The Prevalence of Substance Abuse Among Pregnant Women in Utah

KAREN F. BUCHI, MD, MICHAEL W. VARNER, MD, AND RICHARD A. CHASE, BS

Objective: To determine the rate of substance use among Utah's pregnant women, who are primarily white and middle class, for comparison to rates reported in studies of inner-city populations.

Methods: Urine specimens and demographic data were obtained anonymously from women who delivered infants at ten hospitals in urban and suburban Utah. Urine samples were screened by enzyme immunoassay for amphetamines, marijuana, cocaine, methadone, opiates, benzodiazepines, and ethanol.

Results: Among 792 women screened, the mean age was 26.2 years, 86.1% were white, 62.9% were multigravidas, and 66.3% had private insurance. Cocaine was detected in nine samples (1.1%), illicit amphetamines in five (0.6%), marijuana in 23 (2.9%), ethanol in 32 (4.0%), over-the-counter amphetamines in 51 (6.4%), and benzodiazepines in seven (0.9%). The prevalence rate for women positive for illicit drugs and alcohol combined was 7.8%. Cocaine-positive and marijuana-positive women were more likely to be non-white or Hispanic and to have Medicaid or no insurance than were women negative for either substance. Women with Medicaid or no insurance were four times more likely to be positive for illicit substances (10.7%) than were those with private insurance (2.3%) \(P = .0001\).

Conclusion: The rates and patterns of substance use differ between Utah's pregnant women and inner-city populations. The patterns in Utah may be more representative of many communities in the United States that have a predominantly middle-class, white population. (Obstet Gynecol 1993;81:239-42)

Studies from inner-city hospitals have estimated the prevalence of illicit drug use among pregnant women at delivery to range from 8-24%. The populations surveyed in these studies were predominantly non-white women presenting to individual inner-city hospitals. Limited information is available regarding the prevalence of substance use among pregnant women who live in areas other than the inner city. Utah's population is predominantly white and can be divided between urban (84.4%) and rural or frontier areas (15.6%); therefore, it may not be appropriate to extrapolate prevalence rates for substance use in pregnancy from inner-city studies. We report the results of a urine testing program for substance use among parturient women delivering in ten urban and suburban hospitals in Utah.

Materials and Methods

All women who presented to the labor and delivery wards of ten hospitals and delivered during a 19-day period in the summer of 1991 were eligible to enter this study. All of the hospitals were located along the Wasatch Front, a four-county area of high population density. The institutional review boards or their equivalents at all ten hospitals approved the protocol.

Aliquots of routinely collected urine specimens were obtained at some point before delivery. Demographic information, including age, race, parity, insurance status, zip code of home address, and hospital of delivery, were recorded for each sample. All samples were screened anonymously by enzyme immunoassay (Syva EMIT Drugs of Abuse Reagent System, Palo Alto, CA) for amphetamines (cutoff 150 ng/mL), marijuana metabolites (20 ng/mL), cocaine metabolites (150 ng/mL), methadone (150 ng/mL), opiates (150 ng/mL), benzodiazepines (150 ng/mL), and ethanol (10 mg/dL). The amphetamine polyclonal kit was used to identify women taking over-the-counter sympathomimetics (eg, pseudoephedrine or phenylpropanolamine). Urine samples with positive amphetamine screens were subjected to a second test to separate illicit amphetamine from over-the-counter amphetamine analogues.

The antibody in the opiate assay was directed to morphine, but other opiates such as codeine or meperidine could react with the antibody. Thus, we could...
Table 1. Demographic Characteristics of Women With Positive Urine Screens

<table>
<thead>
<tr>
<th>Race</th>
<th>Non-white</th>
<th>Parity</th>
<th>Insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age (y)</td>
<td>White</td>
<td>Non-white or Hispanic</td>
<td>1</td>
</tr>
<tr>
<td>No. of</td>
<td>≤25</td>
<td>&gt;25</td>
<td>66.7</td>
</tr>
<tr>
<td>positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine</td>
<td>9 (1.1%)</td>
<td>44.4</td>
<td>55.5</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>5 (0.6%)</td>
<td>0</td>
<td>80.0</td>
</tr>
<tr>
<td>Marijuana</td>
<td>23 (2.9%)</td>
<td>65.2</td>
<td>34.8</td>
</tr>
<tr>
<td>Ethanol</td>
<td>32 (4.0%)</td>
<td>46.9</td>
<td>53.1</td>
</tr>
</tbody>
</table>

Data are presented as percentages or N (%).
* Significantly different from cocaine-negative women (P < .05).
† Significantly different from cocaine-negative women (P < .001).
‡ Significantly different from marijuana-negative women (P < .001).
§ Significantly different from marijuana-negative women (P < .05).

Results

During the 19-day period, 1839 births occurred in the state of Utah, of which 1278 occurred in the ten participating hospitals. Urine samples of 792 women, 43.1% of the state cohort and 62.0% of the eligible study cohort, were screened. The mean age of the screened population was 26.2 years (range 14-46), 86.1% were white, 62.9% were multigravidas, and 66.3% had private insurance.

Demographic information was obtained from birth certificates filed during the study period for the state as a whole and for nine of the ten participating hospitals. Mean maternal age and parity did not differ between the screened women and the eligible study cohort or the state cohort. There were no significant differences in the proportion of white and non-white women between the group screened and the eligible unscreened cohort or the state cohort. There were also no significant differences in the proportion of Hispanic women in each cohort.

One or more drugs were detected in 140 (17.7%) of the urine samples. Over-the-counter amphetamines (N = 51, 6.4%) and opiates (N = 40, 5.1%) were detected most frequently. Methadone was not detected in any urine sample. Seven screens (0.9%) were positive for benzodiazepines. There were 69 positive screens in 62 specimens for marijuana, cocaine metabolites, illicit amphetamines, and ethanol (Table 1), giving a combined prevalence rate for women positive for these substances of abuse of 7.8%. Opiates are not included in this rate because we could not determine whether the opiate use was illicit or by prescription.

Only nine samples were positive for cocaine (1.1%). Cocaine-positive women were more likely to have Medicaid or no insurance (P < .001) and to be non-white or Hispanic (P < .05) than were cocaine-negative women (Table 1). Marijuana and ethanol were the substances of abuse detected most frequently. Marijuana-positive women were more likely to have Medicaid or no insurance (P < .001), to be non-white or Hispanic (P < .001), and to be multigravidas (P < .05) than marijuana-negative women. Ethanol-positive women did not differ from ethanol-negative women in terms of age, race or ethnicity, parity, or insurance status. The small number of urine specimens positive for illicit amphetamines yielded no statistically significant demographic differences between positive and negative women. There were also no statistically significant demographic differences between women positive for either over-the-counter amphetamines or benzodiazepines and those negative for these substances.

Multivariate analysis showed that insurance status was the only independent variable that differed significantly (P = .0001) between women positive for cocaine, amphetamines, or marijuana and those negative for these illicit substances. Women with Medicaid or no insurance were over four times more likely to be positive for cocaine, amphetamines, or marijuana (10.7%) than were women with private insurance (2.3%) (P = .0001). In the entire screened cohort, a woman with Medicaid or no insurance was more likely to be 25 years old or less (P < .0001), of minority status (P < .0001), and positive for cocaine, amphetamines, or marijuana (P = .0001) than a woman with private insurance. Women with Medicaid or no insurance who were positive for cocaine, amphetamines, or marijuana were less likely to be primigravidas (13.6%) than were women with Medicaid or no insurance who were negative for these substances (45.9%) (P < .05), but these groups did not differ statistically when considering age or minority status.
Discussion

Many published studies have attempted to estimate the prevalence of substance use among pregnant women in the United States. Most are based on single hospital labor and delivery wards or prenatal clinics serving primarily minority, inner-city women. Two inner-city studies reported that their screened population consisted of parturient women with public insurance or no insurance. Three other studies of inner-city women at delivery did not report the insurance status of the screened population, although one can assume that these urban hospitals primarily served women who were covered by public insurance or were unfunded. The estimated prevalence rates for substance use in these studies were 8–24%, depending on the drugs screened.

Our study screened a mainly white population with private insurance who delivered in ten urban and suburban hospitals. Although only 62.0% of the women eligible for the study were screened, the cohort of screened women did not vary in regard to age, parity, race, or ethnicity from the unscreened eligible cohort. Thus, there was no evidence of selection bias. In this population, we found lower, yet still worrisome, rates of urine positivity for illicit substances and ethanol. Our results are consistent with those of a similar survey performed in Rhode Island in 1989. In that statewide study, a primarily white population of parturient women with private insurance was found to have a combined prevalence rate of 7.5% for cocaine, opiates, marijuana, and amphetamines. Both of these cross-sectional studies are limited by design to detect only those women who have used drugs or alcohol close to delivery. However, compared with studies from inner-city hospitals, they provide what is probably a more accurate reflection of the prevalence of substance use among parturient women who live in predominantly white communities.

Cocaine use by parturient women in Utah (1.1%) was similar to that found in the Rhode Island study (2.6%) and much lower than the rates reported from inner-city hospitals, which ranged at 8.4–11.5%. All of these inner-city studies screened predominantly non-white populations.

We were able to differentiate those urine specimens positive for over-the-counter amphetamines versus illicit amphetamines. This proved to be an important distinction because only 8.9% of the samples that initially screened positive for amphetamines were confirmed to be positive for illicit amphetamines. Matera et al detected amphetamines in 13% of parturients screened, but did not perform confirmatory tests. Our results suggest that use of over-the-counter amphet-


ty was more prevalent among minority women and women with Medicaid or no insurance. In Rhode Island, the rate of marijuana positivity was similar among white women and non-white women, and more prevalent in women with public insurance. In Florida, Chasnoff et al found that marijuana use was more prevalent among white women, but equally common among women attending public and private prenatal clinics. These results indicate that marijuana use varies in each population screened; therefore, generalizations about the "typical" pregnant marijuana user cannot be made.

We found that insurance status identified a group of parturients with an increased risk for positivity for illicit substances. Even when controlling for maternal age, race or ethnicity, and parity, this indicator of socioeconomic status remained significantly different between women positive for cocaine, amphetamines, or marijuana and women negative for these drugs. This difference in prevalence rates between women with public and private insurance was also found in the Rhode Island survey.

In contrast to the differences found with insurance status when assessing positivity for cocaine, amphetamines, and marijuana, no similar risk factors were identified that distinguish those positive and negative for ethanol. Alcohol was detected in 4.0% of our study population. The majority (91%) of the positive screens had levels below 50 mg/dL. Most parturient studies have not screened for alcohol. The Florida prenatal prevalence study reported that 1.0% of the urine specimens were positive for alcohol. A cutoff level of 50 mg/dL, which is roughly equivalent to a blood alcohol level of 0.03%, was used in that study. If we had used a cutoff of 50 mg/dL, our prevalence rate for ethanol would drop to 0.4%. We used a lower cutoff because we were interested in the presence or absence of ethanol. Lower urine levels of ethanol may indicate relatively remote or minimal consumption of alcohol, such as in over-the-counter cold preparations. However, only three of the 51 women positive for over-the-counter amphetamines were also positive for ethanol. It is possible that a positive ethanol screen less than 50 mg/dL could be found in a woman who has not consumed alcohol, due to detection of products of fermentation, but we believe we should not discount our survey results. This study is limited because etha-
nol could be detected only if it had been consumed in the preceding 8–12 hours; therefore, the actual prevalence may be significantly higher. According to results from a population-based study of self-reported alcohol use by pregnant women, an estimated 20% consumed alcohol at some time during pregnancy. Continued educational efforts directed at all women are needed to address the use of this legal substance during gestation.

Because the screening test for opiates cannot differentiate between those taken illicitly and those prescribed, we were unable to assess accurately the prevalence of illicit opiate use in our cohort. We believe that most of the positive samples were due to the use of prescribed intrapartum pain medications, but cannot confirm this because maternal medications were not recorded for each sample. Screening women during prenatal visits and noting whether they are taking prescribed opiates would help avoid this pitfall.

We screened for benzodiazepines to obtain baseline prevalence information about this commonly prescribed, and sometimes abused, drug. An increased rate of reversible withdrawal symptoms, such as apnea, hypotonia, and hypothermia, has been reported in infants exposed to diazepam during the third trimester or at delivery. Given these reported negative effects of benzodiazepines and their abuse potential, this class of drugs should be included with other substances of abuse when taking a prenatal drug history and when educating pregnant women about substance use.

Our results confirm that substance use during pregnancy exists in white, middle-class communities, and that the pattern of use differs from that found in populations of predominantly non-white women with public insurance.

References

1. McCalla S, Minkoff HL, Feldman J, et al. The biologic and social consequences of perinatal cocaine use in an inner-city population: