



Published in final edited form as:

*Am J Orthopsychiatry*. 2011 April ; 81(2): 193–201. doi:10.1111/j.1939-0025.2011.01088.x.

## Does the Outcome of a First Pregnancy Predict Depression, Suicidal Ideation, or Lower Self-esteem? Data from the National Comorbidity Survey

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### Abstract

The present study examines the risk of depression, suicidal ideation, and lower self-esteem following an abortion versus delivery, adjusting for important correlates. Using the National Comorbidity Survey, we examined how first pregnancy outcome (abortion versus delivery) related to subsequent major depression, suicidal ideation, and self-esteem. Models controlling for risk factors, such as background and economic factors, pre-pregnancy violence experience, and pre-pregnancy mental health, as well as a model with all risk factors, were examined. When no risk factors were entered in the model, women who had abortions were more likely to have subsequent depression ( $OR = 1.53$ ,  $CI 1.05-2.22$ ) and suicidal ideation ( $OR = 2.02$ ,  $CI 1.40-2.92$ ), but not more likely to have lower self-esteem ( $B = -.02$ ). When all risk factors were entered, pregnancy outcome was not significantly related to later depression ( $OR = .87$ ,  $CI .54-1.37$ ) and suicidal ideation ( $OR = 1.19$ ,  $CI .70-2.02$ ); predictors of mental health following abortion and delivery included pre-pregnancy depression, suicidal ideation, and sexual violence. Policies and practices implemented in response to the claim that abortion hurts women are not supported by our findings. Efforts to support women's mental health should focus on known risk factors, such as programs to address gender-based violence, rather than abortion history.

### Keywords

Abortion; depression; suicidal ideation; self-esteem; control factors

### Introduction

Compared to pregnancies ending in a delivery or miscarriage, pregnancies ending in abortion are much more likely to be the result of an unintended pregnancy (Finer & Henshaw, 2006). Unintended pregnancies are associated with life disadvantages such as lower socioeconomic status and violence experience (Dietz et al., 1999; Finer & Henshaw, 2006; Gazmararian et al., 1995, 2000; Goodwin et al., 2000; Russo & Denious, 1998, 2001), which are also common among women with depression, suicidal ideation, and lower self-esteem (Beitchman et al., 1992; Neumann, Houskamp, Pollock, & Briere, 1996; Taylor &

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Stanton, 2007). Therefore, a relationship between abortion and subsequent depression, suicidal ideation, or lower self-esteem may emerge when analyses do not adequately control for factors that capture the overlapping life circumstances of women with unintended pregnancies and poor mental health outcomes.

The claim that abortion causes mental health problems has been the basis for various state policies requiring that women seeking abortions be informed of the psychological risks, (Gold & Nash, 2007; Siegel, 2008, in press; Wilmoth, 1992; South Dakota, 2006). Psychological risks have also been cited as reasons to ban access to abortion services (Gonzales vs. Carhart, 2007). For example, in the decision to uphold the partial birth-abortion ban, Justice Kennedy stated (Gonzales vs. Carhart, 2007, p. 29) "...it seems unexceptionable to conclude some women come to regret their choice to abort the infant life they once created and sustained...Severe depression and loss of esteem can follow." Our study is an empirical test of this assertion. That is, we test how common severe depression, suicidal ideation, and lower self-esteem are following an abortion compared to a delivery, particularly in the context of other risk factors that have been shown to be consistent causes or correlates with mental health problems.

All research on abortion and mental health will have limitations for drawing causal inference because individuals cannot be randomly assigned to have an abortion or deliver (Adler, 2000; Steinberg & Russo, in press), but researchers can strive to minimize bias when conducting a study to test the claim that abortion leads to poor mental health. Unfortunately, much of the published research concluding that abortion causes depression or suicidal ideation is biased toward finding a relationship (e.g., Reardon & Cogle, 2002; Cogle et al., 2003; 2005; Coleman et al., 2009; Fergusson et al., 2006, 2008), in part, because inappropriate comparison groups are used or important risk factors are not taken into account. For instance, many studies compare the subsequent mental health outcomes of women who abort with women who deliver on the first pregnancy, but differentially exclude women with subsequent abortions only from the delivery group (e.g., Coleman, Reardon, Rue, & Cogle, 2002a, 2002b; Cogle, Reardon, & Coleman, 2003, 2005; Reardon & Coleman, 2006; Reardon & Cogle, 2002; Reardon, Cogle, & Coleman, 2004; Reardon, Cogle, Rue, Shuping, Coleman, & Ney, 2003; Reardon, Ney, Scheuren, Cogle, Coleman, & Strahan, 2002). This creates bias towards finding worse mental health in the abortion group because it eliminates the most disadvantaged women, those from poor socioeconomic backgrounds or with histories of sexual abuse, only from the delivery group. Additionally, much research has failed to adequately control for risk factors, such as violence experience, associated with both having an abortion and having poor mental health outcomes (e.g., Coleman, 2006; Coleman et al., 2002a, 2002b; Coleman, Reardon, & Cogle, 2005; Coleman, Reardon, Rue, & Cogle, 2002a; Cogle et al., 2003; <sup>2005</sup>; Reardon & Cogle, 2002; Reardon et al., 2002, 2003, 2004). In failing to control for important risk factors, plausible alternative explanations for a significant relationship between abortion and mental health cannot be ruled out. Indeed, analyses that control for risk factors such as violence experience demonstrate that the association of abortion and mental health is non-significant (Russo & Denious, 2001; Steinberg & Russo, 2008; Taft & Watson, 2008).

To test the claim that abortion leads to negative mental health in a nationally representative sample of women in the United States, we compare the mental health of women who have an abortion with women who deliver their first pregnancy. We examine clinically diagnosed major depression, suicidal ideation, and self-esteem. Some research has examined whether women who have an abortion are at an increased risk of subsequent depressive symptoms or disorders (e.g., Coleman et al., 2009; Reardon & Cogle, 2002; Russo & Denious, 2001; Schmiege & Russo, 2005; Taft & Watson, 2008; Pederson, 2008), having suicidal ideation or committing suicide (e.g., Fergusson et al., 2006, 2008; Gissler et al., 1996, 1997, 2004a,

2004b, 2005; Reardon et al., 2002), or lower self esteem (e.g., Bradshaw & Slade, 2003; Pope, Adler, & Tschann, 1999; Russo & Dabul, 1997; Russo & Zierk, 1992). Findings have varied depending on the outcome examined, the measurement of the outcome, the comparison group used, and what factors were controlled in the analyses. We are not aware of any studies examining all of these outcomes with the validated measures used here.

Our primary goal was to examine the prevalence of clinically diagnosed major depression and its most serious complication, suicidal ideation, and lower self-esteem in a U.S. nationally representative sample of women, after an abortion. For the purpose of informing policy, we compare women who had an abortion with those who delivered. We also present and discuss how the failure to include important risk factors that put women at risk for both abortion and poor mental health can influence findings.

## Method

### Sample

The data for this study are from the National Comorbidity Survey (NCS), an epidemiologic investigation designed to study the prevalence and correlates of DSM III-R disorders. The NCS was the first survey to administer a structured psychiatric interview to a nationally representative sample (see Zhao, Kessler, & Wittchen, 1994 for diagnostic criteria). The survey was fielded in 1990 to 1992 with a household-based sample of over 8,000 female and male respondents ages 15 to 54. In the NCS, data on previous events or experiences in the participants' lives are collected retrospectively; and based on women's responses the NCS staff computed participants' first and most recent occurrence of each disorder. Because complex survey techniques were used to collect the data, survey design factors are applied to our analysis to account for the effects of stratification, clustering, and weighting on our estimates. The weighted  $n$  is used to describe our sample and is reported in our analyses. A subsample of the original respondents ( $n = 5,877$ ) completed an NCS Part II survey that included, among other things, reproductive history information. Of these, 2,939 were women, and of these women,  $n = 2,062$  reported having been pregnant at least once.

We compare women who aborted versus delivered on their first pregnancy event because we can most accurately ascertain when the first pregnancy occurred, and mental health subsequent to this pregnancy. We coded the outcome of each woman's first pregnancy a abortion, delivery, or miscarriage/stillbirth according to women's self-report. Data on when the first abortion occurred, when the first miscarriage occurred, and the age of the oldest child were used to compute the outcome of the first pregnancy. Based on the information, we were unable to determine the first pregnancy outcome for seventy women because (1) two pregnancy events occurred at the same earliest age of pregnancy ( $n = 37$ ), (2) information necessary to compute the age at first abortion or miscarriage was missing ( $n = 6$ ), (3) the age of a death of a child was not reported ( $n = 1$ ), or (4) the age of the death of a child occurred prior to or at the same age as a first pregnancy outcome ( $n = 26$ ). Women reporting miscarriages/stillbirths for the first pregnancy ( $n = 226$ ) were excluded. Analyses were conducted on the ( $n = 1,765$ ) women who aborted ( $n = 218$ ) or delivered ( $n = 1,547$ ) their first pregnancy.

### Measures

**Depression**—Depression was assessed using the University of Michigan Composite International Diagnostic Interview (CIDI), modified from the World Health Organization CIDI (Zhao, Kessler, & Wittchen, 1994). Information regarding a woman's first and most recent depressive episode was used to code when depression occurred relative to her first pregnancy outcome. If a depressive episode occurred at the same age as or after her first

pregnancy outcome, she was coded as having the outcome subsequent to the first pregnancy in order to be conservative in our classification. If a depressive episode occurred before the age of a woman's first pregnancy, she was coded as having depression before her first pregnancy. Three-hundred seventy-two women had at least one depressive episode after or at the same age as the first pregnancy event.

**Suicidal ideation**—Suicidal ideation was assessed with three questions asking if participants had ever: (1) seriously thought about committing suicide, (2) made a plan to commit suicide, or (3) attempted suicide. Women who answered yes to any of these items were coded as having suicidal ideations. Information regarding women's first and most recent suicide thoughts, plans, or attempts was used to code when suicidal ideation occurred relative to a woman's first pregnancy outcome. Similar to depression, if suicidal ideation occurred at the same age as or after a woman's first pregnancy outcome, she was coded as having suicidal ideation subsequent to the first pregnancy. Two-hundred and three women had suicidal ideation after or at the same age as the first pregnancy outcome.

**Self-esteem**—Self-esteem was assessed at the time of the interview by the mean on four items from the Rosenberg (1965) self-esteem scale. Examples of items, rated on a four point scale, included "On the whole I am satisfied with myself" and "At times I think I am no good at all." Scores ranged from 1 to 4 and the reliability for those who answered all items ( $n = 5688$ ) was .78. Sixteen women were missing on all self-esteem items; therefore, the sample size for analyses in which self-esteem was the dependent measure is 1749, and the mean self-esteem of the sample was 3.44. Because self-esteem was assessed at the time of the interview, it was by definition after the first pregnancy event. A retrospective measure of self-esteem was not available in this survey.

**Demographic and socioeconomic characteristics**—We controlled for race, age at first pregnancy, marital status, education, and income at the time of the interview because previous research has found these characteristics to vary by mental health status (Cairney & Krause, 2005; Coyne & Downe, 1991; Kessler et al., 1994; Link & Phelan, 1995; Turner, Lloyd, & Roszell, 1999). Additionally, the distribution of these characteristics among women who have abortions differs from women in the general U.S. population (Jones, Darroch, & Henshaw, 2002). Information on marital status, education, and income was only assessed at the time of the interview and not at the time of the first pregnancy.

**Violence experience**—Information on age at first violence experience was used to classify individuals as having experienced sexual violence (rape or molestation) or other violence (including childhood physical abuse, being physically attacked, kidnapped, held captive, or threatened with a weapon) before the first pregnancy event.

**Prior mental health**—We coded whether women had experienced a depressive episode or suicidal ideation prior to the first pregnancy as described above. Similarly, alcohol and drug dependence before their first pregnancy were assessed by coding whether the first onset occurred prior to the first pregnancy. If the onset for the disorder was before the first pregnancy, women were coded as having the alcohol or drug dependence before the first pregnancy.

## Data Analysis

For the dichotomous outcomes of depression and suicidal ideation, logistic regression models are analyzed; for the continuous outcome of self-esteem, linear regression models are analyzed. For each outcome, we present five models. First, unadjusted models are analyzed to examine the relationship of first pregnancy outcome and subsequent depression,

suicidal ideation, or lower self-esteem without adjusting for any risk factors. Second, we conducted adjusted multiple logistic or linear regression to examine the independent relationship of pregnancy outcome and post-pregnancy depression, suicidal ideation, and lower self-esteem. The adjustment variables are entered in separate models to ascertain the individual influence of (1) demographic and socioeconomic factors, (2) violence experience, or (3) prior depression, suicidal ideation, alcohol dependence, or drug dependence. Finally, a fully adjusted model is analyzed. The survey design features of the NCS, which included weighting, stratification, and clustering, are accounted for in all of our analyses (Stata 10.1: College Station, TX)

## Results

Means or proportions of each risk factor by first pregnancy outcome are presented in Table 1. Chi-squares were used to test whether pregnancy outcome related to the categorical risk factors and *t*-tests were used to test whether pregnancy outcome related to the continuous measures. Women terminating their first pregnancy were younger at the time of the first pregnancy,  $p < .0005$ , had higher education levels,  $p < .0005$ , and were less likely to be married at the time of the interview than women who delivered,  $p < .0005$ . Women aborting the first pregnancy were more likely to have experienced pre-pregnancy depression,  $p < .001$ , pre-pregnancy alcohol dependence,  $p < .0005$ , and pre-pregnancy sexual violence,  $p = .001$ , and marginally more likely to have experienced pre-pregnancy suicidal ideation,  $p < .07$ , and pre-pregnancy drug dependence,  $p < .06$ , compared to women who delivered the first pregnancy.

Tables 2 presents bivariate relationships between mental health risk factors and post-pregnancy depression, suicidal ideation, and self-esteem. Again, chi-squares were used to test whether depression or suicidal ideation related to the categorical variables and *t*-tests were used to test whether depression or suicidal ideation related to the continuous measures. Compared to women who were not depressed or did not have suicidal ideation women who were depressed or had suicidal ideation after their first pregnancy were younger at their first pregnancy, less likely to be married and more likely to be separated/widowed/divorced at the time of the interview,  $ps \leq .001$ . Additionally, compared to women who did not have suicidal ideation after their first pregnancy, women who had suicidal ideation had lower incomes at the time of the interview,  $p \leq .001$ . Finally, compared to women without post-pregnancy depression or suicidal ideation, those with post-pregnancy depression or suicidal ideation were more likely to have experienced pre-pregnancy sexual violence,  $ps < .0005$ , or other violence,  $ps < .005$ , and were more likely to have had pre-pregnancy depression,  $ps < .0005$ , suicidal ideation,  $ps < .0005$ , and alcohol,  $ps < .05$ , or drug dependence,  $ps < .0005$ . Women had lower self-esteem if they were younger at time of the first pregnancy (data not shown)  $B = .012$ ,  $p \leq .01$ , married compared to never married,  $p < .02$ , identified as White or Hispanic compared to Black,  $p < .05$ , had lower household incomes,  $p < .02$ , or had lower educational attainment,  $p < .05$ . Additionally, women who had experienced pre-pregnancy sexual or other violence,  $ps < .0005$  or pre-pregnancy depression, suicidal ideation, or alcohol or drug dependence,  $ps \leq .005$  had lower self-esteem.

Many factors common among women who have abortions are also common among women who have post-pregnancy major depression, suicidal ideation, or lower self-esteem, such as being younger at the time of the first pregnancy, experiencing sexual violence, and having pre-pre pregnancy mental health problems.

Table 3 presents the effects of model adjustments on the odds ratio or regression coefficient comparing women who aborted with those who delivered a first pregnancy. Unadjusted analyses, reported in the first column, show that women who had abortions on their first



pregnancy were more likely to have subsequent depression,  $OR = 1.53, p < .05$ , and suicidal ideation,  $OR = 2.02, p < .001$ , than women who delivered their first pregnancy. There were no differences in self-esteem for the two groups. The second through fourth columns show the odds ratios or regression coefficients when controlling for only individual sets of risk factors. There were no differences between women who abort versus deliver in post-pregnancy depression when controlling for background and economic characteristics, pre-pregnancy violence experience, or pre-pregnancy mental health. For suicidal ideation, however, only the background and socioeconomic status adjustments fully explained the bivariate relationship found with pregnancy outcome. For self-esteem, women who had abortions and those who delivered had similar levels of self-esteem, regardless of adjustment for other factors. The final column of Table 3 shows the odds ratio or regression coefficient of pregnancy outcome when controlling for all risk factors.

Table 4 presents the relationship of all the risk factors to major depression, suicidal ideation, and self-esteem in the fully adjusted models. A strong predictor of depression after the first pregnancy event was depression before the first pregnancy event ( $OR = 32.1, p < .0005$ ). Similarly, strong predictors of suicidal ideation after the first pregnancy event were suicidal ideation ( $OR = 8.0, p < .0005$ ) and drug dependence ( $OR = 2.72, p < .05$ ) before the first pregnancy outcome. Being younger at the first pregnancy ( $OR = .90, p < .0005$ ) was also significantly related to having post-pregnancy depression and suicidal ideation. For self-esteem, both pre-pregnancy depression ( $B = -.38, p < .0005$ ) and suicidal ideation ( $B = -.28, p \leq .005$ ) predicted self-esteem. The only significant predictor of all three mental health outcomes was experiencing pre-pregnancy sexual abuse. The  $OR$  was 1.8 to 2.3, for depression and suicidal ideation, respectively,  $ps \leq .01$ , and  $B = -.19, p \leq .002$  for self-esteem.

## Discussion

Our study provides evidence that the relationship of abortion and mental health is explained by other factors related to both unintended pregnancy and mental health. Consequently, it is not surprising that studies that fail to control for important risk factors find poor psychological outcomes following an abortion. Indeed, in our unadjusted models, women who had an abortion were more likely to have subsequent mental health problems. However, the bivariate association between abortion and mental health was explained by other risk factors that were highly correlated with both abortion and subsequent mental health. Specifically, in the final model pre-pregnancy mental health, sexual violence, and being younger at the first pregnancy were significant predictors of depression, suicidal ideation, and self-esteem. These findings are consistent with other research on abortion and mental health (American Psychological Association, 2008; Major et al., 2000; Steinberg & Russo, 2008; Taft & Watson, 2008). Furthermore, the belief expressed by Justice Kennedy, that women who have abortions must suffer a loss of esteem was not found, even when no risk factors were taken into account, supporting other research (Bradshaw & Slade, 2003; Pope et al., 1999; Russo & Dabul, 1997; Russo & Zierk, 1992).

The finding that pre-pregnancy sexual violence was strongly and consistently related to poor mental health and having an abortion, supports other research showing the experience of early sexual violence in particular, as opposed to physical violence, puts women at high risk of unintended pregnancy and poor mental health (Beitchman et al., 1992; Neumann et al., 1996; Roosa et al., 1997). Even if sexual violence is not the direct cause of a first pregnancy, that sexual violence prior to the first pregnancy was a strong predictor of post-pregnancy mental health in the fully adjusted model speaks to the impact of such an experience on women's lives. Moreover, other research finds that women with histories of sexual violence are more likely to be victims of subsequent sexual violence than women without such

histories (Classen, Palesh, & Aggarwal, 2005; Garcia-Moreno & Stockl, 2009; Macy, 2008), putting them at repeated risk for both unintended pregnancy and poor mental health.

## Limitations

Underreporting of abortion is a common problem among studies comparing women who abort to other women (Jagannathan, 2001; Jones & Forrest, 1992; Jones & Kost, 2007; Udry, Gaughan, Schwingl, & van den Berg, 1996; Smith, Adler, & Tschann, 1999). In the current study's sample, of all women's reported pregnancies (abortions and deliveries), 9.0 % ended in abortion between the years of 1954 and 1991. Based on data collected by periodic surveys of all identifiable abortion providers in the US from 1973 to 1991, the percentage of pregnancies (abortion and deliveries) ending in abortion ranged from 19.3% to 30.4% among women 15-44 (Jones et al., 2009). Records of the proportion of pregnancies ending in abortion before 1973 are non-existent; however, estimates are approximately 16 percent in the late 60s (Henshaw, 2009). If we assume a steady percentage of 16% from 1954 to 1972, and we use the published statistics from 1973 to 1992 reported in Jones et al. (2009), 22.5 % of all pregnancies (abortions and deliveries) between 1954 and 1991 ended in abortion among women 15-44 years of age. This suggests approximately 40% (9.0/22.5) of abortions were reported in the NCS data. In the National Survey of Family Growth (NSFG), Jones and Kost (2007) estimated that 35% to 59% of abortions were reported between 1973 and 2001. Compared to the NSFG, abortion underreporting in our sample is within the estimated range of Jones and Kost (2007). In the current study, it would be problematic if underreporting of abortion were associated with mental health, such that those with poor mental health did not report past abortions. However, previous research suggests that women less likely to report abortion have better mental health than those reporting (Jagannathan, 2001; Schmiede & Russo, 2005). In the present study, if women with better mental health were less likely to report a previous abortion, the associations found between pregnancy outcome and mental health would be attenuated.

Another limitation of the present study is that we were unable to control for important contextual factors such as pregnancy intention because it was not measured. Thus, we were unable to ascertain the extent to which pregnancy intention could contribute to the relationship of first pregnancy outcome and subsequent mental health. Indeed, Steinberg and Russo (2008) show and Charles, Polis, Sridhara, and Blum (2008) discuss the importance of pregnancy intention for subsequent mental health. If a significant relationship between abortion and poor mental were found in our study, then our results would still not be strong evidence in support of the claim that abortion causes poor mental health. This is because pregnancy intention and other contextual factors could not be ruled out as alternative plausible explanations accounting for the relationship of abortion and mental health. However, because no significant relationship existed when we controlled for pre-pregnancy risk factors of later mental health, we can be confident that the claim that abortion causes poor mental health is not supported by our data.

## Conclusions

Rather than focusing on abortion as the cause of mental health problems, policies and clinical practices should be tailored to helping women most at risk of poor mental health, regardless of pregnancy outcomes. We found that those at risk of serious post-pregnancy mental health problems were those with histories of mental health problems or an experience of sexual violence before their pregnancy. Sadly, the experience of early sexual abuse has long-lasting implications for women's lives, and this finding should be the focus of policy and practices.

## Acknowledgments

We would like to thank the Ellertson Fellowship for supporting our effort. Dr. Henderson's effort was also supported by an NIH/NICHD Mentored Research Scientist Development Award in Population Research (K01HD054495) and resources from NIH/NCRR/OD UCSF-CTSI (KL2 RR024130). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NIH.

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**Table 1**

Descriptive statistics of risk factors by first pregnancy outcome (% within column)

	Abortion (n= 218)	Delivery (n= 1547)	p-value
Age at first pregnancy	<b>20.0 (.31)</b>	<b>22.0 (.19)</b>	<b>&lt;.0005</b>
Marital status <sup>a</sup>			<b>&lt;.0005</b>
Married/cohabitating	<b>64.9</b>	<b>76.8</b>	
Separated/widowed/divorced	<b>16.2</b>	<b>17.0</b>	
Never married	<b>18.9</b>	<b>6.2</b>	
Race			<i>ns</i>
White	75.3	73.1	
Hispanic	10.5	9.0	
Black	12.5	14.8	
Other	1.7	3.1	
Income <sup>a</sup>			<i>ns</i>
\$0 - \$19,999	23.6	28.0	
\$20,000 - \$34,999	20.0	26.1	
\$35,000 - \$69,999	40.0	32.7	
\$70,000 +	16.3	13.3	
Education <sup>a</sup>			<b>&lt; .0001</b>
0-11 Years	<b>4.3</b>	<b>16.5</b>	
12 Years	<b>34.7</b>	<b>42.3</b>	
13-15 Years	<b>29.3</b>	<b>24.1</b>	
16 + Years*	<b>31.7</b>	<b>17.1</b>	
Sexual violence before first pregnancy			<b>.001</b>
Yes	<b>26.3</b>	<b>14.0</b>	
No	<b>73.7</b>	<b>86.0</b>	
Other violence before first pregnancy			<i>ns</i>
Yes	12.5	9.8	
No	87.5	90.2	
Alcohol dependence before first pregnancy			<b>&lt;.0005</b>
Yes	<b>7.1</b>	<b>2.8</b>	
No	<b>92.9</b>	<b>97.2</b>	
Drug dependence before first pregnancy			<b>&lt;.06</b>
Yes	4.8	2.6	
No	95.2	97.4	
Depression before first pregnancy			<b>.001</b>
Yes	<b>14.6</b>	<b>6.9</b>	
No	<b>85.4</b>	<b>93.1</b>	

	<b>Abortion (n= 218)</b>	<b>Delivery (n= 1547)</b>	<b>p-value</b>
Suicidal ideation before first pregnancy			.07
Yes	12.5	7.9	
No	87.5	92.1	

*Note.* Self-esteem and background and economic factors were assessed at the time of the interview. The values for depression and suicidal ideation are odds ratios and for self-esteem are unstandardized regression coefficients. Bolded values are significantly different at  $p < .05$ .

**Table 2**

Descriptive statistics of risk factors by presence or absence of depression or suicidal ideation and mean self-esteem at each level of each risk factor

	Depression		Suicidal ideation		Self-esteem
	Yes (n = 372) 21.1 (.21)	No (n = 1393) 21.9 (.19)	Yes (n = 203) 19.6 (.30)	No (n = 1562) 22.0 (.17)	
Age at first pregnancy	67.3	77.4	62.0	77.0	3.45 <sup>a</sup>
Marital Status					
Married/cohabitating	25.1	14.7	28.9	15.4	3.46 <sup>ab</sup>
Separated/wid/div	7.6	7.9	9.1	7.6	3.31 <sup>b</sup>
Never married					
Race					
Hispanic	8.9	9.3	11.2	8.9	3.29 <sup>a</sup>
Black	10.5	15.6	18.8	13.9	3.58 <sup>b</sup>
Other	3.5	2.8	3.2	2.9	3.46 <sup>ab</sup>
White	77.2	72.4	66.8	74.3	3.44 <sup>a</sup>
Income					
\$0-\$19,999	30.0	26.8	39.0	26.0	3.28 <sup>a</sup>
\$20,000-\$34,999	26.6	25.0	30.2	24.7	3.38 <sup>a</sup>
\$35,000-\$69,999	33.6	33.6	24.9	34.7	3.54 <sup>b</sup>
\$70,000+	9.9	14.7	5.9	14.7	3.66 <sup>c</sup>
Education					
0-11 years	14.0	15.3	16.0	14.9	3.33 <sup>a</sup>
12 years	45.7	40.2	49.6	40.3	3.37 <sup>a</sup>
13-15 years	23.2	25.2	20.6	25.3	3.51 <sup>b</sup>
16+ years	17.2	19.4	13.9	19.6	3.59 <sup>b</sup>
Sexual violence before first pregnancy					
Yes	27.4	12.3	32.9	13.3	3.20 <sup>a</sup>
No	72.6	87.7	67.3	86.7	3.49 <sup>b</sup>



	Depression		Suicidal ideation		Self-esteem
	Yes (n = 372)	No (n = 1393)	Yes (n = 203)	No (n = 1562)	(n = 1749)
Other violence before first pregnancy					
Yes	<b>16.7</b>	<b>8.4</b>	<b>25.9</b>	<b>8.1</b>	3.19 <sup>a</sup>
No	<b>83.3</b>	<b>91.6</b>	<b>74.1</b>	<b>91.9</b>	3.47 <sup>b</sup>
Alcohol dependence before first pregnancy					
Yes	<b>6.8</b>	<b>2.3</b>	<b>6.0</b>	<b>2.9</b>	3.10 <sup>a</sup>
No	<b>93.2</b>	<b>97.7</b>	<b>94.0</b>	<b>97.1</b>	3.45 <sup>b</sup>
Drug dependence before first pregnancy					
Yes	<b>5.5</b>	<b>2.2</b>	<b>7.4</b>	<b>2.3</b>	3.11 <sup>a</sup>
No	<b>94.5</b>	<b>97.8</b>	<b>92.6</b>	<b>97.7</b>	3.45 <sup>b</sup>
Depression before first pregnancy					
Yes	<b>30.6</b>	<b>1.7</b>	<b>15.6</b>	<b>6.8</b>	2.98 <sup>a</sup>
No	<b>69.4</b>	<b>98.3</b>	<b>84.4</b>	<b>93.2</b>	3.48 <sup>b</sup>
Suicidal ideation before first pregnancy					
Yes	<b>15.5</b>	<b>6.6</b>	<b>31.7</b>	<b>5.4</b>	2.99 <sup>a</sup>
No	<b>84.5</b>	<b>93.4</b>	<b>68.3</b>	<b>94.6</b>	3.48 <sup>b</sup>

Note. Self-esteem, marital status, income, and education are at time of interview. For depression and suicidal ideation, bolded values indicate significant chi-square or *t*-test differences,  $p < .05$ . For self-esteem superscripts with different letters indicate significantly different means,  $p < .05$ . Because the age of first pregnancy and self-esteem are both continuous, the first cell under self-esteem is left blank.

**Table 3**

Adjusted odds ratio or regression coefficients (and confidence interval) of abortion versus delivery for subsequent depression or suicidal ideation

	No factors	Background and economic factors	Violence Experience	Pre-pregnancy mental health	All factors
Depression	1.53* (1.05-2.22)	1.31 (.85-2.02)	1.36 (.89-2.06)	1.18 (.81-1.71)	.87 (.54-1.37)
Suicidal ideation	2.02*** (1.40-2.92)	1.57 (.97-2.56)	1.78** (1.19-2.66)	1.86*** (1.29-2.70)	1.19 (.70-2.02)
Self-esteem	-.02 (-.16-.12)	-.04 (-.18-.10)	.02 (-.11-.15)	.04 (-.09-.17)	.03 (-.09-.15)

*Note.* Self-esteem and background and economic factors were assessed at the time of the interview. The values for depression and suicidal ideation are odds ratios and for self-esteem are unstandardized regression coefficients.

\*  $p \leq .05$ ,

\*\*  $p \leq .01$ ,

\*\*\*  $p \leq .001$

Table 4

Adjusted odds ratios or regression weights (and their standard errors) of all factors in the final model

	Depression	p-value	Suicidal ideation	p-value	Self-esteem	p-value
Abortion versus delivery on first pregnancy	.87 (.19)	.53	1.19 (.31)	.52	.03 (.06)	.69
Background and economic factors						
Age at first pregnancy	<b>.90 (.02)</b>	< .0005	<b>.81 (.03)</b>	< .0005	.78 (.44)	<i>ns</i>
Marital status						
Married	1.12 (.33)	<i>ns</i>	1.35 (.37)	<i>ns</i>	.003 (.004)	<i>ns</i>
Div/sep/wid	<b>2.53 (.69)</b>	< .005	<b>2.72 (.69)</b>	< .0005	.16 (.09)	.10
Never married	1.00		1.00			
Race						
Black	.60 (.17)	< .10	1.24 (.38)	<i>ns</i>	<b>.17(.05)</b>	<b>.001</b>
Hispanic	1.12 (.24)	<i>ns</i>	1.00 (.33)	<i>ns</i>	-.06 (.07)	<i>ns</i>
Other	1.38 (.61)	<i>ns</i>	1.20 (.52)	<i>ns</i>	.04 (.14)	<i>ns</i>
White	1.00		1.00			
Income						
0-19,999	.87 (.22)	<i>ns</i>	1.57 (.63)	<i>ns</i>	<b>-.32 (.08)</b>	< .0005
20,000-34,999	1.06 (.31)	<i>ns</i>	1.85 (.67)	<i>ns</i>	<b>-.24 (.06)</b>	<b>.001</b>
35,000-69,999	1.26 (.32)	<i>ns</i>	1.60 (.60)	<i>ns</i>	-.09 (.05)	<i>ns</i>
70,000 +	1.00		1.00			
Education						
0-11 years	.91 (.36)	<i>ns</i>	.48 (.23)	<i>ns</i>	-.10 (.07)	<i>ns</i>
Completed high	1.28 (.39)	<i>ns</i>	.91 (.35)	< .10	<b>-.13 (.06)</b>	<b>.02</b>
Some college	1.10 (.32)	<i>ns</i>	.61 (.24)	<i>ns</i>	-.02 (.06)	<i>ns</i>
College +	1.00		1.00			
Pre-pregnancy violence experience						
Sexual violence	<b>2.27 (.38)</b>	< .0005	<b>1.81 (.37)</b>	.006	<b>-.19 (.06)</b>	<b>.002</b>
Other violence	1.34 (.35)	<i>ns</i>	<b>2.38 (.75)</b>	<b>.008</b>	<b>-.14 (.06)</b>	<b>.02</b>
Pre-pregnancy mental						
Depression	<b>32.12 (8.21)</b>	< .0005	1.22 (.37)	<i>ns</i>	<b>-.38 (.07)</b>	< .0005

	Depression	<i>p</i> -value	Suicidal ideation	<i>p</i> -value	Self-esteem	<i>p</i> -value
Suicidal ideation	.90 (.27)	<i>ns</i>	<b>8.01 (2.503)</b>	< .0005	<b>-.28 (.09)</b>	<b>.005</b>
Alcohol dependence	1.48 (.57)	<i>ns</i>	.66 (.35)	<i>ns</i>	-.06 (.10)	<i>ns</i>
Drug dependence	.92(.37)	<i>ns</i>	<b>2.72 (1.33)</b>	<.05	-.04 (.12)	<i>ns</i>

*Note.* Self-esteem and background and economic factors were assessed at the time of the interview. The values for depression and suicidal ideation are odds ratios and for self-esteem are unstandardized regression coefficients. For the dichotomous outcomes of depression and suicidal ideation, the reference category is the one with a 1.00. For the continuous measure of self-esteem, the reference category is the one with a dash. Reference categories for pre-pregnancy violence and mental health are not shown (since each of these variables take on only two values). Bolded coefficients are significant,  $p < .05$