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Side Effects, Physical Health Consequences, and Mortality Associated with Abortion and Birth after an Unwanted Pregnancy

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A B S T R A C T

Introduction: The safety of abortion in the United States has been documented extensively. In the context of unwanted pregnancy, however, there are few data comparing the health consequences of having an abortion versus carrying an unwanted pregnancy to term.
Methods: We examine and compare the self-reported physical health consequences after birth and abortion among participants of the Turnaway Study, which recruited women seeking abortions at 30 clinics across the United States. We also investigate and report maternal mortality among all women enrolled in the study.
Results: In our study sample, women who gave birth reported potentially life-threatening complications, such as eclampsia and postpartum hemorrhage, whereas those having abortions did not. Women who gave birth reported the need to limit physical activity for a period of time three times longer than that reported by women who received abortions. Among all women enrolled in the Turnaway Study, one maternal death was identified—one woman who had been denied an abortion died from a condition that confers a higher risk of death among pregnant women.
Conclusion: These results reinforce the existing data on the safety of induced abortion when compared with childbirth, and highlight the risk of serious morbidity and mortality associated with childbirth after unwanted pregnancy.

The safety of abortion under current medical guidelines (World Health Organization [WHO], 2012) has been extensively documented (Cates Jr., Rochat, Grimes, & Tyler Jr., 1978; Raymond & Grimes, 2012; Raymond, Grossman, Weaver, Toti, & Winikoff, 2014). Induced abortion is among the safest outpatient procedures performed in the United States (Raymond & Grimes, 2014; Upadhyay et al., 2015). The risk of mortality from childbirth in the United States is estimated to be 14 times higher than the risk from induced abortion, and the risk of all maternal morbidities, defined as "conditions either unique to pregnancy or potentially exacerbated by pregnancy that occurred in at least 5% of all pregnancies" is significantly higher among women who give birth than among those who have abortions (Raymond et al., 2014).

Women's self-reported experiences with the physical effects of abortion and birth have been documented in the medical literature (Declercq, Cunningham, Johnson, & Sakala, 2008; Lohr, Hayes, & Gemzell-Danielsson, 2008; Renner, Jensen, Nichols, & Edelman, 2009). However, subacute side effects are not captured routinely by traditional data sources, such as hospital electronic health records and medical billing codes. In the context of unwanted pregnancy (defined herein as a pregnancy that the woman wanted to terminate), there are few data that compare the health consequences of having an abortion versus carrying the pregnancy to term.

Data from the Turnaway Study, which follows women seeking abortion just under and just beyond the gestational age limit at abortion facilities across the United States, documents women's

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own reports of the side effects and physical health consequences experienced after abortion, or, if they were turned away after seeking abortion, ongoing pregnancy and birth. By asking women to report on the range of physical health effects of their abortion or birth, the Turnaway Study provides documentation of women's physical health experiences beyond what is captured by medical records of women who seek to terminate a pregnancy. The purpose of this analysis was to examine Turnaway Study participants' self-reported physical health consequences following birth and abortion, to document more comprehensively the morbidity and mortality associated with unwanted pregnancy.

Materials and Methods

The Turnaway Study is a prospective cohort study of women who sought abortions at 30 abortion facilities in the United States, some of whom did not receive the abortion they desired because of advanced gestational age. Women were recruited when they sought abortion and were interviewed by telephone 1 week later. The Turnaway Study follows participants for 5 years, interviewing them by telephone twice per year. This paper presents findings from the baseline and 6-month interviews. The University of California, San Francisco's Committee for Human Research approved this study. All participants provided informed consent.

Participants were English- and Spanish-speaking women, aged 15 or older, presenting at one of the study facilities between January 2008 and December 2010, without known fetal anomalies or demise. Facilities were selected if they provided abortions to the latest gestational age limit within a 150-mile radius. The gestational age limits of participating facilities ranged from the first to the end of the second trimester, set by state law and/or clinic policy. Four facilities had limits of 10 to 13 weeks, 8 facilities had limits between 14 and less than 20 weeks, and 18 facilities had gestational age limits of more than 20 weeks. Detailed descriptions of the study and recruitment facilities have been published elsewhere (Gould, Perrucci, Barar, Sinkford, & Foster, 2012; Roberts, Avalos, Sinkford, & Foster, 2012; Rocca, Kimport, Gould, & Foster, 2013).

Women who were eligible for the study were assigned to one of three study groups based on their gestational age at the time they sought an abortion. Women presenting at a facility up to 3 weeks over the facility's gestational age limit who were denied an abortion were assigned to the *turnaway group*. For every turnaway participant, we recruited two women for the *near limit abortion group* (women presenting at a facility with a pregnancy that was within 2 weeks under the facility's gestational age limit who obtained an abortion) and one woman for the *first trimester abortion group* (women who obtained a first trimester abortion). Each *turnaway group* participant was treated as an index case for which we sought two *near limit group* participants and one first trimester abortion group participant from the same facility. The *first trimester abortion group* was included to assess how the experiences of women in the *near limit group* compared with the more typical experience of abortion in the United States, where 90% of abortions occur in the first trimester (Pazol, Creanga, Burley, & Jamieson, 2014).

The physical health effects of birth and abortion were assessed via self-report. Women in all three study groups were asked the following two open-ended questions regarding their physical health experiences after birth or abortion: 1) "Did you experience any side effects or health problems from your [birth/abortion]?" and 2) "Was there a period after your [birth/abortion] when you were physically unable to do daily activities such as walking, climbing steps or doing errands?" If participants answered affirmatively to either the first or second question, they were asked the following follow-up questions: 1) "What side effects or health problems did you experience?" and 2) "How long were you physically unable to do daily activities such as walking, climbing steps, or doing errands?"

Responses to open-ended questions about side effects and health problems were classified into categories and coded according to ICD-10 disease classifications when possible. Self-reported health problems or side effects were classified as potentially life-threatening conditions if any maternal deaths had been recorded in the United States from a related cause in the most recent 5 years of available data (Creanga et al., 2015).

To examine maternal mortality, defined as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" (WHO, 1993) we searched for maternal deaths among all women who enrolled in the study. We gathered data from two sources of information: personal contacts and the National Death Index, a central computerized index of death record information on file in all state vital statistics offices. In the event we could not reach the participant, we contacted individuals named by the participant as someone the study investigators could contact. If this secondary contact stated the participant had died, the contact was asked to specify the date and cause of death, as well as the city and state where the participant died. The National Death Index was consulted to determine whether any women who had enrolled in the study but were lost to follow-up (or reported dead by a secondary contact) had died. All identified maternal deaths were confirmed by requesting death certificates or coroners' reports regarding the cause of death. In reporting cause of death for all deaths in this study, we have complied with federal health information restrictions that require withholding the specific clinical diagnosis.

Statistical Analysis

We examined the distributions of variables of interest to ensure approximate normal distribution. Descriptive, bivariable analyses were performed to describe the study population and assess the frequency of reporting side effects or health problems after first trimester abortion, later abortion, and childbirth that were attributed to the birth or abortion. Statistical significance was assessed first through global χ^2 tests for homogeneity, and, where heterogeneity was indicated, though pair-wise comparisons using the *near limit group* as the reference category.

Results

Of eligible women approached, 37.5% consented to participate, and 85% of those who consented ($n = 956$) completed the baseline interview. Ninety-two percent of those who completed the baseline interview were retained at the first follow-up interview (6 months). There was no differential participation across the two main study groups (*near limit abortion* and *turnaway*), but fewer women eligible for the *first trimester abortion group* participated. Of the 956 who completed a baseline interview, 452 were in the *near limit abortion group,* 231 in the *turnaway group,* and 273 in the *first trimester abortion group.* Because the main comparison of interest for this analysis is the

experience of birth versus abortion for women seeking abortion, women who miscarried or obtained an abortion elsewhere after being denied an abortion ($n = 24$) were excluded from this analysis. Two *near limit abortion group* participants and one *first trimester group* participant later reported that they had opted not to have the abortion and were also excluded from analyses. Finally, women with missing responses to all questions about physical health effects from birth or abortion ($n = 8$) and women in the *turnaway group* who did not complete their first follow-up interview or completed it more than 6 months after their initial interview ($n = 53$) were not included in these analyses. Thus, the sample for this analysis includes 868 participants; 452 in the *near limit abortion group,* 143 in the *turnaway group,* and 273 *first trimester abortion group.*

The primary outcome of this study is self-reported side effects and health problems resulting from birth and abortion. Women in all three study groups completed the first study interview an average of 8 days (range, 7–14) from having an abortion or being denied. Women who had abortions were asked questions about the side effects and health problems resulting from abortion at the first study interview. For women carrying the pregnancy to term, questions about health effects come from the second interview, 2.4 months after birth (range, 1 day–6 months).

Table 1 presents the sociodemographic and physical health characteristics of participants in our study. Women who obtained abortions and those who were turned away after requesting abortions had similar levels of education, were as likely to be married, and had similar health histories at the time they sought abortion. On average, women who were denied abortions were 1.6 years younger than women who obtained near limit abortions ($p < .001$). Slightly fewer women in the first trimester group reported their race as "Other" than in the near limit abortion group ($p = .002$). More women in the *turnaway group* were nulliparous than women in the *near limit group.* Among women who presented at a gestational age less than 10 weeks (259 women), 76% ($n = 177$) reported having a medication abortion.

Table 2 describes the self-reported side effects and health problems by study group. On average, *turnaway group* participants reported 10.1 days of limitations on physical activity (mean, 10.1 days; SD, 11.68) after giving birth compared with an average 2.9 days of limitations on physical activity reported by women obtaining abortions in both the *near limit group* (mean, 2.9 days; SD, 2.6) and an average 3.2 days reported by the *first trimester group* (mean, 3.2; SD, 3.6) after pregnancy termination.

The total percentage of women who reported any side effects or health problems did not significantly differ by whether the pregnancy ended in birth ($n = 16$; 11.2%), first trimester abortion (n = 28; 10.3%), or abortion later in pregnancy ($n = 55$; 12.2%). The most common side effects/health problems reported by women following abortion in the near limit and first trimester groups were: pain (4% and 3%), cramps (3% and 3%), abnormal bleeding (2% and 2%), and nausea/vomiting (1% and 3%), respectively. Among the *turnaway group*, the most common side effect/health problem reported was preeclampsia (2%), a potentially life-threatening condition (Sibai, Dekker, & Kupferminc, 2005). Other health problems reported among women who continued to carry their pregnancy were abnormal bleeding, anemia, blood transfusion, life-threatening eclampsia, extended postoperative wound healing, fractured pelvis, hypokalemia, infection, postpartum hemorrhage, and retained placenta (1% each). A greater percentage of women in the *turnaway group* (6.3%; $n = 9$) who gave birth reported potentially life-threatening conditions, compared with 1.1% of women ($n = 5$) in the near limit group ($p < .001$).

Table 1
Characteristics of Participants by Study Group (N = 868)[‡]

Characteristic	Turnaways	Near Limits	First Trimesters	*p* Value[†]
Demographics (*n*)	143	452	253	
Age (mean, SD)	23.3 (5.6)[*]	24.9 (5.8)	26.0 (5.7)	<.001
Race/ethnicity, *n* (%)				
White	35 (24)	157 (35)	116 (42)	
Black	50 (35)	133 (29)	80 (29)	
Hispanic/Latina	38 (27)	92 (20)	56 (21)	
Other	20 (14)	70 (16)	21 (8)[*]	.002
Highest level of education, *n* (%)				.13
<High school	32 (22)	86 (19)	43 (16)	
High school or GED	53 (37)	159 (35)	86 (32)	
Associates degree, some college, technical school	49 (34)	177 (39)	113 (41)	
College	9 (6)	30 (7)	31 (11)	
Employed	56 (39)[*]	241 (53)	171 (63)[*]	<.001
Gestational age (weeks) at which sought abortion, mean (SD)	23.2 (3.3)[*]	18.8 (4.9)	7.5 (2.3)[*]	<.001
Parity, *n* (%)				.02
Nulliparous	67 (47)[*]	153 (34)	95 (35)	
1 child	33 (23)	132 (29)	64 (23)	
≥2 children	43 (30)	167 (37)	114 (42)	
Marital status, *n* (%)				.10
Single	121 (85)	358 (79)	205 (75)	
Married	13 (9)	36 (8)	30 (11)	
Divorced/Widowed	9 (6)	58 (13)	38 (14)	
Physical health history				
Self-report of physical health just before becoming pregnant, *n* (%)				.07
Very good	61 (43)	147 (33)	82 (30)	
Good	57 (40)	218 (48)	138 (51)	
Fair	24 (17)	69 (15)	40 (15)	
Poor	1 (1)	15 (3)	13 (5)	
Very poor	0 (0)	3 (1)	0 (0)	
Self-report of physical health at time of baseline interview, *n* (%)				.15
Very good	42 (29)	108 (24)	65 (24)	
Good	60 (42)	233 (51)	150 (55)	
Fair	34 (24)	93 (21)	51 (19)	
Poor	6 (4)	18 (4)	7 (2)	
Very poor	1 (1)	0 (0)	0 (0)	

[*] $p < .05$ for comparisons between *near limits* and other study groups.
[†] Uncorrected *p*-value is based on multiple comparisons with "*near limits*" as the reference group.
[‡] Study group N's and corresponding values differ from those presented in other papers published from the Turnaway Study. For this analysis we included data from one site with lower gestational age limits that was dropped from other analyses.

In this data collection period, one maternal death was identified. A 24-year-old woman turned away from an abortion clinic on the East coast died within 10 days of delivery from an infection that is associated with a higher risk of mortality in pregnant women relative to nonpregnant women.

Discussion

Data from the Turnaway Study document considerable differences in the self-reported physical health effects that women experience after aborting or delivering an unwanted pregnancy, ranging from discomforts and expected side effects to life-threatening conditions and death. Our results are

Table 2
Reported Side Effects and Health Problems by Study Group (N = 868)

Variable	Turnaways (n = 143)	Near Limits (n = 452)	First Trimesters (n = 253)	p Value[†]
Limitations on physical activity, *n* (%)				
Limitations on physical activity reported in days (mean, SD)	10.1 (11.69)[*]	2.9 (2.6)	3.2 (3.6)	<.001
Side effects or health problems, *n* (%)				
Any reported side effects/health problems, *n* (%)	16 (11.2)	55 (12.2)	28 (10.3)	.84
Potentially life-threatening condition reported, *n* (%)	9 (6.3)[*]	5 (1.1)	1 (0.4)	<.001
Side effect/health problem reported, *n* (%)				
Abdominal cramping	0 (0)	12 (3)	6 (2)	
Abnormal bleeding	2 (1)	10 (2)	6 (2)	
Nausea/vomiting/ gastrointestinal upset	0 (0)	3 (1)	8 (3)	
Pain	0 (0)	16 (4)	9 (3)	
Preeclampsia[‡]	3 (2)	1 (0.5)	0 (0)	
Infection[‡]	1 (1)	3 (1)	1 (0.5)	
Dizziness	0 (0)	3 (1)	2 (1)	
Weakness or fatigue	0 (0)	4 (1)	3 (1)	
Breast changes	0 (0)	4 (1)	1 (0.5)	
Low blood pressure	1 (1)	1 (0.5)	0 (0)	
Normal/light bleeding	0 (0)	2 (0.5)	3 (1)	
Anemia	1 (1)	0 (0)	0 (0)	
Blood transfusion[‡]	2 (1)	0 (0)	0 (0)	
Bruises secondary to procedure/ equipment	0 (0)	3 (1)	0 (0)	
Disrupted caesarean wound[‡]	1 (1)	0 (0)	0 (0)	
Eclampsia/seizure[‡]	1 (1)	0 (0)	0 (0)	
Edema	0 (0)	4 (1)	0 (0)	
Fever	0 (0)	4 (1)	0 (0)	
Fractured pelvis	1 (1)	0 (0)	0 (0)	
Headache	0 (0)	2 (0.5)	1 (0.5)	
Hypokalemia	1 (1)	0 (0)	0 (0)	
Postpartum hemorrhage[‡]	1 (1)	0 (0)	0 (0)	
Retained placenta[‡]	1 (1)	0 (0)	0 (0)	
Allergic reaction to anesthesia[‡]	0 (0)	1 (0.5)	0 (0)	
Hemorrhoids	0 (0)	1 (0.5)	0 (0)	

[*] $p < .05$ for comparisons between near limits and other study groups.
[†] Uncorrected p-value is based on multiple comparisons with "near limits" as the reference group.
[‡] Denotes a potentially life-threatening condition.

consistent with the large body of evidence documenting both the safety of abortion and the higher rates of morbidity and mortality associated with birth compared with abortion.

Women in our study who gave birth did not frequently report common side effects from childbirth, such as pain and cramps. Women who had abortions in our study did, however, report common side effects from abortion such as pain, nausea, and cramping. Prior studies indicate that women in the postpartum period expect to experience some level of health complications and changes in their bodies postpartum (Borders, 2006), which women who have abortions may less fully expect. It is possible that women in our study who give birth perceived some health effects as normal and did not report them as "side effects or health problems." It is also possible that the reporting of side effects and health problems by study group could be due to recall bias. Women were interviewed 8 days after their abortion, whereas women in the birth group were interviewed anywhere from a few weeks to 6 months after giving birth. Thus, women who had abortions may still have been experiencing the mild sequelae of abortion while the women who gave birth may have long-ceased experiencing mild postpartum symptoms.

Although induced abortion has indeed been shown to be safer than childbirth with respect to risk of death (Raymond & Grimes, 2012), the literature also documents that the extremely low risk of mortality associated with abortion increases gradually with each week of gestation (Bartlett et al., 2004). In our analyses, women in the *near limit abortion group* largely had abortions in the second trimester—abortions that are associated with more risk than the typical abortion patient in the United States, who usually has a first trimester termination. Nevertheless, the frequency of side effects/health problems reported by near limit abortion participants was no different from those reported by women after first trimester abortions. No maternal deaths were identified among participants who obtained abortions and none of the participants obtaining abortions reported experiencing severe or life-threatening health problems. Moreover, the mean period of limitation on physical activity for women who had abortions was similar whether women were in the *first trimester group* or the *near limit groups.* Consistent with the well-documented physical risks of childbirth, women in the *turnaway group* reported potentially life-threatening health problems—such as eclampsia and postpartum hemorrhage, and more than three times the average length of limitations on physical activity after birth, compared with women who obtained abortions.

Maternal mortality, which can happen at any time in pregnancy or within 42 days of birth or pregnancy termination, is a rare event in the United States where the maternal mortality ratio is 24 in 100,000 live births (WHO, 2010). Our finding that one maternal death occurred among women enrolled in our study who were denied abortions underscores the reality of an increased risk of death faced by women who are denied abortion services.

Our study has some limitations. First, the sample size of the Turnaway Study was not designed specifically to detect a difference in self-reported side effects or health problems by study group, we did not have a sufficient sample of women under 10 weeks gestation by type of abortion to report differences between medication and surgical abortion, and it is possible that our null findings are the result of insufficient power to detect a true difference. Second, given a response rate of 37.5%, it is possible that those who did not participate could differ from those who did participate in meaningful ways. However, a 37.5% response rate for a 5-year study with biannual interviews of women seeking a stigmatized health service is within the range of other large-scale prospective studies (Galea & Tracy, 2007). Third, in our study women were asked whether they had experienced any side effects or health problems from birth/abortion. Because of the compound question, we cannot distinguish between what women reported as side effects and what women reported as health problems (Sinkowitz-Cochran, 2013). Finally, our measures of physical morbidity are not based on medical records or confirmed diagnoses, but rather on self-report. Other studies have, however, shown high sensitivity and specificity of maternal recall of recent pregnancy morbidity, particularly of more severe complications (Coolman et al., 2010). The self-reported nature of our data is also an advantage because it allows us to capture the full range of women's physical health experiences after birth and abortion.

Implications for Practice and/or Policy

Women in our study who obtained abortions did frequently report pain, cramping, and nausea as subsequent side effects/health problems. One possible explanation of this phenomenon is that cultural stigma against abortion, cultural perceptions of abortion as unsafe, along with state-mandated misinformation in abortion consent materials (Richardson & Nash, 2006) may lead women to be more concerned about physical health effects that they experience immediately after an abortion and therefore more likely to report even mild health effects. Addressing such issues in patient counselling may help women to better understand the abortion process.

Conclusion

This study describes the physical health experiences of women after birth and abortion. Our results reinforce the existing data on the safety of induced abortion when compared with childbirth, and highlight the risk of serious morbidity and mortality associated with childbirth after an unwanted pregnancy.

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