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Suicide risks associated with pregnancy outcomes: a national cross-sectional survey of American females 41–45 years of age

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ABSTRACT

Objective: Numerous studies have linked abortion to an elevated risk of suicide. One hypothesis is that this association is entirely incidental and most likely fully explained by preexisting mental illness. This hypothesis can be tested by examining women's own self-assessments of the degree, if any, that abortion and other pregnancy outcomes contributed to suicidal thoughts and behaviors.

Methods: A topic blind survey was distributed to 2829 American females 41–45 years of age. Respondents were asked about any history of attempted suicide(s) and reproductive histories. Grouped by reproductive history, respondents were then asked to rank on visual analog scales the degree, if any, to which their pregnancy outcome contributed to suicidal thoughts, self-destructive behaviors, and any attempted suicides.

Results: Aborting women were twice as likely to have attempted suicide compared to other women. Aborting women, especially those who underwent coerced or unwanted abortions, were significantly more likely to say their pregnancy outcomes directly contributed to suicidal thoughts and behaviors compared to women in all other groups.

Conclusions: The hypothesis that higher rates of suicide following abortion can be entirely explained by preexisting mental health problems is inconsistent with women's own self-assessments of the degree their abortions directly contributed to suicidal and self-destructive behaviors.

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Suicide; suicidal ideation; self-destructive behaviors; pregnancy loss; abortion; miscarriage

Introduction

While all forms of pregnancy loss may involve feelings of loss and grief, case reports indicate that at least a subset of women who have had abortions report feelings of guilt and self-hatred which fueled their subsequent suicidal thoughts and behaviors [1–3].

An elevated risk of suicide and/or suicidal ideation associated with induced and spontaneous abortions has been identified in record-based population studies [4–10], longitudinal surveys [11–13], cross-sectional surveys [14–17], and case studies [1–3,18–20]. Each of these study designs have advantages and disadvantages. Record-based studies which examine data drawn from death certificates and medical records for entire populations have high statistical power and do not suffer from any self-selection bias. But neither can they provide any direct insight into the direct mindset of women who have considered, attempted, or completed suicides. Such insights can be drawn from surveys and case studies, but these methodologies are also subject to selection bias, especially in the form of self-censure and concealment of past abortions in national surveys [21,22] and rely on smaller sample sizes, which limits statistical power, especially in regard to identifying smaller effect sizes.

For example, a Finnish study linking the nation's death certificates to medical records revealed that the annual rate of suicide per 100,000 women of reproductive age was 11.3 for women who had not been pregnant in the previous year but 18.1 and 34.7, respectively, for women who had experienced a miscarriage or abortion within the previous year [4]. But correlation is only evidence for, not proof of, a causal connection., This led some abortion proponents to hypothesize that the associations between abortion and suicide risk are most likely best explained by preexisting risk factors, such as mental illness, which simply incline the same women who are most likely to

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have abortions to also be more likely to have suicidal thoughts or behaviors, independent of the abortion experience itself [23,24]. This is where surveys of women controlling for other factors associated with mental health are helpful for either confirming or disproving this alternative hypothesis [1–3,20].

Notably, the best designed longitudinal [11–13] and cross-sectional [14–17] studies have found an independent association between abortion and suicidal thoughts or behaviors even after controlling for prior mental health and numerous other common risk factors. For example, a 25-year longitudinal study of 1265 children born in Christchurch New Zealand revealed a significantly higher relative risk (RR) of suicidal ideation among young women who had abortions compared to both women who had not been pregnant (RR = 2.38; 95% CI: 1.18–4.76) and women who had been pregnant but had not had abortions (RR = 4.17; 95% CI: 1.79–9.09) after controlling for measures of mental health histories, family functioning, child conduct problems, socio-demographic factors, educational achievement, young adult lifestyle factors, and more [11]. Similarly, an analysis of the cross-sectional National Comorbidity Survey Replication (NCS-R) study revealed that adjusted odds ratio (AOR) was significantly higher for women with a history of abortion before suicidal ideation (AOR = 1.97 95% CI: 1.46–2.66) or attempted suicide (AOR = 2.18; 95% CI: 1.66–2.86), after controlling for age, marital status, race, education, and household income [14]. However, even these findings cannot conclusively prove that there are no other common undiscovered risk factors that may help to explain the observed association between abortion and suicide.

At the same time, recognition of causal connections does not require irrefutable proof that there is a single cause for each effect. Indeed, multiple causes for each effect are common, especially in human psychology. Given the existing evidence described above, it is reasonable to conclude that at least some women experience abortion as a stressful event that may trigger, compound, complicate, or otherwise exacerbate suicidal risk.

For example, in a well-documented case of suicide two weeks following an abortion, a suicide note left by Emma Beck, a prominent British artist, clearly attributed her suicide to the abortion of her twins: "I told everyone I didn't want to do it, even at the hospital. I was frightened, now it is too late. I died when my babies died. I want to be with my babies: they need me, no-one else does" [20]. Clearly, based on Beck's self-attribution, it would be absurd to suggest that her abortion did not at least *contribute* to her suicide. Yet, at the same time, even this clear self-attribution of a direct cause and effect does not prove that her abortion was the *sole cause* of her suicide.

Indeed, given the fact that many, perhaps most, behaviors are driven by multiple interior and exterior feelings, thoughts, and experiences, it is most likely that multiple factors contribute to suicidal thoughts or behaviors. Therefore, it is unreasonable to demand that researchers must prove that abortion is the direct and sole cause of any negative mental health outcome, such as suicide. In terms of the legal requirements for providing good screening, decision counseling, and risk disclosure to women considering abortion, the level of evidence required is satisfied simply by statistically significant associations [25].

With these considerations in mind, it is notable that few, if any, prior studies into suicide have directly asked women if, and to what degree, they believe their abortion experiences have contributed to their suicidal thoughts or behaviors, much less in a quantitative manner. This study fills that research gap. Assessing the degree, if any, that self-aware women attribute their suicidal thoughts and behaviors to their abortions, and other pregnancy outcomes, is strong evidence for determining if there are any causal connections between pregnancy outcomes and suicide.

But abortion experiences are not monolithic. Prior findings have revealed that more negative psychological effects are associated when the abortion decision type is not freely wanted and consistent with one's own values and preferences [26,27]. In addition, the American Psychological Association's Task Force on Mental Health and Abortion concluded that there is a greater risk of adverse mental health effects when there is emotional attachment to the pregnancy or perceived pressure to abort from others [28]. Therefore, any investigation of suicide risks associated with abortion should also examine the effects associated with these differences in abortion decision types.

The null hypothesis is that pregnancy outcomes of any type, especially abortion, have no effect on suicidal thoughts and behaviors. The four alternative hypotheses are as follows.

1. Pregnancy outcomes can affect suicidal thoughts and behaviors.
2. Women who have given birth and are raising a child have lower risks of suicide due to an increase in relationships and responsibilities toward their children.
3. Women who experience pregnancy losses, natural or induced, are at greater risks of suicidal thoughts and behaviors.

4. Aborting women will be increasingly at higher risk of suicidal thoughts and behaviors to the degree that their abortions were undertaken in violation of their own values and preferences.

Materials and methods

Experts in abortion and mental health research were consulted in preparing a questionnaire on the prevalence and effects of abortions that conflict with women's own maternal preferences and moral beliefs.

The recruitment of survey participants was conducted using the services of Cint.com, one of the world's largest digital marketing and social sciences survey firms. The Cint survey panels include over 28 million U.S. residents. Cint panelists are persons who have provided consent to Cint to receive, review, and voluntarily complete surveys using their own electronic devices in exchange for small rewards with a value, for this invitation, of under $2 per completed survey. The consent agreement includes a notice that some questions may address "sensitive info". Opportunities to complete surveys do not disclose the subject or content of the surveys, but respondents are free to cease participation in any given survey at any time.

For the purposes of our survey, we invited a random sample of United States residents pre-identified as females 41–45 years of age, to complete a survey. This narrow age range was chosen to eliminate the confounding effects of age while capturing the experience of women who have completed most of their reproductive lives. The survey was electronically distributed and collected over a three-day period in July of 2024.

Respondents out of our gender and age range were excluded. In addition, since the survey was designed to be completed in ~5–7 min by respondents with any history of pregnancy, those who reported any pregnancy who completed the survey in <4 min were excluded. This exclusion reflected the likelihood that some respondents are "speedsters" who do not actually read and consider the questions and instead just answer randomly to complete the survey as quickly as possible to earn the small credits Cint.com awards for completing surveys.

The survey exposure rate, response rates, and exclusion rates are shown in Figure 1. Among 2,829 people who responded to the survey invitation 2,361 (83.5%) completed the first page of demographic questions. Of those eligible to continue the survey, 123 (5.2%) dropped by refusing to complete the psychiatric history. Another 25 (1.1%) dropped out when asked their opinion regarding abortion and 22 (0.9%) dropped out when asked about their own pregnancy outcomes. Of those who provided both psychiatric and pregnancy histories ($n = 2191$), 166 (7.6%) dropped out before completing the entire survey. Of the completed surveys, 100 (4.9%) were excluded for speeding through the survey in under 4 min, a pace too fast to be reliable, yielding a total of 1,925 usable surveys. As described below, these respondents were grouped into five mutually exclusive pregnancy outcome groups based on a prioritization algorithm.

Among the usable surveys, 409 (21.2%) reported a history of abortion(s) which is only slightly lower than the rate for lifetime exposure rate to induced abortions for American women (23.7%) for women between 41 and 45 years of age as estimated by the Guttmacher Institute [29]. This suggests that there was relatively little concealment of past abortions, at least in comparison to national surveys in which typically capture only about 50% of the expected rate of abortions [21,22].

Variables used

There was no identification of the subject matter in the invitation or first page of the survey. The first page of the questionnaire asked only about age and gender to determine if respondents met the participation requirements. The second page included a list of eleven mental health diagnoses and asked respondents to identify which, if any, they had ever been diagnosed. In addition, this page asked if respondents had ever attempted suicide: never, once, twice, three or more times.

Only after completing the second page were respondents asked "Have you ever had an unplanned, mistimed, unwanted, or otherwise difficult pregnancy?, "thereafter referred to as a "problematic pregnancy". Respondents were then asked the total number of times they had given birth to a live born child, had a pregnancy loss (miscarriage, still birth, or other loss), or had an induced abortion.

From this pregnancy history, women were divided by a program algorithm into one of five groups, by order of priority: those who had a history of induced abortions, pregnancy losses, problematic pregnancies, live births, and those who had never been pregnant. Thus, women in the abortions group may have had live births, natural pregnancy losses, and problematic pregnancies. However, women were included in the live birth group only if they had no other pregnancy outcomes. Those who reported any pregnancy outcome were asked additional questions.

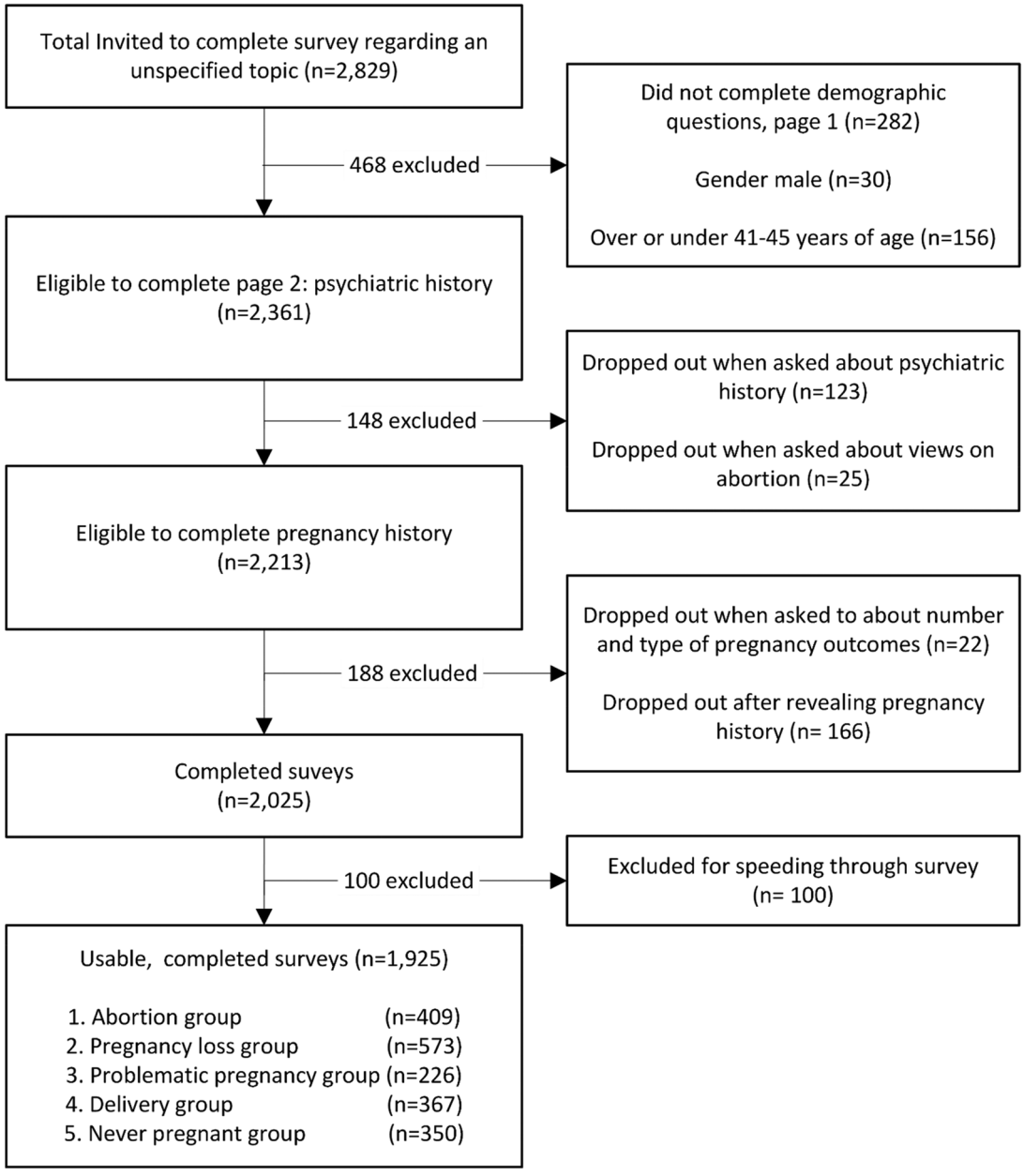

Figure 1. Study population.

Table 1 shows the three questions related to suicidal behaviors included in these analyses. The third question regarding suicidal causation was asked only of women who reported having attempted suicide during the psychological history presented on the second page of the survey. For each question, the bracketed word [Group] was replaced by "abortion", "pregnancy loss", "problematic pregnancy", or "delivery" based on each woman's algorithmically defined group. These ratings were answered using a visual analog sliding scale that was electronically coded on a 101-point scale, from 0 to 100. The value was not displayed to the respondent.

For women who reported induced abortions, an additional categorical question was asked: "Which best describes your abortion decision?" Respondents were presented with four possible answers: "Wanted and consistent with my values and preferences" (Wanted), "Accepted but inconsistent with my values or preferences" (Inconsistent), "Unwanted and contrary to my values and preferences" (Unwanted) or "Coerced and contrary to my values and preferences" (Coerced).

Normally distributed continuous variables are reported as the means and standard deviations (SDs) and group comparisons were conducted with Student's *t*-test. Abnormally distributed continuous variables are reported with medians and interquartile ranges (IQRs)

Table 1. Survey scales, abbreviations and range labels (0–100).

Abbreviation	Complete statement or question	Scale of agreement
SuicidalThoughts	There have been times when my (first) [Group] directly contributed to suicidal thoughts	Not at all | Very much
SelfDest	There have been times when my (first) [Group] directly contributed to self-destructive or more risk taking behaviors	Not at all | Very much
SuicideCause	Previously, I reported having attempted suicide one or more times. Feelings about my [Group](s) contributed to my suicide attempt(s)…	Not at all | Very much

Table 2. Rates of attempted suicide, odds ratios, and 95% confidence intervals (CI) segregated by pregnancy outcome and abortion decision types.

		Have you ever attempted suicide?	
	Group (*n*)	Yes (%)	OR (95% CI)
Pregnancy outcome type	Abortion (409)	142 (34.7%)	Ref
	Never pregnant (350)	60 (17.1%)	0.39 (0.28–0.55)*
	Delivery (367)	49 (13.4%)	0.29 (0.20–0.42)*
	Problematic pregnancy (226)	63 (27.9%)	0.73 (0.51–1.04)
	Pregnancy loss (573)	172 (30.0%)	0.81 (0.62–1.06)
Abortion decision type	Wanted (122)	36 (29.5%)	Ref
	Inconsistent (145)	52 (35.9%)	1.34 (0.80–2.24)
	Unwanted (90)	30 (33.3%)	1.19 (0.66–2.15)
	Coerced (52)	24 (46.2%)	2.05 (1.05–4.00)*

*$p < .05$.

and were tested for significant differences using Mann-Whitney rank-sum tests. Categorical variables were examined by rates (percentages within each group) and compared using odds ratios and 95% confidence intervals. To calculate odds ratios, the number of respondents attributing a value over 80 on each of the three scales were identified as being at the highest risk. Odds ratios for being at the highest risk were then computed for each outcome variable using the delivery group as the reference group.

All procedures contributing to this work were approved by Sterling Institutional Review Board (ID:10225) and comply with the ethical standards of the relevant national and institutional committees on human experimentation. Consent for survey participation was digitally obtained from all respondents by Cint.com. No information was collected that would allow the authors to identify individual participants. Analyses were conducted using JASP 0.19.

Results

Of the usable completed surveys ($n = 1925$), 486 (25.2%) reported having attempted suicide at least once. The rates of suicide for each pregnancy outcome group are shown in Table 2, along with a segregated analysis of women who had abortions regrouped by each of the four abortion decision types. Odds ratios and 95% confidence intervals were computed using abortion as the reference group for the pregnancy outcome analysis and the decision type Wanted as the reference group for the abortion decision type analysis. 95% confidence intervals indicate that they are statistically significant when both the upper and lower limits are above or below the value of one. A history of attempted suicide was highest for the abortion group (34.7%). Women who had live births (and no history of abortion, pregnancy loss, or problematic pregnancies had the lowest rate of attempted suicide (17.1%), only 29% (95% CI: 0.20–0.42) of the rate of women who had abortions. Women who were never pregnant also had significantly fewer suicide attempts (OR = 0.39; 95% CI: 0.28–0.55). The upper limits on the 95% CI's for problematic pregnancies and pregnancy loss were only slightly above 1.00. This suggests that these attempted suicide rates would most likely be significantly lower in a larger sample size, but they were not statistically significant, using a 95% confidence interval, in this study.

The examination of attempted suicide rates among women who had abortions, grouped by decision type (Table 2), reveals that the rate of attempted suicide among women whose abortions were wanted and consistent with their values and preferences (29.5%) was very similar to that of women who reported a pregnancy loss and no history of abortion (30.0%). The highest rate of attempted suicide (46.2%) was reported by women who felt coerced into an abortion contrary to their own values and preferences. This was significantly higher (OR = 2.05; 95% CI: 1.05–4.00) than the rate for the Wanted decision type. The rates for the Inconsistent and Unwanted abortion decision types were not significantly different, using our 95% level of confidence, but appear likely to be significantly different if they were tested in a larger sample size.

Only women who reported a history of any pregnancy were asked whether they attributed any suicidal or self-destructive thoughts or behaviors to their pregnancy outcomes. Of these, only women who reported an attempted suicide were asked how much, if at all, their pregnancy outcome contributed to one or more of their suicide attempts. These items were assessed on 101-point visual analog scales. All three scales were tested using the Shapiro-Wilk test for normality and were found to deviate from normality, and therefore were assessed using median scores, quartiles, and Mann-Whitney rank sum tests for statistically significant differences between the groups, as shown in Table 3. Abortion was significantly more likely to be associated with self-destructive thoughts and suicidal

thoughts or behaviors compared to all three other pregnancy outcomes on all three scales. Among women who had abortions, those whose decision type was "wanted and consistent with my values and preferences" were significantly less likely to attribute their suicidal thoughts or self-destructive behaviors to their abortions than women in the other three abortion decision type groups. But there was no statistical difference between the women in the wanted, inconsistent, and unwanted decision type groups in regard to the degree they attributed their attempted suicides to their abortions. Only women in the coerced decision type group were significantly more likely than the wanted decision type group to attribute suicide attempts to their abortions. A larger sample size might be required to identify more differences between these four decision type groups.

The three scales for rating the degree to which women reported feeling, after their pregnancy outcome, self-destructive (SelfDest) or suicidal thoughts or behaviors (SuicidalThoughts), or attributed their pregnancy outcome as a contributing factor to a reported suicide attempt (SuicideCause), were all strongly correlated with each other, as shown in Table 4.

Histogram distributions of the degree that the women reported each pregnancy outcome type contributed to at least one suicide attempt, clustered into five bins for each group, are shown in Figure 2. The lowest bin (0–20) corresponds to little or no attribution, 21–40 to mild attribution, 41–69 to moderate attribution, 61–80 to significant attribution, and 81–100 to high attribution. Examination of these histograms reveals that over half of women who had abortions gave moderate to high levels of attribution of abortion as a contributing factor in their suicide attempts.

Figure 3 shows similar histograms for the women who had abortions segregated by decision type.

Table 3. Descriptive statistics and rank sum test comparisons for three scales identifying the degree that the index pregnancy outcome contributed to suicidal, self-destructive thoughts, or attempted suicide.

Scale	Group	*n*	Median	Std. deviation	25th percentile	50th percentile	75th percentile	Mann-Whitney *U*	*p*	Ref
Pg outcome contributed to suicidal thoughts	Delivery	367	0.0	23.2	0.0	0.0	9.5	100,598.5	<.001	A
	Problematic pregnancy	226	2.0	26.7	0.0	2.0	23.8	55,438	<.001	A
	Pregnancy loss	573	5.0	32.8	0.0	5.0	51.0	127,378	0.018	A
	Abortion	409	14.0	35.5	0.0	14.0	66.0	Ref A	Ref A	
	Wanted	122	1.0	32.2	0.0	1.0	41.3	Ref B	Ref B	
	Inconsistent	145	15.0	32.6	0.0	15.0	61.0	10,134.5	0.036	B
	Unwanted	90	34.5	37.9	2.0	34.5	78.8	7266	<.001	B
	Coerced	52	48.0	39.4	3.0	48.0	83.3	2024.5	<.001	B
Pg outcome contributed to self-destructive behaviors	Delivery	367	0.0	23.0	0.0	0.0	7.5	106,896.5	<.001	A
	Problematic pregnancy	226	2.5	29.5	0.0	2.5	33.8	57,698.5	<.001	A
	Pregnancy loss	573	10.0	33.9	0.0	10.0	57.0	132,438	<.001	A
	Abortion	409	27.0	37.2	0.0	27.0	73.0	Ref A	Ref A	
	Wanted	122	3.0	33.2	0.0	3.0	47.8	Ref B	Ref B	
	Inconsistent	145	34.0	35.3	1.0	34.0	73.0	11,057.5	<.001	B
	Unwanted	90	51.5	39.2	2.0	51.5	83.0	7259	<.001	B
	Coerced	52	47.5	40.2	4.8	47.5	90.3	1949.5	<.001	B
Pg outcome contributed to suicide attempt(s)	Delivery	49	1.0	30.8	0.0	1.0	30.0	4986	<.001	A
	Problematic pregnancy	63	1.0	29.6	0.0	1.0	34.5	6364	<.001	A
	Pregnancy loss	172	27.0	36.0	2.0	27.0	70.3	14,152.5	0.015	A
	Abortion	142	55.5	36.7	6.3	55.5	79.8	Ref A	Ref A	
	Wanted	36	46.0	38.5	2.3	46.0	76.0	Ref B	Ref B	
	Inconsistent	52	40.5	32.9	0.8	40.5	68.0	843.5	0.431	B
	Unwanted	30	64.0	35.5	28.0	64.0	88.8	630.5	0.244	B
	Coerced	24	85.5	35.9	45.0	85.5	99.3	269.5	0.014	B

Table 4. Pearson's correlations between the three outcome scales used to attribute the degree that a pregnancy outcome contributed to self-destructive or suicidal thoughts or behaviors and suicide attempts.

Variable		SuicidalThoughts		SelfDest		SuicideCause
1. SuicidalThoughts	Pearson's *r*	—				
	p-Value	—				
2. SelfDest	Pearson's *r*	0.716	***	—		
	p-Value	<.001		—		
3. SuicideCause	Pearson's *r*	0.682	***	0.583	***	—
	p-Value	<.001		<.001		—

*$p < .05$, **$p < .01$, ***$p < .001$.

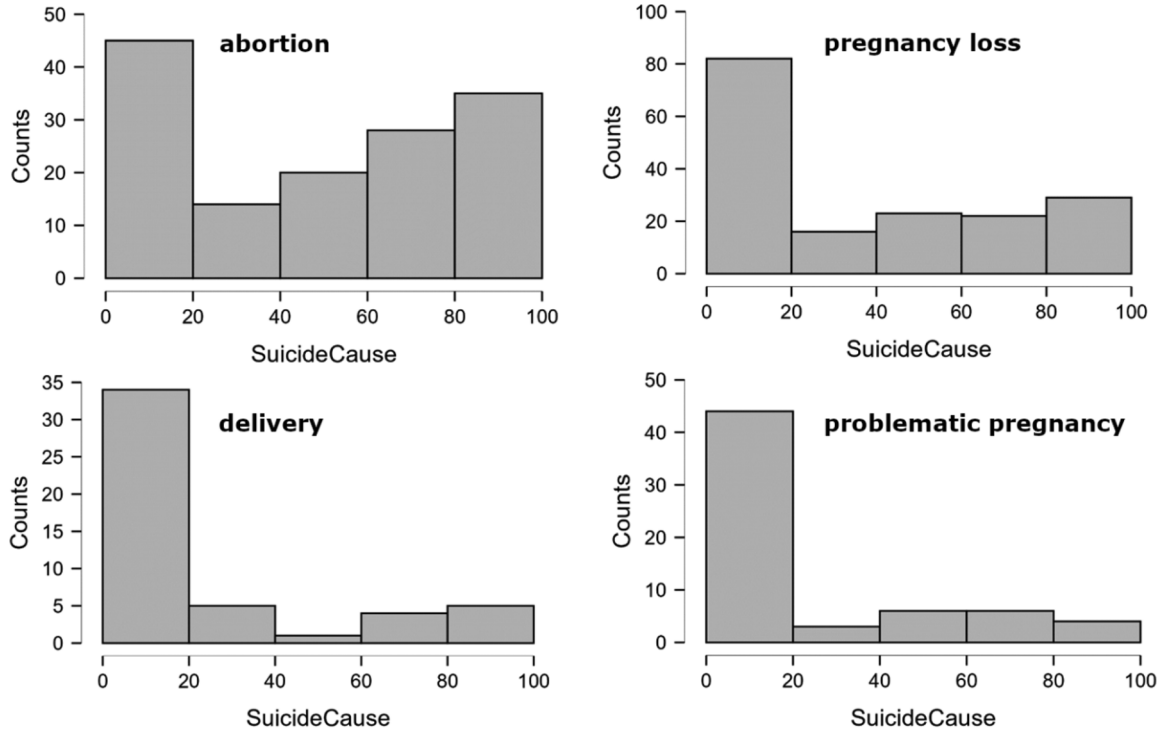

Figure 2. Histograms showing the distribution of women who reported at least one attempted suicide who reported that their pregnancy outcomes contributed little to high levels toward their suicide attempts.

These histograms show that even women with wanted abortions frequently reported that their abortions directly contributed to their suicide attempts at moderate to high levels. Still, women who had coerced abortions were by far the most likely to report that their abortions were a major contributing factor in their suicide attempts.

Table 5 shows the odds ratios for reporting a high level of direct causal attribution (81–100) for each outcome variable to the respondent's pregnancy outcome, using the delivery group as the reference group. The delivery group and problematic pregnancy group were not significantly different on any of the three scales. However, women in the pregnancy loss and abortion groups were over three to six times more likely than delivering women to attribute the highest levels of causal effect for suicide attempts, suicidal thoughts, and self-destructive behaviors to their pregnancy outcomes. Compared to delivering women, women whose abortions were wanted and consistent with their preferences were more likely to attribute suicide attempts to their pregnancy outcomes (OR = 5.08; 95% CI 1.63–15.84) but this rose even higher when the abortion decision type fell into the unwanted (OR = 8.04; 95% CI 2.63–24.64) or coerced decision types (OR = 24.13; 95% CI 8.17–71.28). Perhaps due to insufficient sample size, women reporting suicides following an abortion that was characterized as "accepted but inconsistent with my values and preferences" were higher, but not outside the 95% confidence interval (OR = 2.58; 95% CI 0.74–9.07) including women who had live births. Suicidal thoughts and self-destructive behaviors attributed to pregnancy outcomes for all abortion decision types were significantly higher than that of the reference group, most especially among the women who had unwanted or coerced abortions.

Discussion

In this survey of a national population of women 41–45 years of age, with a low dropout rate, four measures of suicide risk were accessed: the lifetime incidence of ever having attempted suicide, and the self-reported degrees to which women attributed subsequent suicidal thoughts, self-destructive behaviors, or suicide attempts to either a live birth, a problematic pregnancy, a natural pregnancy loss, or an induced abortion, with the latter group further segregated by abortion decision type (wanted, inconsistent, unwanted, or coerced).

Our findings (Table 2) revealed that attempted suicide rates were highest among women who reported a history of abortion (34.7%) and lowest among women who had experienced at least one live birth and had neither any pregnancy losses nor problematic pregnancies (13.4%). A history of attempted suicide varied significantly in relation to abortion decision

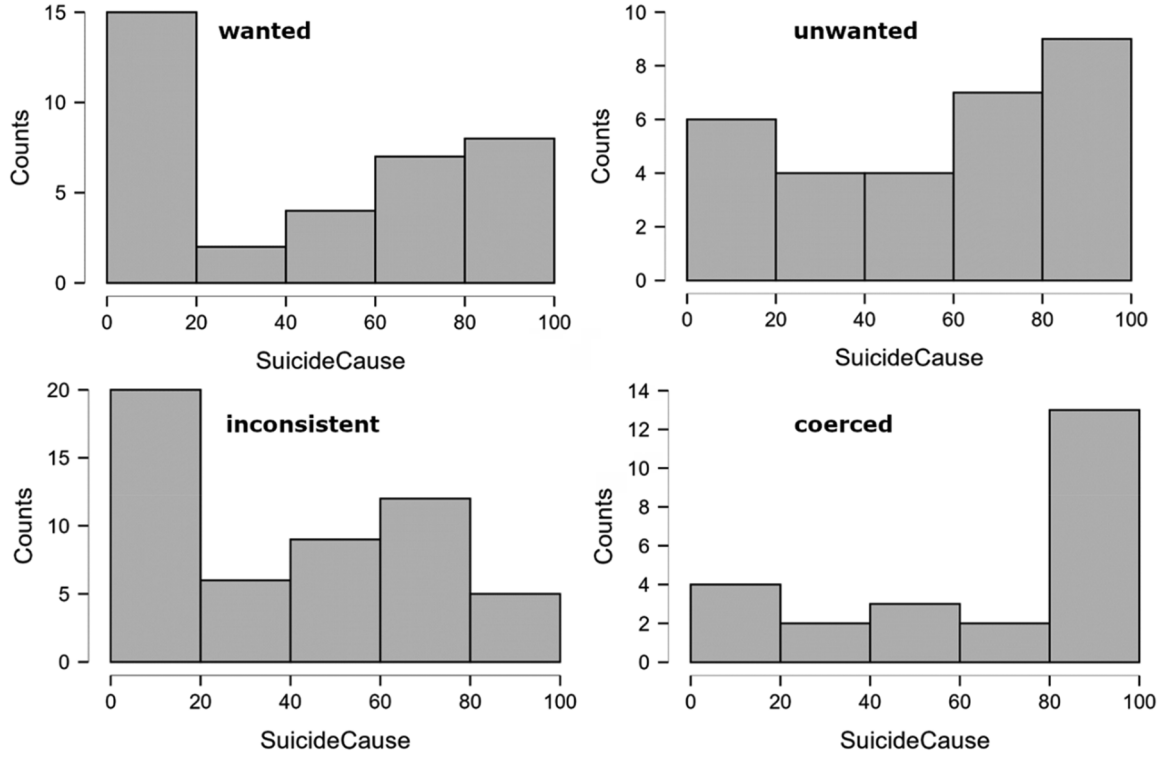

Figure 3. Histograms showing the distribution of women who reported at least one attempted suicide and also had a history of abortion, segregated by abortion decision type, who reported that their abortions contributed little to high levels toward their suicide attempts.

Table 5. Odds ratios for suicidal thoughts, self-destructive behaviors, and suicide attempts attributed to respondent's pregnancy outcomes.

			SuicidalThoughts > 80		SelfDest > 80		SuicideCause > 80	
Category	Group	*n*	>80 (%)	OR (95% CI)	>80 (%)	OR (95% CI)	>80 (%)	OR (95% CI)
Pregnancy outcome type	Delivery	367	12 (3.3%)	Ref	13 (3.5%)	Ref	5 (1.4%)	Ref
	Problematic pregnancy	226	10 (4.4%)	1.37 (0.58–3.22)	15 (6.6%)	1.94 (0.90–4.15)	4 (1.8%)	1.30 (0.35–4.91)
	Pregnancy loss	573	56 (9.8%)	3.20 (1.69–6.06)	67 (11.7%)	3.61 (1.96–6.63)	29 (5.1%)	3.86 (1.48–10.06)
	Abortion	409	59 (14.4%)	4.99 (2.63–9.44)	77 (18.8%)	6.32 (3.44–11.58)	35 (8.6%)	6.78 (2.63–17.49)
Abortion decision type	Wanted	122	10 (8.2%)	2.64 (1.11–6.28)	12 (9.8%)	2.97 (1.32–6.70)	8 (6.6%)	5.08 (1.63–15.84)
	Inconsistent	145	13 (9.0%)	2.91 (1.30–6.55)	25 (17.2%)	5.67 (2.81–11.44)	5 (3.4%)	2.59 (0.74–9.07)
	Unwanted	90	20 (22.2%)	8.45 (3.95–18.08)	25 (27.8%)	10.47 (5.10–21.53)	9 (10.0%)	8.04 (2.63–24.64)
	Coerced	52	16 (30.8%)	13.15 (5.77–29.95)	15 (28.8%)	11.04 (4.88–24.97)	13 (25.0%)	24.13 (8.17–71.28)

type, with 46.2%of women who were coerced into abortions contrary to their own values and preferences reporting a suicide attempt compared to 29.5% of women whose abortions were described as wanted and consistent with their own values and preferences. This latter rate was similar to the suicide attempt rate of those who reported a natural pregnancy loss (30.0%) or a problematic pregnancy (27.9%), but significantly higher than women who had never been pregnant (17.1%) and those who only had successful deliveries (13.4%).

When asked the degree, if any, that their pregnancy outcomes directly contributed to their suicide attempts, <2% of women in the delivery and problematic pregnancy groups reported that their pregnancy outcome made a major contribution (score >80) to their suicide attempts, compared to 5.1% of women who had pregnancy losses and 8.6% of those who had abortions (Table 5). These differences were even more pronounced across abortion decision type, with 6.6 and 25.0% of women with a wanted and coerced abortions, respectively, saying their abortions were major direct contributing factors (score >80) in their suicide attempts.

Similar patterns relative to the different pregnancy outcome groups, and abortion decision types, were observed in regard to self-assessments of how much such pregnancy outcomes contributed to suicidal thoughts and self-destructive behaviors (see Tables 3 and 5).

Hypotheses tested

Our findings require rejection of the null hypothesis that pregnancy outcomes, especially abortion, have no effect on suicidal thoughts and behaviors. Our first alternative hypothesis, that pregnancy outcomes can affect suicidal risk, is supported by the finding that there were significant differences in regard to self-reported suicide attempts, suicidal thoughts, and self-destructive behaviors across all four pregnancy outcomes. For example, compared to women who had deliveries only, those who had pregnancy losses or abortions were respectively nearly four times and seven times more likely to report their pregnancy outcomes were major contributors to their suicide attempts (Table 5).

In contrast, our findings also support the second alternative hypothesis, that the lowest risk of suicidal thoughts and behaviors occurs among ever pregnant woman who only have successful deliveries. Notably, we also found that the rates of suicidal thoughts or behaviors attributed to problematic pregnancies that were delivered were not significantly different than the rates reported by those who have only had successful deliveries (Table 5).

In addition, the third alternative hypothesis, that pregnancy loss can contribute to suicidal thoughts and behaviors, was also supported by our finding that women with a history of pregnancy loss or abortion were both significantly more likely, across all outcome measures, to report that their pregnancy losses directly contributed to their suicidal thoughts and behaviors (Table 5).

Finally, our findings are consistent with the third alternative hypothesis, that there is an increasingly higher risk of suicidal thoughts and behaviors to the degree that women feel compelled to undertake abortions in violation of their own values and preferences (Tables 3 and 5) [13].

Limitations and strengths

The most significant limitation of this study is that it is entirely retrospective. Memories and feelings may change over time. Responses on the scales presented to these women may have been somewhat higher or lower than they would have been if the same women had been surveyed during the time frame where they most experienced suicidal thoughts or self-destructive behaviors. Whether the passage of time has made the responses collected more thoughtful and accurate or distorted by reinterpretations of the past is impossible to determine. In either event, it is most likely that given the substantial study size and consistency of the findings in relation to other studies examining differences in suicide risk associated with abortion, pregnancy loss, and deliveries, that the general trend in differences between the groups of pregnancy outcomes, even if not precise, are meaningful and generalizable.

In addition, the question regarding any history of attempted suicide(s) was asked before any inquiries regarding pregnancy history. Therefore, some reported suicide attempts certainly occurred before a first pregnancy outcome. However, the temporal relationship between pregnancy outcomes before suicide attempts was instead assessed through a scale identifying the degree to which each woman attributed her pregnancy outcome as a contributing factor in the previously reported suicide attempts. For women who attempted suicide before their pregnancies, "not at all" would have been the appropriate response.

The greatest strength of this study is that it investigated women's own self-assessments of the degree that different pregnancy outcomes contribute to suicide attempts, suicidal thoughts, and self-destructive behaviors. While the present findings cannot reveal when, if ever, that abortion is *the sole cause* of increased suicide risks, this evidence from self-aware women confirms that it is at least a contributing factor in some, if not many, cases.

Implications

Following the identification of abortion as a risk factor for suicide in Finland's medical records, the guidelines for abortion care in Finland were updated to highlight the importance of post-abortion checkups to evaluate the woman's needs for any additional mental health support [30]. These findings support the importance of all abortion providers providing such post-abortion assessments and counseling services.

These findings also underscore the importance of pre-abortion screening to identify patients who may feel pressured to abort contrary to their own values and preferences. These patients should be helped to find resources that will empower them to pursue options more congruent with their own preferences. If this is not possible, patients and their loved ones should be advised of their elevated risk of suicidal and self-destructive behaviors in the aftermath of an abortion and encouraged to seek support if their mental health does deteriorate.

Mental health workers should also be aware of the elevated risks of suicidal thoughts and behaviors

associated with natural and induced pregnancy losses. Patients struggling with suicidal or self-destructive thoughts and behaviors should be screened for a history of pregnancy loss and offered an opportunity to explore whether or not there are unresolved issues of grief or guilt that may be contributing to their mental pain. This may open opportunities for understanding, connection, hope, and healing [1,31].

Conclusion

The hypothesis that higher rates of suicide following abortion can be entirely explained by preexisting mental health problems is inconsistent with women's own self-assessments of the contributing factors in their suicidal or self-destructive behaviors. Women who experience pregnancy losses, either induced or natural, are at higher risk of suicidal and self-destructive thoughts and behaviors. Exposure to abortion, especially when the abortion is contrary to the values and preferences of the pregnant women, may contribute to higher rates of suicide attempts, suicidal thoughts, and self-destructive behaviors. These findings should be used to improve both pre-abortion screening and counseling and post-abortion care.

Institutional Review Board statement

Sterling IRB, 18 July 2022, ID:10225.

Patient and public involvement

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication

Not required.

Disclosure statement

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Data availability statement

To allow the research team additional time to complete their investigations the data that support the findings will be available from the author following an embargo of one year from the date of publication.

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