

A history of induced abortion in relation to substance use during subsequent pregnancies carried to term

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OBJECTIVE: Previous research has revealed a general association between induced abortion and substance use. The purpose of this study was to examine the correlation when substance use is measured specifically during a subsequent pregnancy.

STUDY DESIGN: A nationally representative sample of women was surveyed about substance use during pregnancy shortly after giving birth. Women with a previous induced abortion, whose second pregnancy was delivered, were compared separately with women with one previous birth and with women with no previous births.

RESULTS: Compared with women who gave birth, women who had had an induced abortion were significantly more likely to use marijuana (odds ratio, 10.29; 95% CI, 3.47-30.56), various illicit drugs (odds ratio, 5.60; 95% CI, 2.39-13.10), and alcohol (odds ratio, 2.22; 95% CI, 1.31-3.76) during their next pregnancy. The results with only first-time mothers were very similar.

CONCLUSION: Psychosocial mechanisms that may explain the findings are discussed. Screening for abortion history may help to identify pregnant women who are at risk for substance use more effectively. (*Am J Obstet Gynecol* 2002;187:1673-8.)

Key words: Induced abortion, substance use, pregnancy

Induced abortion is perceived generally as a stressful life event,¹ yet available data suggest that only a minority of women (approximately 10%-20%) have serious negative psychologic complications.^{2,3} Among women who report negative effects, a wide range of stress-related symptoms have been identified that include anxiety,⁴ depression,^{5,6} sleep disturbances,² grief,⁷ and substance abuse.^{8,9} Women who have postabortion anxiety and/or depression may also abuse substances in an effort to self-medicate.

Most postabortion studies have examined the incidence of negative effects within weeks or months after the procedure, but recent research indicates that women who undergo an abortion may have delayed reactions.^{2,10,11} One logical time for the emergence of delayed responses is during a later pregnancy. Women who have regret, guilt, and other negative emotions that are associated with an induced abortion may conceive again

with the intent of carrying the second pregnancy in an attempt to mask the feelings that are associated with the abortion.¹² However, if the negative emotions are not addressed effectively, the physical and psychologic changes that are associated with the second pregnancy may exacerbate abortion-related stress.

Research has revealed that women who have had an abortion, compared with women with no history of abortion, are more likely to have anxiety and depression during pregnancy or after childbirth.^{6,13} Given the available evidence that suggests that future pregnancies may trigger emotional reactions to an abortion, the primary goal of the current study was to explore associations between a maternal history of induced abortion and the tendency to use substances that are known to represent unhealthy means of coping.

A history of induced abortion has been associated with enhanced risk for substance abuse after the procedure.^{2,8,9,14-17} However, very little research has examined relations between a maternal history of induced abortion and substance use during pregnancy. Most of the available studies have revealed associations between induced abortion and smoking during pregnancy.^{18,19} Other studies have also found higher rates of alcohol consumption²⁰ and use of illicit drugs (such as cocaine, methamphetamines, and opiates)²¹⁻²³ among pregnant women with a history of induced abortion compared with pregnant women with no prior abortion.

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Unfortunately, no studies have compared pregnant women with different reproductive histories in terms of various forms of substance use during pregnancy with a racially diverse, nationally representative sample, which was the aim of the current investigation. Based on the literature, our hypothesis was that substance use (in the form of cigarettes, alcohol, marijuana, and any illicit drugs) during pregnancy would be associated with a maternal history of induced abortion.

Material and methods

For the primary analyses, the sample of 607 women was derived from the National Pregnancy and Health Survey completed by 2613 women. This sample was limited to women who had been recently delivered of a child, with either one previous pregnancy with a resolution of an induced abortion (gravida 2, para 1; $n = 74$) or a live birth (gravida 2, para 2; $n = 531$) and the necessary background data. Exactly 64.3% of the sample was white ($n = 406$), 18.4% was Hispanic ($n = 116$), and 11.4% ($n = 72$) was African American; specific ethnicity data were not available for the remainder of the sample. The mean age was 26.5 years (SD ± 5.07 years; range, 15-44 years). For women with a history of an induced abortion, a mean of 5.03 ± 3.35 years had elapsed since the earlier pregnancy (range, 1-16 years), whereas among the women who had given birth, a mean of 3.42 ± 2.64 years had passed since the previous pregnancy (range, 1-18 years). Most of the respondents were married (71.5%); the remainder indicated living with their partners, never married, widowed, divorced, or separated. Although most of the women worked full-time outside the home (55.9%), 31.5% reported working full-time in the home, 6% were attending school, and 2.7% were unemployed. Finally, 39.1% of the subsample had 12 years of formal education (completed high school), 22.3% had 13 to 15 years of formal education, 12.8% had 16 years of education (completed college), 8.2% had >16 years of formal education, and 17.1% had <12 years of formal education.

A second set of analyses were conducted to compare the women who had had an induced abortion (gravida 2, para 1) with a sample of women without an abortion history who also gave birth for the first time (gravida 1, para 1). From this sample of 738 women, 58.1% was white ($n = 429$), 19% was Hispanic ($n = 140$), and 15.4% ($n = 114$) was African American; specific ethnicity data were not available for the rest of the sample. The mean age was 23.40 ± 5.68 (range, 13-41 years). Most of the respondents were married (56.5%); the remainder indicated being unmarried. Although most of the women worked full-time outside the home at the time of testing (62.3%), 6.2% reported working full-time in the home, 22% were attending school, and 6.1% were unemployed. Finally, 31% of this sample had 12 years of formal education (completed high school); 17% had 13 to 15 years of

formal education, 13% had 16 years of formal education (completed college), 7.9% had >16 years of formal education, and 31% had <12 years of formal education.

The survey was sponsored by the US Department of Health and Human Services, the National Institutes of Health, and the Division of Epidemiological and Prevention Research at the National Institute on Drug Abuse for the purpose of providing the first national assessment of licit and illicit drug use and alcohol consumption among pregnant women. The data, collected by Westat, Inc, has been made publicly available for statistical analysis (<http://lion.icpsr.umich.edu/SAMHDA/studies.html>). To protect the anonymity of respondents, all variables that could be used to identify specific individuals have been collapsed, recoded, or removed from the public use file.

A two-stage sampling procedure within strata was adopted, with the selection of hospitals in the first stage and the selection of individual mothers within the sampled hospitals in the second stage. The sampling frame for the hospitals contained all hospitals in the contiguous United States with ≥ 200 annual births. Mothers were selected randomly from within the participating hospitals. Of all eligible respondents, 2613 women (78%) completed the questionnaire, which represented 87% of those approached.

Sociodemographic information, obstetric history, and drug and alcohol use data were obtained through a questionnaire answer sheet completed by the respondent and concealed from the interviewer, who presented the questionnaire to the women soon after delivery. With our primary sample restricted to women with one previous pregnancy that resulted in a live birth (gravida 2, para 2) or an induced abortion (gravida 2, para 1), we were unable to conduct analyses that were based on specific forms of illicit drugs other than marijuana because of the low numbers. Analyses were conducted that were relative to the use of any illicit drugs at any point in the pregnancy (marijuana, methadone, heroine, cocaine, methamphetamines, and illicit use of sedatives, tranquilizers, amphetamines, analgesics, and inhalants) and exclusive use of marijuana, alcohol, or cigarettes at any point during the pregnancy.

Results

Primary analyses. Chi-square tests, with the calculation of ORs and the η^2 statistic, were used to examine the strength of associations between previous reproductive outcome and usage of various substances at any point during pregnancy. The results of these analyses (Table I) indicate significantly higher rates of usage for the induced abortion group (gravida 2, para 1) compared with the birth group (gravida 2, para 2), relative to any form of illicit drug use (marijuana, methadone, heroine, cocaine, methamphetamines, and illicit use of sedatives, tranquil-

Table I. Previous reproductive outcome (gravida 2, para 1 vs gravida 2, para 2) and usage of various substances during a recent pregnancy that was carried to term

<i>Group characteristics by substance use during pregnancy</i>	χ^2	<i>P value</i>	<i>OR*</i>	<i>95% CI</i>	η^2
Any illicit drugs					
Full sample	19.38	<.0001	5.60	2.39-13.10	0.18
Time elapsed since previous pregnancy					
≤2 y†	3.06	.008			
3-5 y†	10.54	.001	5.92	1.78-19.7	0.18
Marital status					
Married†	16.52	<.0001	10.25	2.62-40.06	0.19
Not married	1.80	.180			
Income					
Low†	0.96	.327			
High†	24.61	<.0001	10.05	3.36-30.12	0.23
Marijuana					
Full sample	26.05	<.0001	10.29	3.47-30.56	0.21
Time elapsed since previous pregnancy					
≤2 y†	6.14	.013	6.97	1.19-40.81	0.15
3-5 y†	17.50	<.0001	16.40	2.90-92.81	0.23
Marital status					
Married†	24.68	<.0001	37.64	3.81-371.94	0.23
Not married	3.33	.068	3.17	0.87-11.60	0.15
Income					
Low†	2.44	.119			
High†	32.93	<.0001	44.11	5.21-373.43	0.27
Cigarettes					
Full sample	1.08	.299			
Time elapsed since previous pregnancy					
≤2 y	0.06	.806			
3-5 y	0.72	.396			
Alcohol					
Full sample	9.14	<.01	2.22	1.31-3.76	0.12
Time elapsed since previous pregnancy					
≤2 y	0.38	.536			
3-5 y	6.69	<.01	2.67	1.23-5.71	0.14
Ethnicity					
White	12.35	<.0001	2.99	1.59-5.62	0.17
African American†	0.38	.538			
Hispanic†	3.76	.053	4.00	0.90-17.93	0.18

*ORs were computed with the birth group (gravida 2, para 2) as the reference group.

†Cell count <5, interpret cautiously

izers, amphetamines, analgesics, and inhalants), marijuana use, and alcohol consumption. A significant difference was not detected between the groups relative to cigarette smoking. Abortion history explained 18%, 21%, and 12% of the variance in relation to any illicit drugs, marijuana, and alcohol usage, respectively. Moreover, compared with usage rates in the group with a previous live birth, alcohol use was higher in the postabortion group (OR, 2.22; 95% CI, 1.31-3.76), as was marijuana (OR, 10.29; 95% CI, 3.47-30.56), and the use of any illicit drugs (OR, 5.60; 95% CI, 2.39-13.10).

With a significant difference detected between the previous induced abortion and birth groups relative to the amount of time since the earlier pregnancy ($t [586] = 4.23, P < .001$), separate analyses comparing drug, alcohol, and cigarette use were conducted on the basis of time elapsed (≤2 years and 3-5 years). The results of these tests are also provided in Table I. As indicated by the ORs and η^2 statistics, the greatest differences between the pre-

vious abortion and birth groups tended to occur with a longer elapsed time.

Additional analyses conducted separately based on levels of potentially confounding factors. After a comparison of the rates of substance use of various forms during pregnancy among women with histories of induced abortion and birth, the data were screened for possible associations between sociodemographic factors and the dependent variables that were significantly related to previous reproductive history. When significant associations were found, comparisons that were based on previous reproductive history were conducted separately for the categories of the particular sociodemographic variables. No significant associations were detected between maternal age, employment status, or educational history and any of the forms of substance use. However, a few significant associations were revealed that were relative to various forms of substance use and marital status, income, and ethnicity. Specifically, the marital status variable (married

Table II. Previous reproductive outcome (gravida 2, para 1 vs gravida 1, para 1) and usage of various substances during a recent pregnancy carried to term

<i>Group characteristics by form of substance use</i>	χ^2	<i>P value</i>	<i>OR*</i>	<i>95% CI</i>	η^2
Any illicit drugs					
Full sample	14.27	<.0001	4.00	1.85-8.66	0.13
Marital status					
Married†	9.53	.002	5.68	1.56-19.42	0.15
Not married	4.74	.03	2.90	1.07-7.85	0.12
Marijuana					
Full sample	21.74	<.0001	6.87	2.72-17.39	0.17
Cigarettes					
Full sample	0.26	.608			
Alcohol					
Full sample	13.53	<.01	2.58	1.53-4.33	.13
Marital status					
Married†	2.41	.12			
Not married	17.45	<.0001	4.44	2.12-9.37	0.23
Income					
Low	23.79	<.0001	10.53	3.44-32.21	0.32
High	3.22	.08			
Ethnicity					
White	10.94	.001	2.76	1.48-5.15	0.15
African American†	0.05	.82			
Hispanic†	8.18	.004	7.13	1.54-32.88	0.23
Maternal age (y)					
<25	17.73	<.0001	4.50	2.12-9.56	0.19
≥25	1.15	.284			
Maternal education					
<12th grade	16.17	<.0001	8.60	2.54-29.08	0.26
≥12th grade	4.83	.28	1.90	1.06-3.39	0.09

*Computed with the no induced abortion group (gravida 1, para 1) as the reference group.

†Cell count <5, interpret cautiously.

vs not married) was associated with the use of any illicit drugs (χ^2 [1], 17.72; $P < .0001$; $n = 607$) and marijuana usage (χ^2 [1], 15.69; $P < .0001$; $n = 607$) during pregnancy. Those who were unmarried tended to report a more frequent use of drugs. Likewise, the income variable ($\leq \$14,850$, $\geq \$14,851$) was related significantly to the use of any illicit drugs (χ^2 [1], 3.95; $P < .05$; $n = 607$) and marijuana usage (χ^2 [1], 5.01; $P < .05$; $n = 607$) during pregnancy. Higher income was associated with higher rates of reported drug usage. Ethnicity (white, African American, Hispanic) was associated significantly with alcohol consumption (χ^2 [2], 15.62; $P < .0001$; $n = 594$). The white respondents reported consumption of alcohol most frequently, with similar rates reported by the Hispanic and black respondents. The results of the relevant separate tests, based on sociodemographic variables, are presented in Table I.

Secondary analyses. A second set of analyses was conducted to compare substance use among postabortive women (gravida 2, para 1) with a sample of women without a history of abortion who were also giving birth for the first time (gravida 1, para 1). These tests removed the likelihood of confounders because of (1) possible lifestyle changes that were necessitated by child care (resulting in lower substance use) in the postbirth group and (2) differences between the postabortion and post-

birth groups that might be attributable to discrepant levels of stress that were associated with carrying a first versus a second pregnancy to term.

Chi-square tests, with calculation of ORs and the η^2 statistics were again conducted to examine the strength of associations between abortion history and substance use in first-time mothers. The results of these analyses, which indicated significantly higher rates of usage for the induced abortion group in comparison with the no abortion group relative to any form of illicit drug use, marijuana use, and alcohol consumption, are presented in Table II. A significant difference was not detected between the groups relative to cigarette smoking. Abortion history explained 13%, 17%, and 13% of the variance in the use of any illicit drugs, marijuana, and alcohol consumption, respectively. Further, compared with usage in the no abortion group, higher rates of any illicit drugs (OR, 4.00; 95% CI, 1.85-8.66), marijuana (OR, 6.87; 95% CI, 2.72-17.39), and alcohol (OR, 2.58; 95% CI, 1.53-4.33) were observed in the postabortion group.

As with the primary analyses, using data from the first-time mothers, several additional χ^2 tests were conducted to examine the associations between abortion history and usage of various substances during pregnancy that were based on categories of the sociodemographic variables that were found to be related significantly to the particu-

lar types of substance use. Alcohol use was related to marital status (χ^2 [1], 6.22; $P < .013$; $n = 789$), income (χ^2 [1], 15.47; $P < .0001$; $n = 789$), maternal education (χ^2 [1], 26.94; $P < .0001$; $n = 789$), maternal age (χ^2 [1], 42.31; $P < .0001$; $n = 789$), and ethnicity (χ^2 [1], 51.03; $P < .0001$; $n = 789$). Higher rates of consumption were reported by the married, higher income, more educated, and older women. In addition, the white respondents were more likely to report the consumption of alcohol than the Hispanic and African American participants, who were equally inclined to report alcohol use. Marital status was related significantly to the use of any illicit drugs (χ^2 [1], 7.00; $P < .01$; $n = 789$), with unmarried respondents more inclined to report the use of illicit drugs. The results of the relevant separate tests based on sociodemographic variables are presented in Table II.

Comment

This study was designed to compare the use of illicit drugs, alcohol, and cigarettes during pregnancy among a nationally representative group of women with either a history of an induced abortion or a live birth. Consistent with previous research,²⁰⁻²³ the results revealed significantly higher rates of consumption associated with a previous abortion, compared with previous birth relative to the use of any illicit drugs (OR, 5.60; 95% CI, 2.39-13.10) and alcohol (OR, 2.22; 95% CI, 1.31-3.76). Although no previous studies have focused specifically on a comparison of marijuana use during pregnancy among women with different reproductive histories, this study revealed rather dramatic differences between women with a history of abortion and women with a history of a live birth that were relative to marijuana use (OR, 10.29; 95% CI, 3.47-30.56). Counter to earlier findings,^{18,19} a significant difference in the use of cigarettes was not detected between the abortion and birth groups.

There are several possible explanations for the generally significant findings. Women with a history of abortion may have a greater need to use emotion-altering substances during pregnancy, because the subsequent pregnancy may arouse unresolved feelings related to the abortion. Women with a history of induced abortion, compared with their peers who opt for delivery, also may be more liberal, inclined to take risks, and/or tend to be involved in difficult partner relationships more often. Perhaps women with a history of induced abortion, compared with those without a previous abortion, experienced more domestic violence during pregnancy; there is research support for an association between victimization and substance use during pregnancy.²⁴ Various factors alone or in combination, as opposed to the abortion itself, may have been the critical variables that were related to the discrepant rates of substance use that was revealed in this report. The core problem is that an abortion history is essentially a package variable composed of many

personal and situational factors that lead up to the decision to abort and that embody the potential to trigger negative psychological effects in some women. To disentangle the logical explanations for higher rates of usage, future work should incorporate more detailed interviews or open-ended questions to gain insight into the thoughts and feelings of women pertaining to the abortion and the use of substances.

The decision to run additional comparisons only with women who were undergoing their first birth was made in an effort to sort out alternate explanations for the findings because of life style changes that were based on discrepant experiences with child care and stress that was associated with a first versus a second pregnancy intended to continue. The use of this sample resulted in very similar general findings, effectively reducing the likelihood of these potential confounds operating.

When comparative analyses were conducted that were based on time elapsed since the initial pregnancy event, the differences between the abortion and birth groups that were relative to the use of any illicit drugs, marijuana, and alcohol were considerably more pronounced when the amount of time was longer (3-5 years as opposed to ≤ 2 years). This finding is consistent with the few longitudinal studies that indicate increases in negative reactions long after the abortion.^{2,10,11}

Unfortunately, most postabortion studies are conducted within a framework that presupposes that an abortion experience, even if construed as traumatic, will be time limited. The results of this study and the previously conducted longitudinal work suggest the need to reconfigure models that pertain to the time associated with possible postabortion adjustment trajectories.

Differences between the abortion and birth groups relative to the rates of any illicit drug use and marijuana use, in particular, were much more pronounced when the women were married and had higher incomes. When the secondary analyses that compared first-time mothers on the basis of abortion experience were conducted, a similar result was detected relative to the use of illicit drugs. Perhaps women who choose to abort despite having the benefits of a spouse and sufficient income are more likely to experience remorse, guilt, or other negative emotions that lead to substance use in a later pregnancy. Further, in view of data reported by Jones and Forrest,²⁵ which suggest that 74% of married women were likely to report a previous abortion compared with only 30% of unmarried women, it is possible that many of the unmarried women in this sample concealed an abortion.

This study involved comparisons of substance use during a second pregnancy between women with a history of an induced abortion or a birth. Substance use comparisons also were made between first-time mothers on the basis of a history of induced abortion. Although the findings from these two sets of analyses were generally consis-

tent, there were some discrepancies relative to alcohol use. Specifically, for the first-time mothers, stronger differences between the abortion group and the no abortion group (with higher rates for the abortion group) relative to alcohol use were observed for women who had lower incomes, were unmarried, had less formal education, and were ≤ 25 years old.

The strengths of this study include the use of a carefully selected, nationally representative sample, the opportunity to evaluate possible long-term effects of abortion, and the use of outcomes that were related to many different forms of substance use. However, the data were derived through the exclusive use of self-report measures and the sample of women with one previous pregnancy that ended in abortion was relatively small. A more careful analysis of patterns of drug use in women with different reproductive histories would have been possible if repeated measurements had been obtained from the first pregnancy through the second. More prospective work clearly is needed in this area.

This study has important implications for obstetricians and general practitioners. A history of abortion appears to be a reliable marker for the increased risk of substance abuse in subsequent pregnancies. We would recommend that physicians routinely inquire about previous pregnancy loss, especially when a woman is newly pregnant. Information from histories should not be relied on because an abortion may have occurred in the intervening time and because women may have chosen previously to conceal a past abortion. The simple, nonjudgmental question, "Have you experienced any pregnancy losses such as miscarriage, abortion, adoption, or stillbirth?" will not only produce valuable information, it will also provide women with permission to discuss unresolved issues that are related to previous pregnancy losses. Moreover, a patient's response to this question, including nonverbal clues, will better enable the alert physician to discern if a referral for substance abuse or counseling may be warranted.

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