The Prevalence of Chemical Substance and Alcohol Abuse in an Obstetric Population in Dublin

P Bosio, *E Keenan, R Gleeson, *A Dorman, T Clarke, M Darling, *J O'Connor.

*Rotunda Hospital, Parnell Square, Dublin 1. *National Drug Advisory & Treatment Centre, Trinity Court, 31/32 Pearse Street, Dublin 2.*

Abstract

Objective: To determine the prevalence of illicit drug abuse and alcohol use in an obstetric population based in an urban maternity hospital.

Setting: A collaborative study between the Rotunda Hospital, Dublin and the Irish National Drug Advisory & Treatment Centre. Design: A prospective study consisting of anonymous, unlinked urine testing of 504 'first visit' antenatal patients and a separate group of 515 patients six weeks after delivery.

Methods & Outcome Measures: Toxicological screening using enzyme-linked immunoassay techniques, with all positive samples being re-analysed. Drug histories were taken and samples were tested for alcohol and six of the most commonly abused drugs. The pre- and postnatal prevalence of abuse was matched with demographic data.

Results: The prevalence of chemical substance misuse in the antenatal population was 2.8% and 5.6% in the postnatal population. Substances identified included benzodiazepines, cannabis, amphetamines, opiates and cocaine. Less than 2% of samples tested positive for alcohol. None of the women yielding positive samples had been pre-identified on the basis of history. A significant proportion of the women were in the high risk categories with regard to age and socio-economic status

Conclusion: The prevalence of drug misuse antenatally was nearly 3% and postnatally almost 6%. Substance abusers in pregnancy are more likely to be single, unemployed, and to have had a previous pregnancy.

Introduction

The prevalence of drug addiction in pregnancy is well documented in the USA[1,3] but the magnitude of the problem in these islands remains unknown, although several retrospective studies have been conducted.[4,6] Various maternal medical complications are associated with substance abuse, including neurologic, cardiovascular and respiratory conditions and an increased risk of infectious disease.[7,9] Fetal and neonatal complications include: abortion, prematurity, intrauterine growth retardation, stillbirth, congenital malformation, abruptio placenta, fetal distress, neonatal toxicity and withdrawal syndrome and neurobehavioural abnormalities.[10,14] Frequently, the substance abuser lives in an environment where others use drugs and alcohol, and spousal or child abuse may occur in the home."

In the UK and Ireland the problem is allegedly much less common. However an accurate assessment of the prevalence of drug and/or alcohol misuse in pregnancy is necessary to allow a structured approach to resource allocation, intervention and follow-up.

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Subjects and Methods

Anonymous, unlinked urine testing was performed on all women attending the Rotunda Hospital for their first antenatal visit over a six-week period as well as on a separate group of women attending for their six-week postnatal clinic. Over 1000 patients were screened for a comprehensive range of substances (Table 1).

Midstream urine samples were collected by midwives and labelled with age, marital status, parity (including history of fetal loss), employment status and cigarette smoking. The samples were kept in cold storage and analysed within 48 hours. In addition, all patients were specifically questioned regarding their drug history, prescribed or otherwise, during the preceding four weeks.

Toxicologic screening was performed using enzyme-linked immunoassay (Emit^{R} d.a.u™ Assay) as a preliminary analytical test. The National Drug Advisory & Treatment Centre's recommended cut-off levels were used to determine the presence of a drug or drug metabolite and all positive samples were re-analysed using gas chromatography to obtain a confirmed analytical result. This gave a negligible false positive rate. A positive test for alcohol was >10mg%. The screening results were then matched with the demographic data. The relationship between patient characteristics and urinalysis positivity was expressed as odds ratios. The confidence intervals for the odds ratios were calculated using an exact method algorithm implemented in the WHO/US CDC Software Statcalc.[16] The Chi^{2} Test was used to compare antenatal versus postnatal prevalence of substance misuse.

Table 1. Analysis of Substance Misuse in Antenatal and Postnatal Patients.

Substance	Antenatal (n=504)		Postnatal (n=515)	
	No.	%	No.	%
Alcohol	7	1.4 (average 30.3 mg%)	8	1.6 (average 57.9 mg%)
Cannabis	5	1.0	14	2.7
Benzodiazepines	4	0.8	8	1.6
Opiates	2	0.4	7	1.3 (1 codeine)
Cocaine	1	0.2	-	-
Amphetamine	1	0.2	-	-
Methodone	1	0.2	-	-
Total Patients*	**18**	**3.6%**	**36**	**7.0%**

* 3 antenatal patient with 2 substances & 1 postnatal patients with 2 substances.
+ Excluding alcohol; Antenatal Prevalence -2.8% / Postnatal Prevalence - 5.6%.

Results

The results of the screening are shown in Table 1. A total of 504 antenatal and 515 postnatal patients were screened. Cannabis was the most common substance detected, its use being more prevalent postnatally. There were three patients who tested positive for two substances antenatally, i.e. cannabis and amphetamine, opiate and methadone and cannabis and alcohol. One postnatal patient tested positive for two substances (benzodiazepine and cannabis). A total of eighteen antenatal patients tested positive for one or more substances, giving a prevalence of 3.6%. Excluding alcohol, the prevalence of substance misuse in this patient population was 2.8%. Table 2 matches the demographic characteristics of the test-positive and negative populations.

Antenatally, the median age was the same in both groups. Almost 80% of the 'positive' group were single; nearly twice the rate of the 'negative' group. There was a high incidence of

multiparous patients testing positive but the percentage of nulliparous women with a history of

Table 2. Demographic Characteristics Antenatal/Postnatal Urinalysis.

Factor	Antenatal Patients				Postnatal Patients			
	Positive		Negative		Positive		Negative	
	(n=18)	%	(n=486)	%	(n=36)	%	(n=479)	%
Medium Age (Yrs)	27		27		26		28	
Marital Status								
Single	14	77.8	209	43.0	18	50.0	185	38.6
Parity								
Primigravid	1	5.6	160	32.9	22	61.1	126	26.3
Para 0 + Hx								
Fetal Loss	3	16.6	25	5.2	4	11.1	35	7.3
Para ≥ 1	14	77.8	301	61.9	10	27.8	318	66.4
Para ≥ + Hx								
Fetal Loss	5	27.8	61	12.6	2	5.6	43	9.0
Hx Fetal Loss*	8	44.4	86	17.7	6	16.6	78	16.3
Employment Status								
Unemployed	9	50.0	109	22.4	13	36.1	131	27.3
Housewife	6	33.3	170	35.0	5	13.9	142	29.6
Cigarettes	13	72.2	241	49.6	17	47.2	206	43.0

* Regardless of parity

Table 3. Positive Urinalysis and Patient Characteristics: Odds Ratios.

Factor	OR Antenatal	95% CI	OR Postnatal	95% CI
Single	4.6	1.4 to 19.6	1.6	0.8 to 3.3
Primigravid	0.1	<0.01 to 0.8	4.4	2.0 to 7.4
Para 0 Hx fetal loss	3.7	0.6 to 14	1.6	0.4 to 4.9
Para ≥	2.1	0.7 to 9.1	0.2	0.08 to 0.4
Para ≥ 1 + Hx fetal loss	2.7	0.7 to 8.3	0.6	0.07 to 2.5
Hx fetal loss	2.3	0.7 to 6.9	1.0	0.3 to 2.6
Unemployed	3.4	1.2 to 10.1	1.5	0.7 to 3.2
Cigarettes	2.6	0.9 to 9.6	1.2	0.6 to 2.5

fetal loss, either induced or spontaneous, was over three times that of the control group. The incidence of fetal loss amongst the positive urinalysis group, regardless of parity, was almost twice that of the control group. .50% of the women testing positive were unemployed versus 22% in the negative group. Expressing the relationship between positive urinalysis and patient characteristics as odds ratios shows that testing positive antenatally is predicted by being single, unemployed, and not being primigravid (Table 3).

Postnatally, cannabis, benzodiazepine, opiate and alcohol use was more prevalent ($p = 0.003$). However no 'hard drugs' were found postnatally. The prevalence of substance misuse was 7.0% (5.6% excluding alcohol). There was little difference in median age between the test positive urinalysis group and the negative group. 50% of the postnatal 'positive' group were single, 35.7% were unemployed and 46.4% were cigarette smokers. All these figures were higher than in the relevant 'negative' group but the differences were not as marked as in the antenatal population. There was, however, a marked difference as regards parity; 61% of the positive urinalysis group were primigravidae versus 26% of the negative urinalysis group. There was no statistically

significant difference between the positive and negative test groups as regards history of fetal loss. None of the test-positive patients admitted to having used either prescribed or illicit drugs within the preceding four weeks.

Discussion

A prevalence study based on urinalysis alone has some inherent limitations. Chemical use was ascertained from a single test linked to hospital attendance. Some patients who tested negative for drugs may have used cocaine, amphetamines or opiates at other times during pregnancy. Also, toxicologic studies of urine samples are limited in that a positive result reveals only that a particular substance has been used within a specified period of time before testing. That time interval is specific for the substance and is dependent on its metabolism and/or urinary excretion (ranging from one to two days for amphetamines, two to four days for opiates and cocaine and up to 30 to 70 days for some benzodiazepines or cannabinoids). Such tests therefore do not indicate the frequency of use or the amount used. Hence, the prevalence of alcohol and substance misuse is almost certainly under-reported in our data.

Evidence of substance use was observed in 3.6% of our antenatal population and 7.0% of the postnatal population. Most of the published data based on prospective screening studies derives from the United States. Our prevalence figures are significantly lower than those reported from the USA where in 1989, a survey of 36 hospitals found that 11% of pregnant women had used an illegal drug at some point during the pregnancy.[17] Zuckerman *et al* reported that 31% of women delivering in Boston City Hospital used marijuana and 18% used cocaine during pregnancy.[2] Chasnoff *et al* reported 14.8% of pregnant women had a positive urine toxicology screen for cocaine, marijuana, alcohol, or heroin.[3]

Our results are similar to those published from Birmingham, England by Condie *et al* where 2% of women tested positive at the first visit antenatal clinic. That study failed to detect any cocaine metabolites or methadone." Our study documented significant differences between the toxicology-positive and negative women, especially amongst the antenatal population. Women who tested positive antenatally were almost twice as likely to be single, unemployed and on a second or subsequent pregnancy. This close correlation with socio-economic deprivation has previously been well-documented.[19]

Postnatally, the primigravid are more likely to test positive. Over 70% of the postnatal chemical-positive women were first-time mothers possibly reflecting increased coping difficulties. None of our toxicology-positive patients (including the one patient on the methadone maintenance program), had been identified on the basis of history alone confirming previous suggestions that a drug history alone is not accurate for identifying chemical use among pregnant women.[3,10] We used single urinalysis screening. Serial screening of high risk mothers during pregnancy would represent a more concerted effort to identify drug abusers. This may be financially beneficial since estimates of neonatal costs show that maternal treatment programs, where instituted early during pregnancy, are cost effective.[20] However, excluding alcohol, possible occasional 'medical' drugs (opiates and benzodiazepines) and cannabis, all of which may be of little or no harm to mothers and babies, the prevalence of harmful drug misuse in the antenatal population was 0.6%. Notwithstanding-the limitations of single urinalysis screening, it would appear that drug abuse is not a serious problem among Dublin's pregnant population. However, this does not take into account the fact that drug addicts are often unbooked patients presenting late or in labour or may attend elsewhere for termination of pregnancy. Unless larger studies yield a more significant prevalence, compulsory urinalysis for drugs of abuse would be difficult to justify. It would possibly also lead to substance misusing mothers avoiding treatment services at a time when they most need those services.

There was a significantly lower prevalence of chemical substance and alcohol misuse during pregnancy when compared with the postnatal sample population. This is somewhat surprising in view of the fact that the postnatal sample, by virtue of voluntarily opting to return to the six-week clinic, is likely to be a more motivated and selective group. This may represent a more

responsible pattern of behaviour during pregnancy with an increased effort to minimise exposure of the fetus to chemical substances.

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Correspondence: Dr P Bosio, Dept of Obstetrics, Rotunda Hospital, Parnell Square, Dublin 1.