%) 2013	Values N (%) 2016	p-value
Age (years)			.214
18 or younger	52 (16.3)	34 (13.8)	
19-34	241 (75.5)	210 (81.4)	
35 or older	26 (8.15)	14 (5.4)	
Marital status			.371
Married	34 (10.66)	17 (6.6)	
Lives with her partner[1]	184 (57.68)	151 (58.5)	
Single	98 (30.7)	87 (33.7)	
Divorced	3 (0.94)	2 (0.78)	
No data/No response	0	1 (0.39)	
Educational level			.658
None	0	1 (0.39)	
Primary[2]	123 (38.56)	91 (35.3)	
Secondary[3] -UTU[4]	188 (58.93)	160 (62)	
Tertiary	8 (2.51)	5 (1.94)	
No data/No response	0	1 (0.39)	
Pregnancy planning			.360
Yes	137 (42.95)	101 (39.1)	
No	181 (56.74)	156 (60.5)	
No data/No response	1 (0.31)	1 (0.31)	
She lives with her partner			.970
No	79 (24.7)	64 (24.8)	
Yes	240 (75.24)	193 (0.75)	
Undetermined	0	1 (0.39)	
Level of family income[5]			.026
Indigence	152 (47.8)	110 (42.6)	
Poverty	142 (44.65)	134 (52)	
Above poverty line	18 (5.66)	5 (1.94)	
No reply	7 (2.19)	9 (2.7)	

Note. [1] More than one year living with the same partner.
[2] Elementary education, first 6 years of schooling.
[3] Secondary school, 6 to 12 years of schooling.
[4] Universidad del Trabajo [University of Work] of Uruguay, between 9 and 12 years of studies.
[5] Income levels according to the scale of the National Institute of Statistics and Census of Uruguay.

Table 2 summarizes the behaviors of tobacco and alcohol consumption during pregnancy.

Regarding alcohol, 76 (23.82%) women reported consumption during pregnancy in 2013, whereas 91 (35.3%) of them reported it in 2016. These differences were statistically significant. The number of episodes of intoxication did not vary significantly in the two research periods.

In 2013, 189 women admitted having smoked sometime in their lifetime, 53 (28%) stopped smoking before pregnancy, and 136 women (42.63%) smoked sometime during pregnancy. In 2016, 143 women reported having smoked sometime in their lifetime, 28 (20%) quit before the pregnancy, and 115 (44.6%) smoked sometime during pregnancy.

Table 2. *Differences in the frequency of drug use according to self-report in pregnant women, between 2013 and 2016.*

Self-report of Drugs	Values N (%) 2013	Values N (%) 2016	p-value
Active consumption of tobacco*			.611
Yes	136 (42.63)	115 (44.6)	
No	183 (57.37)	142 (55)	
No data/No response	0	1 (0.39)	
Passive exposure to tobacco			.000
Yes	167 (52.35)	62 (24)	
No	152 (47.65)	196 (52.7)	
Alcohol consumption			.003
Yes	76 (23.82)	91 (35.3)	
No	241 (75.54)	166 (64.3)	
No data/No response	2 (0.63)	1 (0.39)	
Intoxication			.235
Yes	7 (2.19)	10 (3.8)	
No	312 (97.78)	248 (96.2)	

Note. *Includes any consumption during pregnancy (consumption before knowing she was pregnant) and consumption after knowing that she was pregnant).

Of those who actively smoked when they became pregnant, 59 (43%) quit when learning about their pregnancy in 2013, with that figure increasing in 2016 to 69 (60%) (p = .008). Of the women who continued to smoke, 52 (38%) and 35 (30.4%) smoked, but to a lesser extent, in 2013 and 2016, respectively. Finally, 25 (18%) and 11 (9.5%), respectively for 2013 and 2016, continued smoking without any changes. These differences were statistically significant (Table 3).

Table 3. *Differences in the frequency of tobacco consumption in women before and during pregnancy, between 2013 and 2016.*

Tobacco use	Values N (%) 2013	Values N (%) 2016	p-value
Smoked sometime in her lifetime			.365
Yes	189 (59.2)	143 (55.9)	
No	130 (40.8)	115 (44.1)	
Total	319 (100)	258 (100)	
Stopped smoking before the pregnancy			.075
Yes	53 (28)	28 (20)	
No	136 (72)	115 (80)	
Total	189 (100)	143 (100)	
Smoked during the pregnancy			.020
Smoked until they found out they were pregnant	59 (43)	69 (60)	
They smoked less	52 (38)	35 (30.4)	
Continued smoking as before	25 (18)	11 (9.5)	
Total	136 (100)	115 (100)	

With regard to marijuana use, an increase was observed in the self-report of consumption from one interval to the next. During gestation, in 2013, 5 women (1.57%) reported smoking marijuana, whereas in 2016, 28 women (10.85%) did so ($p < .001$). In 2013, 41 women (12.85%) smoked marijuana until finding out they were pregnant, versus 79 (30%) in 2016 ($p < .001$). Forty-six (14.4%) women had smoked marijuana sometime in their lifetime in 2013, and 107 (41.4%) in 2016 ($p < .001$). The frequency of consumption is shown in Table 4.

The use of cocaine and CBP did not change significantly between 2013 and 2016. In 2013, 8 (2.5%) women and, in 2016, 8 women (3.1%) consumed cocaine.

Discussion

The substance most frequently used by women during pregnancy according to self-reports in both time periods of the study was tobacco, with a prevalence of 39.9% in 2016. A significant decrease in tobacco use during pregnancy was observed between 2013 and 2016 ($p = .02$). The number of pregnant women passively exposed to tobacco smoke dropped significantly ($p < .001$). The frequency of smoking cessation upon learning about the pregnancy was 43% in 2013 and 60% in 2016. Pregnancy is probably the event that most motivates to quit smoking and the national anti-smoking campaign, which began with changes in legislation in 2008, provides an ideal setting for smoking cessation. A study conducted in the United Kingdom noted that the motivation to change substance consumption habits during pregnancy decreased significantly as the pregnancy progressed. Up to one third of the women who did not smoke during the pregnancy returned to smoking in the three months following childbirth (Cooper et al., 2017). In Uruguay, tobacco is still a legal and easily accessible substance. These data show the need for persistent and repeated interventions over time to achieve changes in consumption habits.

Regarding the ingestion of alcoholic drinks during pregnancy, an increase from 23.8% in 2013 to 35.3% in 2016 was observed ($p = .003$). We do not know whether this phenomenon could be explained by an effect of complementation (where more liberal policies on marijuana use produce a complementary increase in alcohol consumption), produced by the recent legislation of recreational consumption of cannabis (Guttmannova et al., 2016). Although advances are being made in the regulation of alcohol sales, its consumption is not regulated. Alcohol is currently the most consumed substance at some time in the lifetime of the general population in Uruguay, according

Table 4. *Differences in the frequency of consumption of marijuana, cocaine, and cocaine base paste (CBP) in women before and during pregnancy, between 2013 and 2016.*

	Values N (%) 2013			Values N (%) 2016		
Marihuana	Before * Ω	During¥	TotalΩ	Before * Ω	During¥	TotalΩ
Experimental	2	0	2	32	0	32
Monthly	18	2	20	11	2	13
Weekly	12	1	13	22	8	30
Daily	9	2	11	14	18	32
Total	41	5	46	79	28	107
Cocaine	Before*	During¥	Total	Before*	During¥	Total
Experimental	0	0	0	0	0	0
Monthly	1	1	2	1	2	3
Weekly	1	1	2	5	0	5
Daily	3	1	4	0	0	0
Total	5	3	8	6	2	8
CBP	Before*	During¥	Total	Before*	During¥	Total
Experimental	0	0	0	0	0	0
Monthly	1	2	3	2	0	2
Weekly	1	1	2	0	1	1
Daily	5	1	6	4	0	4
Total	7	4	11	6	1	7

Note. The data are expressed in absolute frequency (N).
*Refers to consumption prior to pregnancy or quitting upon learning about the pregnancy.
¥Refers to consumption during pregnancy.
Ω value $p < .001$ for the contrast between 2013 and 2016.

to a survey conducted by the National Board of Drugs of Uruguay (2016), and it is also considered to cause more problematic use.

An increase in self-reported marijuana use sometime during the lifetime is observed, rising from 14.4% to 41.4% between the years 2013 to 2016. The World Report of Drug Use in 2014 informs that the frequency of marijuana use is 12.4% in Africa, 12.1% in North America, and 15.2% in Colombia (United Nations Office on Drugs and Crime, 2014). During gestation, in 2013, 1.57% of the women reported smoking marijuana, whereas in 2016, it rose to 10.85%. This increase was statistically significant ($p < .001$). Pregnancy is one of the key moments for changes in maternal lifestyle. The vital moment in which the woman becomes pregnant can be a determining factor of the characteristics of marijuana consumption (De Genna, Cornelius, Goldschmidt & Day, 2015; Elder, 1975). Interventions during pregnancy can have a positive impact on the reduction of substance consumption.

The drug with the lowest consumption in the study population was cocaine. Its consumption is important for its effects on the mother, the pregnancy, and the newborn. There was no significant variation in the self-report of consumption of this substance.

The consumption of substances during pregnancy not only has biological implications for the mother and the fetus, but also social and legal implications. Not all countries have decided to address the issue in the same way. In Wales, the project of "Zoe's Law" intended to give legal status to fetuses older than 20 weeks, which would allow the authorities to make the mothers responsible for negligent acts and the health providers for prioritizing, in some cases, fetal well-being over the wishes of the mother. Other countries choose the inclusion of the mother in an addiction treatment program (Hotham, Ali, White & Robinson, 2016). In Spain, the progressive implementation of anti-smoking laws that established the prohibition of smoking in public spaces in two stages, a partial one and a more restrictive one, was associated with a reduction in the risk of preterm births (4.5%) and low birth weight (2.3%). This health benefit was particularly evident with the introduction of the more restrictive prohibition (Simon et al., 2017). In Uruguay, Law 18.256 was implemented in 2008 for this same purpose.

The macroeconomic changes observed in Uruguay between 2013 and 2016 have determined changes in the level of family income in the study population. Substance use is more frequent in populations with lower family income level. These changes do not explain the increase in the self-reports of marijuana consumption.

There are some limitations in the study due to using self-reports as a method of identification. The denial or under-reporting of substances that are perceived as potentially harmful or not socially accepted determines a lower reported figure. However, the application of a questionnaire at the two time periods, 2013 and 2016, allows us to observe changes in consumption habits. Another constraint is the exclusion of infants of less than 35 weeks of gestational age, which may leave out women who had preterm labor due to overuse of harmful substances. The participating population of the research comes from the most vulnerable sectors of Uruguayan society, with a high level of indigence, poverty, and unplanned pregnancy. Therefore, these results cannot be extrapolated to the general population or to other sociocultural contexts. Finally, given that the same people who administer the questionnaires are members of the research team could lead to interviewer bias.

Conclusions

A significant increase in the self-reported use of marijuana and alcohol before and during pregnancy was observed between 2013 and 2016. The consumption of cocaine and CBP remained stable during that period. Tobacco consumption declined significantly in pregnant women. The research design does not allow determining whether these data are related to an increase of consumption or of their self-report when perceiving an atmosphere of greater social and legal tolerance.

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Conflict of interests

The authors declare they have no conflict of interest.

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