
The use of illicit drugs during pregnancy among mothers of premature infants

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Background: Tobacco, alcohol and/or illicit drug use during pregnancy are risk factors for neonatal complications. In Puerto Rico, the Department of Health reports that 32% of pregnant women use alcohol and 3% use illicit drugs. Nineteen percent (19.1%) of newborns are born prematurely. The purpose of this study is to determine the prevalence of illicit drug use during pregnancy in mothers of premature infants.

Methods: This study included the data of 218 mothers of premature infants admitted to the Neonatal Intensive Care Unit of the University Pediatric Hospital during 2002 to 2005 enrolled in an educational program.

Results: Fourteen women (6%) reported using illicit drugs during pregnancy (cocaine 2%, marijuana 3%, heroin 2%, methadone 2%, and ecstasy 1%). Mothers using drugs during pregnancy were more likely to start

prenatal care after the first trimester (21% vs. 10% in nonusers; $p < 0.01$) and to smoke cigarettes (36% vs. 8% in nonusers; $p < 0.01$).

Conclusions: The most important maternal-prenatal risk factor for drug use in this group of mothers, was failure to receive prenatal care during the first trimester, and cigarette use. The use of illicit drugs during pregnancy complicated by a premature delivery is underestimated and many times unknown to physicians. The physicians should be assertive in gathering this information while interviewing women during pregnancy and in the postpartum period since women who use drugs during pregnancy are at higher risk of social problems, future preterm deliveries and may impair adequate follow up of their premature babies.

Key words: Drug abuse, Pregnancy, Prematurity.

The use of tobacco, alcohol and illicit drugs during pregnancy is a risk factor for neonatal complications. According to the National Survey on Drug Use and Health, in 2002 and 2003, 4.3% of pregnant women between 15 and 44 years of age reported using illicit drugs in the past month, 4.1% reported binge alcohol use, and 18% reported tobacco use. Pregnant women aged 15 to 25 years were more likely to use illicit drugs and smoke cigarettes than pregnant women aged 26 to 44 years (1). In 2002, the Department of Health reported that in Puerto Rico 32% of women reported alcohol use during pregnancy, and 3% reported using illicit drugs. This was for all pregnant women regardless of timing of delivery. Also, in 2004, 19.1% of infants in Puerto Rico were born prematurely (2).

It has been our impression that the rate of illicit drug use among pregnant women in Puerto Rico is higher than

previously reported, and that this information is sometimes unknown to the physician at delivery. The purpose of this study is to determine the prevalence of illicit drug use during pregnancy in mothers of premature infants and associated risk factors.

Methods

This is a retrospective cross-sectional study that included data collected from mothers of premature infants admitted to the Neonatal Intensive Care Unit (NICU) of the University Pediatric Hospital (UPH) during the years 2002 to 2005 who were enrolled in the Preemies and Family program. The UPH-NICU is a referral hospital predominantly serving low income patients covered by the government medical insurance. The Preemies and Families program is an educational program aimed to parents of premature infants (less than 37 weeks of gestation) admitted to the NICU. Parents are enrolled in the program on a voluntary basis. As part of the program, a family coordinator interviewed the mothers who answered a self-administered questionnaire designed for the program. The questionnaire included demographic data, social data, use of drugs, alcohol or cigarettes during pregnancy, contraceptive use, and prenatal and post-natal medical care among other items.

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No funding support. The authors have no conflict of interest to disclose. The manuscript has not been previously published.

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The data was available on statistical software without identifiers. There was no link between the data and the infant or the mother. Data was analyzed using means, median, and ranges. To determine the risk factors associated to illicit drug use, we compared the groups using Pearson's chi-square and t-test as appropriate. A *p* value of less than 0.05 was considered statistically significant. The University of Puerto Rico, Medical Sciences Campus, Institutional Review Board approved the study.

Results

The participants included 218 mothers. This represents approximately 20% of the premature infants admitted to the NICU during the study period. The mean maternal age of the group was 27 ± 6.6 years (14-43 years). The mean gestational age at delivery of the participants was 29 ± 2.7 weeks (24-35 weeks). The mean birth weight of the infants was 1238 ± 462 grams (534 - 4403 grams). Nine percent (9%) of the mothers reported drinking alcohol during pregnancy and 10% reported smoking cigarettes during pregnancy. Six percent (6%, n=14) reported using illicit drugs during pregnancy (cocaine 2%, marihuana 3%, heroin 2%, methadone 2%, and ecstasy 1%).

To determine the risk factors associated to illicit drug use, the data was analyzed comparing two groups: drug users (N=14) and nonusers (N=204) (Table 1). Women who used drugs during pregnancy were less likely to receive prenatal care in the first trimester ($p=0.0000$). They were 6.5 times more likely to have used cigarettes during the pregnancy (OR 6.5, CI 1.9-21.7, $p=0.0007$). A higher percent of drug users were single mothers (OR 2.5, CI 0.8-7.4), domestic violence victims (OR 3.1, CI 0.9-10.7), and had an unplanned pregnancy (OR 2.6, CI 0.7-9.7), although this did not reach statistical significance. There was no association between illicit drug use and sexually transmitted diseases.

Discussion

Although there has been a trend towards a decrease use of alcohol, tobacco or illicit drugs during pregnancy, pregnant women still

report using them. Ebrahim and Gfroerer analyzed the data collected from the National Household Survey on Drug Abuse to estimate the prevalence of pregnancy related illicit drug use in 1996-1998 (3). In this study, 6.4% of non-pregnant women of childbearing age (18-44 years) and 2.8% of pregnant women reported using illicit drugs. Among sociodemographic subgroups, pregnant and non-pregnant women who were young (18-30 years) or unmarried and pregnant women with less than high school education had the highest rates of illicit drug use. Ho and colleagues studied the characteristics of pregnant women who used ecstasy (4). They reported that pregnant women who use ecstasy tend to be young, single and report psychological morbidity, and have a clustering of risk factors that may compromise the pregnancy and fetus. Our study group had a higher rate of drug use during pregnancy than that reported for pregnant women in Puerto Rico and the United States. This is probably due to the inclusion of premature babies only, as drug use during pregnancy has been associated to premature birth. In this sample, the most important maternal-prenatal information risk factors are failure to receive prenatal care during the first trimester, and cigarette use. Lack of attendance to prenatal appointments and domestic violence were not significantly associated to drug use but are worth further analysis with a larger group of mothers.

Table 1. General characteristics of mothers of a group of premature infants admitted to NICU during 2002-2005 who used drugs during pregnancy compared to non users.

	Drug Users (N=14)	Non Users (N=204)	Unadjusted OR (95% CI)	<i>p</i> value
Demographic Data				
Mean (SE) maternal age*	28 ± 6	27 ± 7		NSS
Pregnancies (mean)*	3 ± 1	2 ± 1		NSS
Education (High school graduate)#	71%	84%	0.5 (0.15-1.7)	NSS
Marital status single#	50%	26%	2.5 (0.8-7.4)	NSS
Pregnancy				
Gestational age (weeks)*	28 ± 3	29 ± 3		NSS
Infant birth weight (grams)*	1060 ± 360	1250 ± 467		NSS
Unplanned pregnancy#	79%	58%	2.6 (0.7-9.7)	NSS
Prenatal care in first trimester#	79%	90%	0.4 (0.1-1.5)	0.0000
Attended to all appointments#	93%	99%	0.4 (0.11-1.6)	NSS
Behaviors				
Alcohol use#	14%	9%	1.7 (0.3-8.3)	NSS
Cigarette use#	36%	8%	6.5 (1.9-21.7)	0.0007
Contraceptive use#	29%	41%	0.57 (0.17-1.9)	NSS
Condom use#	7%	23%	0.26 (0.03-2.1)	NSS
Domestic violence victims#	29%	11%	3.1 (0.9-10.7)	NSS
Guilty feeling#	29%	14%	2.4 (0.7-8.2)	NSS

OR=odds ratio CI=confidence interval NSS = no statistical significance *t-test #chi-square

Smoking, heavy alcohol intake, and polydrug use, combined with a higher expected rate of unplanned pregnancies, increases the risk of fetal exposure to potentially harmful substances (4). Poor birth outcomes such as low birth weight and neonatal death have been reported in infants born to mothers who used alcohol, cigarettes or illicit drugs during pregnancy. Ludlow JP and colleagues studied the obstetric and perinatal outcomes of women using opiates or amphetamines during pregnancy (5). They found that both groups of drug-using women were younger than the general population. Their infants were significantly more likely to be delivered at less than 37 weeks gestation, have a birth weight of less than 2.5 kg, be small for gestational age, and require admission to the special care nursery. They concluded that women who use illicit drugs are more likely to experience adverse obstetric and perinatal outcomes than women in the general population.

Miles and colleagues studied the effects of maternal substance use on neonatal outcomes in 212 pregnant cocaine/opiate dependent women. Subjects were classified in two groups according to toxicology result (positive or negative). They found that infants born to toxicology positive mothers had lower birth weight and were smaller for gestational age (6). In our study group, there was no difference in maternal age, gestational age, and infant birth weight, but the impact that prenatal illegal drug abuse may have on the high prematurity rate in Puerto Rico can not be undermined.

One important finding in this study is that women who used drugs during pregnancy were less likely to receive medical attention in their first trimester. This puts both the mother and the fetus at risk of complications. Also, women who do not receive prenatal care in the first trimester may be at risk to continue further illicit drug use during late pregnancy, putting the newborn infant at risk of neonatal abstinence syndrome. The neonatal abstinence syndrome is a serious disorder in infants who are exposed to maternal drug abuse. These infants present nonspecific symptoms (irritability, high pitch cry, hyperactivity, abnormal sleep pattern, vomiting, diarrhea, failure to gain weight), which makes the diagnosis a difficult one. Pharmacologic intervention may be required to control severe signs and symptoms. Maternal history of drug abuse during pregnancy and/or a high index of suspicion are required to make the proper diagnosis in the premature infant presenting withdrawal syndrome.

Women who used drugs during pregnancy in our study group were more likely to smoke cigarettes. Cigarette smoke during pregnancy has been extensively studied, and it is associated to a higher risk of neonatal complications

such as asymmetric intrauterine growth restriction and low birth weight. Also, as reported by Miles and colleagues, maternal smoking is associated with a longer NICU length of stay (6).

One limitation of our study is sample size. Although the study included 218 women, the drug users group was small. Another limitation is that only premature infants admitted to the Neonatal Intensive Care Unit were included in the sample. Premature infants admitted to the regular nursery were not included. Infants exposed to drugs and/or those with withdrawal syndrome can receive medical care there and may not require to be transferred to NICU. Also, the questionnaire used in the study was designed for the educational program and was not validated.

The information gathered in this study should make physicians more aware that the use of illicit drugs during pregnancy is underestimated and many times unknown to them. Physicians should be more assertive in gathering this information while interviewing women during pregnancy and in the post-partum period, since women who use drugs during pregnancy are at higher risk of social problems, which may impair adequate follow up of their premature infants and place the mother at further risk for another premature delivery.

Resumen

El uso de tabaco, alcohol y drogas ilícitas durante el embarazo son factores de riesgo para complicaciones en los recién nacidos. En Puerto Rico, el Departamento de Salud informa que el 32% de las madres embarazadas usa alcohol y el 3% usa drogas ilícitas. En Puerto Rico, el 19% de los recién nacidos nace prematuros. El propósito de este estudio es determinar la prevalencia del uso de drogas ilícitas durante el embarazo en madres de infantes prematuros. Este estudio incluyó datos de 218 madres de infantes prematuros admitidos a la Unidad de Cuidado Intensivo Neonatal el Hospital Pediátrico Universitario durante los años 2002 a 2005, las cuales participaban de un programa educativo. Catorce mujeres (6%) informaron haber usado drogas durante el embarazo (cocaína el 2%, marihuana el 3%, heroína el 2%, metadona el 2% y éxtasis el 1%). Las madres que usaron drogas comenzaron su cuidado prenatal luego del primer trimestre (21% vs. 10% en las no usuarias; $p < 0.01$) y un mayor número (36% vs. 8% en las no usuarias; $p < 0.01$) fumaron cigarrillos. En este grupo de madres, los factores de riesgo materno prenatal más importantes para el uso de drogas fueron no haber recibido cuidado prenatal durante el primer trimestre y el uso de cigarrillos. El parto prematuro asociado al uso de drogas ilícitas puede ser subestimado y los médicos

a cargo del cuidado de la madre y del infante pudieran desconocer esta información. Los profesionales de la salud deben ser asertivos al entrevistar a estas mujeres durante el embarazo y el período posparto, ya que el uso de drogas las pone a mayor riesgo de problemas sociales, partos prematuros futuros e impedimentos para el seguimiento de los bebés prematuros una vez dados de alta.

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