



Original research article

## Intended pregnancy after receiving vs. being denied a wanted abortion

Ushma D. Upadhyay<sup>a,\*</sup>, E. Angel Aztlan-James<sup>b</sup>, Corinne H. Rocca<sup>a</sup>, Diana Greene Foster<sup>a</sup><sup>a</sup> *Advancing New Standards in Reproductive Health, Department of Obstetrics, Gynecology & Reproductive Sciences, University of California, San Francisco, Oakland, CA*<sup>b</sup> *Family Planning Associates, Chicago, IL*

## ARTICLE INFO

## Article history:

Received 12 February 2018

Received in revised form 14 September 2018

Accepted 16 September 2018

## Keywords:

Abortion  
Intended pregnancy  
Planned pregnancy  
Longitudinal

## ABSTRACT

**Objectives:** To understand how having or being denied an abortion affects the likelihood of trying to become pregnant, overall pregnancy rates, and the rate and timing of an intended pregnancy in the future.**Study design:** The Turnaway Study is a prospective cohort study of women who received or were denied a wanted abortion. Women were recruited from one of 30 US abortion facilities. We examined subsequent intended pregnancy among those who presented just under the facility's gestational limit and received an abortion (Near-Limit Abortion Group,  $n=413$ ) and those who presented for abortion just beyond the facility's gestational limit, were denied an abortion and went on to parent the child (Parenting Turnaways,  $n=146$ ). First, we modeled the probability of trying to become pregnant using multivariable mixed-effects logistic regression. We then used Cox proportional-hazards models to compare overall pregnancy rates and intended pregnancy rates over 5 years. **Results:** Parenting Turnaways had lower predicted probabilities of reporting trying to become pregnant in the first 1.5 years after birth/abortion than the Near-Limit Abortion Group. They also had lower pregnancy rates overall [40.4 per 100 woman-years vs. 53.5 per 100 woman-years, adjusted hazards ratio (aHR)=0.69, 95% confidence interval (CI): 0.54–0.89]. The 5-year *intended* pregnancy rate was low among both groups, but compared to the Near-Limit Abortion Group, Parenting Turnaways had a lower intended pregnancy rate (2.2 per 100 woman-years vs. 7.5 per 100 woman-years, aHR=0.29, 95% CI: 0.10–0.85).**Conclusion:** Being able to obtain a wanted abortion may enable women to have an intended pregnancy later.**Implications:** Ensuring that women can obtain an abortion for an unwanted pregnancy may enable them to have a subsequent pregnancy when they are ready to have a baby.

© 2018 Published by Elsevier Inc.

## 1. Introduction

Being able to terminate an unwanted pregnancy might enable women to have children at a later time under better life circumstances. When asked their reasons for abortion, many women indicate that while the current pregnancy is unwanted, a future one could be desirable. For example, a study based on data from the Turnaway study (also the data source for the current study) found that 12% of women seeking an abortion cite wanting a better life for the baby than they could currently provide as a reason for the abortion [1]. Supporting these data, a qualitative study examined how ideals of motherhood influenced women's decisions to have an abortion. Many women believed that children were entitled to a stable and loving family, financial security, and a high level of care and attention which they were unable to give. Many respondents discussed how there were certain conditions that had to be met before they could be responsible parents [2].

A few studies have examined the likelihood of subsequent *unintended* pregnancy after abortion. These studies have mixed findings

and have challenges in selecting appropriate comparison groups [3–5]. Using the same dataset as the current study, a previous analysis found no association between receiving or being denied a wanted abortion and time to subsequent *unintended* pregnancy [6].

We found only one study that examined the association between having an abortion and subsequent *intended* pregnancies. In an analysis of data from the 2002 National Survey of Family Growth (NSFG), among adolescents who had two pregnancies within 2 years, carrying the first pregnancy to term vs. having an abortion was not significantly predictive of having an intended subsequent pregnancy within 2 years. Yet, reporting the first pregnancy as intended was associated with having a subsequent intended pregnancy compared to the first being unintended [7]. Prior poor obstetrical outcome (stillbirth or miscarriage), older partner and partner intention were also associated with a subsequent intended pregnancy. However, the NSFG is not an ideal dataset to study abortion as abortion is severely underreported, and additionally, intended pregnancy is relatively rare among adolescents [8]. Thus, further research would contribute to our understanding of the impact of abortion on future intended pregnancy.

For this analysis, we used data from the Turnaway study, a 5-year longitudinal study of women presenting for abortion who either

\* Corresponding author.

E-mail address: [ushma.upadhyay@ucsf.edu](mailto:ushma.upadhyay@ucsf.edu) (U.D. Upadhyay).

received or were denied the abortion (“turned away”). The study was designed to assess the health and economic consequences of receiving an abortion compared with carrying an unwanted pregnancy to term. To date, the study has found that 95% of women who have an abortion report that they made the right decision at all time points over 3 years [9] and no mental health harm from receiving an abortion at 5 years [10]. All differences observed are to the detriment of women who are denied an abortion, including higher anxiety [10] and lower self-esteem in the short term [11], higher unemployment and poverty for 4 years [12], and reduced likelihood of having and achieving aspirational 1-year life plans [13]. A comparison of outcomes of children born following abortion denial found higher poverty and worse maternal bonding among children born following abortion denial compared to the next child born to women who received an abortion [14].

Using data from the Turnaway study, we sought to understand whether obtaining an abortion is associated with subsequent rates of intended pregnancy. We hypothesized that those who received a wanted abortion would have an intended pregnancy sooner than those denied an abortion. To understand this relationship further, we also modeled the likelihood of trying to become pregnant in the next 5 years as well as subsequent rates of any pregnancy.

## 2. Materials and methods

The Turnaway study received approval from the University of California, San Francisco, Committee on Human Research. From 2008 to 2010, we recruited women from 30 abortion facilities in 21 states across the country. Study sites were identified using the National Abortion Federation membership directory and by referral. Sites were selected to have the latest gestational limit of any facility within 150 miles. Gestational limits ranged from 10 weeks to the end of the second trimester [15].

Women were eligible if they sought an abortion within the eligible gestational ranges for each of the study groups, had no known fetal or maternal health indication for abortion, spoke English or Spanish and were aged 15 years or older. Further details on recruitment and methods can be found elsewhere [15,16]. After baseline, participants completed a follow-up phone interview every 6 months for 5 years.

Women were recruited with a 1:2:1 ratio within each site: women who presented up to 3 weeks over the facility's gestational age limit and were turned away (“Turnaways”), women who presented up to 2 weeks under the limit and received abortions (“Near-Limit Abortion Group”) and women who presented in the first trimester and received abortions (“First-Trimester Abortion Group”). Given that the majority (92%) of abortions in the United States occur in the first trimester of pregnancy [17], comparisons between the Near-Limit Abortion Group and the First-Trimester Abortion Group served to assess whether the experiences of women seeking later abortions differ from the typical experience of women having abortions in the United States.

For this analysis, we surmised that women who are currently parenting a young child have time and financial constraints which may influence both their desire for and risk of another pregnancy. These factors may be different from women who were denied an abortion but subsequently had a miscarriage, got an abortion elsewhere or placed their child for adoption. Thus, we divided the Turnaway group into Parenting Turnaways and Non-Parenting Turnaways.

### 2.1. Outcomes

Group differences in incidence of intended pregnancy could be affected by differences in both desire for pregnancy and risk of pregnancy. To differentiate the effects of each of these factors, we look at three outcomes by study group: (a) the probability of reporting trying to become pregnant, (b) time to the first subsequent pregnancy over the 5-year follow-up period following the birth/abortion of the index pregnancy

and (c) the time to the first subsequent *intended* pregnancy over the follow-up period.

At each follow-up interview, participants were asked, “Are you currently trying to become pregnant?” Their responses served as an imperfect proxy for desire for pregnancy. To examine any subsequent pregnancy and subsequent intended pregnancy, incident pregnancies were captured via self-report on all follow-up surveys. We calculated time to first subsequent pregnancy starting from the point at which women began to be at risk of pregnancy: 2 weeks after abortion or 6 weeks after delivery. For Non-Parenting Turnaways who obtained an abortion after recruitment at another abortion provider with a later gestational limit, exposure to the risk of subsequent pregnancy was estimated to begin 4 weeks after recruitment (2 weeks to find an abortion at another facility and 2 weeks to return to fecundity). For Non-Parenting Turnaways reporting miscarriage, exposure was assumed to begin at 3 months after recruitment.

All subsequent pregnancies were categorized by intention status, as determined by the London Measure of Unplanned Pregnancy (LMUP), a six-item, validated, retrospective measure [18,19]. It scores intention based on a woman's stance prior to conception including contraceptive use, intention to become pregnant, desire to have a baby, discussions with the man involved in the pregnancy and healthy preconception behaviors [19]. Each item is scored 0, 1 or 2, and total scores range from 0 to 12, with missing values imputed per the LMUP developers' guidelines. For this analysis, we used scores of 10–12 to indicate a planned pregnancy, scores 4–9 to indicate an ambivalent pregnancy and scores 0–3 to indicate an unplanned pregnancy, per published guidelines [20].

### 2.2. Independent variables

The primary independent variable was study group: First-Trimester Abortion Group, Near-Limit Abortion Group, Parenting Turnaways and Non-Parenting Turnaways. We selected the Near-Limit Abortion Group as the reference category to compare the effect of receiving versus being denied a wanted abortion on either side of the facility gestational limit and to allow for explicit comparison of women having earlier (First-Trimester) versus later abortions.

Categorical variables for baseline age, race, highest level of completed education, federal poverty level, cohabitation, history of abortion prior to the index pregnancy and parity (previous births at baseline: 0, 1, 2 or more) were included in the analysis. These demographic variables have been shown to be associated with risk for unintended pregnancy or multiple unintended pregnancies [21,22] and may also be associated with intended pregnancy. Additionally, we controlled for history of childhood (age<18) sexual abuse, assault or neglect, which is also associated with unintended pregnancy [23,24]. We included history of anxiety or depression because research has demonstrated that these disorders predict contraceptive behaviors that can lead to unintended pregnancy [25,26].

### 2.3. Analyses

Overall, 37.5% of eligible women consented to complete semiannual telephone interviews for 5 years. A total of 956 of these women (85%) completed the baseline interview. We excluded all participants ( $n=76$ ) recruited at one clinic with the lowest gestational limit, 10 weeks, because 20 of 21 Turnaways obtained an abortion elsewhere and therefore the site did not provide a sufficient sample of women carrying to term. We also excluded women lost to follow-up after baseline ( $n=64$ ), those who obtained tubal ligations at the delivery of the index pregnancy ( $n=5$ ), those in the Near-Limit Abortion Group who decided not to have an abortion ( $n=3$ ) and those for whom the intendedness of their subsequent pregnancies could not be determined ( $n=10$ ). Thus, the analytic sample included 798 of the 956 women enrolled in the study. An average of 5% was lost from wave to wave, with no differential loss by study group through wave 11. A total of 58% ( $n=558$ ) of women

**Table 1**  
Baseline sociodemographic characteristics and reproductive history characteristics of study population and distribution by study group (n=798).

	Near-Limit Abortion Group (NL) (n=379)	First-Trimester Abortion Group (F) (n=236)	Parenting Turnaways (PT) (n=126)	Non-Parenting Turnaways (NPT) (n=57)	Total	N	p value NL vs F	p value NL vs TP	p value NL vs NPT
Total	47.5	29.6	15.8	7.1	100.0	798			
Age, mean±SD <sup>a</sup>	24.9±5.8	26.0±5.7	23.1±5.4	24.5±5.9	24.9±5.8		.011	.008	.989
Age category							.022	.003	.729
15–19 <sup>a</sup>	16.4	14.8	31.7	21.0	18.7	149			
20–24	39.3	28.4	34.9	40.4	35.5	283			
25–35	36.9	47.9	30.2	31.6	38.7	309			
35–46	7.4	8.9	3.2	7.0	7.1	57			
Race							.029	.365	.997
Non-Latina white	32.2	40.6	24.6	38.6	33.9	271			
Non-Latina black	32.5	31.4	35.7	29.2	32.5	259			
Hispanic/Latina	20.6	19.9	26.2	17.6	21.1	168			
Multiracial/other	14.8	8.1	13.5	14.1	12.5	100			
Education							.194	.520	.982
Less than high school	18.5	16.1	24.6	15.8	18.5	148			
High school diploma or GED	33.8	29.7	33.3	33.3	32.5	259			
Some college, vocational training, or associates degree	40.9	42.8	35.7	43.9	40.9	326			
College degree	6.8	11.4	6.4	7.0	8.1	65			
Marital status							.477	.181	.324
Single, never married	79.7	76.3	85.7	78.9	79.6	635			
Married	8.2	11.4	8.7	3.5	8.9	71			
Separated/divorced/widowed	12.1	12.3	5.6	17.5	11.5	92			
Employment and school							.024	.072	.899
Not in school or employed	24.8	16.9	33.3	24.6	23.8	190			
In school or employed <sup>b</sup>	75.2	83.1	66.7	75.4	76.2	608			
Previous children at baseline							.260	.012	.748
0	34.0	38.6	49.2	38.6	38.1	304			
1	29.0	23.3	22.2	28.1	26.2	209			
2 or more	36.9	38.1	28.6	33.3	35.7	285			
Previous abortion (prior to index pregnancy)							.972	.035	.713
0	52.5	53	62.7	56.1	54.5	435			
1 or more	47.5	47	37.3	43.9	45.5	363			
History of childhood sexual abuse or assault							.511	.618	.567
No	80.5	79.4	80.2	86	80.3	641			
Yes	19.1	18.2	18.3	12.3	18	144			
Missing	0.4	2.4	1.6	1.8	1.6	13			
History of diagnosed anxiety or depression							.098	.251	.929
No	75.7	69.5	81.7	71.9	74.6	595			
Yes	24.3	30.5	18.3	28.1	25.4	203			

<sup>a</sup> This age category includes one participant aged 14 who was recruited early in the study before the minimum enrollment age was changed to 15.

<sup>b</sup> Includes homemakers.

were retained at the last interview. In this paper, we primarily focused on comparisons between the main comparison groups, the Near-Limit Abortion Group and Parenting Turnaways, but data on the First-Trimester Abortion Group and the Non-Parenting Turnaways are presented in tables for reference.

First, we described the sample, comparing the sociodemographic characteristics of each group to the Near Limit Abortion Group using mixed-effects regression models that included random effects for facility to account for clustering.

Second, we fit the data to a multivariable mixed-effects logistic regression model, which generated odds ratios as effect estimates. The model included random intercepts for woman and facility and random time effects. Based on estimates from this model, we calculated the predicted probability of reporting trying to become pregnant at each 6-month time point over follow-up and assessed differences by study group. To assess whether results would change after accounting for the additional (index) child among Parenting Turnaways, we conducted a sensitivity analysis, estimating the model with the index pregnancy included in the parity covariate to see how it affected the results.

Third, we used life table analysis to estimate 5-year rates of *any subsequent* pregnancy and any subsequent *intended* pregnancy within the 5 years after the index pregnancy. We plotted the 5-year rates of first pregnancy after birth/abortion and first intended pregnancy after birth/abortion using Kaplan–Meier estimates. Each woman contributed

observation time to the analysis until she became pregnant, was lost to follow up, was sterilized or exited the study at the end of the observation period. For all analyses, Parenting Turnaways contributed on average 4.5 years of time at risk because they were still pregnant for the first months of the study. When modeling any pregnancy, participants were censored at the time of their first pregnancy regardless of intention. Women were censored at the time of sterilization or at the midpoint between the current and previous survey if they did not give a precise date of sterilization (n=9). When modeling intended pregnancy, we retained participants who had pregnancies not meeting the definition of intended in the risk set to be observed for any future intended pregnancies.

Fourth, to assess whether study group was associated with intended pregnancy, we estimated multivariable Cox proportional-hazards regression models adjusting for potential confounders. The analysis estimated years to intended pregnancy. The Cox model accounted for clustering at the facility level using Stata's cluster option which computes standard errors based on aggregate scores for the facilities. Missing covariable data were encoded to allow for the inclusion of participants who had missing values on any independent variables. We tested the proportional-hazard assumption using Schoenfeld residuals [27]. We also visually examined Schoenfeld residuals for each study group. We conducted a sensitivity analysis to test whether potential violation of the proportionality assumption affected our results, estimating the model without the Non-Parenting Turnaway group.

**Table 2**

Adjusted mixed-effects logistic regression model of trying to become pregnant within 5 years of receiving or being denied a wanted abortion

	aOR	95% CI
Study group		
First-Trimester Abortion Group	1.51	(0.51–4.44)
Near-Limit Abortion Group	Reference	
Parenting Turnaway	0.09*	(0.01–0.87)
Non-Parenting Turnaway	0.54	(0.06–4.46)
Years	1.02	(0.65–1.61)
Study group × years		
First-Trimester Abortion Group × years	0.95	(0.67–1.36)
Near-Limit Abortion Group × years	Reference	
Parenting Turnaway × years	2.17*	(1.14–4.14)
Non Parenting Turnaway × years	1.24	(0.63–2.43)

Mixed-effects regression model adjusted for age, race/ethnicity, education, marital status, school/work status, parity, history of abortion, history of child abuse/neglect and history of depression/anxiety.

Years is the number of years of follow-up after baseline.

\* p<.05.

### 3. Results

#### 3.1. Participant characteristics

There were few sociodemographic differences among the four groups (Table 1). Parenting Turnaways were significantly younger (mean: 23.1 vs 24.9 years, p=.008) and less likely to have had previous children (50.8% vs 65.9%, p=.012) or abortions (37.3% vs 47.5%, p=.035) than the Near-Limit Abortion Group.

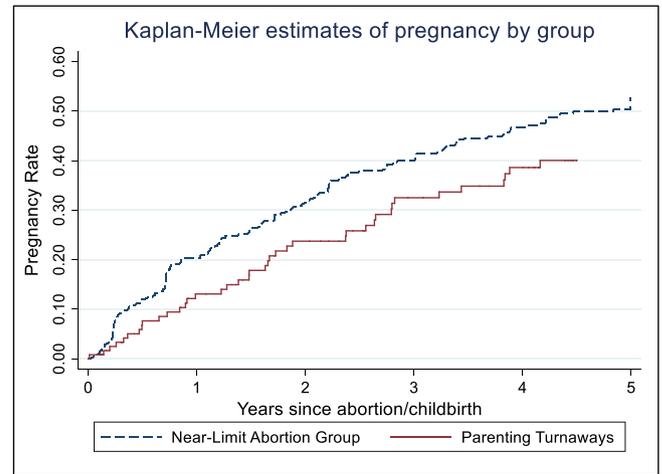
#### 3.2. Trying to become pregnant

Based on the mixed-effects model, the predicted probability of the average participant reporting trying to become pregnant ranged from 0.1% to 8.2% across time points. The predicted probability of trying to become pregnant was significantly lower among Parenting Turnaways than the Near-Limit Abortion Group at baseline (immediately after the birth/abortion) and continued to be significantly lower through 1.5 years (Tables 2 and 3). The predicted probability of trying increased more steeply for Parenting Turnaways than the Near-Limit Abortion Group over time, but after 1.5 years, this difference did not grow large enough to reach statistical significance. The sensitivity analysis model that adjusted for parity with the index pregnancy included did not alter the results; the predicted probability of trying to become pregnant was significantly lower among Parenting Turnaways than the Near-Limit Abortion Group only initially, and then differences were no longer significantly different (not shown).

At baseline, participants in the First-Trimester Abortion and the Non-Parenting Turnaway Groups did not have significantly different predicted probabilities of trying to become pregnant compared to the Near-Limit Abortion Group. Their trajectories also did not differ significantly from the Near-Limit Abortion Group.

#### 3.3. Subsequent pregnancies

Of the 798 women in the analysis, 315 women (39%) experienced at least one pregnancy during the 5-year follow-up period and experienced a total of 479 pregnancies. Among these 479 pregnancies, 73



**Fig. 1.** Kaplan–Meier failure estimates of any pregnancy over 5 years after receiving or being denied an abortion, by study group.

(15%) were intended, 186 (39%) were ambivalent, and 220 (46%) were unintended. (A previously published analysis from these data [6] reported a higher number of women having unintended pregnancies; that analysis considered ambivalent pregnancies to be unintended.)

Among the Near-Limit Abortion Group, 168 women (44% of the Near-Limit Abortion Group) had 276 subsequent pregnancies; 13% were intended, 43% were ambivalent, and 44% were unintended. Among the Parenting Turnaways, 40 women (32%) had 60 subsequent pregnancies; 8% were intended, 60% were ambivalent, and 58% were unintended (results not shown in tables). Notably, because they were still pregnant for several months at the start of the observation period, Turnaways were at risk of pregnancy for less time.

In a Kaplan–Meier analysis, which accounts for differences in time at risk, the cumulative pregnancy rate after the index pregnancy was consistently higher for Near-Limits than for Parenting Turnaways (20.5 vs 12.8 per 100 woman-years at 1 year, 31.9 vs 23.3 at 2 years, 40.5 vs 31.8 at 3 years, 47.3 vs 37.9 at 4 years, and 53.5 vs 40.4 at 4.5 years). The log-rank test comparing the curves showed a significantly higher pregnancy rate among the Near-Limit Abortion Group than Parenting Turnaways (p=.049). Participants in the First-Trimester Abortion and the Non-Parenting Turnaway Groups did not have significantly different pregnancy rates than those in the Near-Limit Abortion Group (Fig. 1).

The cumulative intended pregnancy rate was also consistently higher among Near-Limits than Parenting Turnaways (1.1 vs 0.0 per 100 woman-years at 1 year, 2.6 vs 0.0 at 2 years, 4.3 vs 2.2 at 3 years, 6.9 vs 2.2 at 4 years, and 7.5 vs 2.2 at 4.5 years). The log-rank test comparing the curves found a marginally higher intended rate among the Near-Limit Abortion Group than Parenting Turnaways (p=.08) (Fig. 2). Participants in the First-Trimester Abortion and the Non-Parenting Turnaway Groups did not have significantly different intended pregnancy rates than those in the Near-Limit Abortion Group.

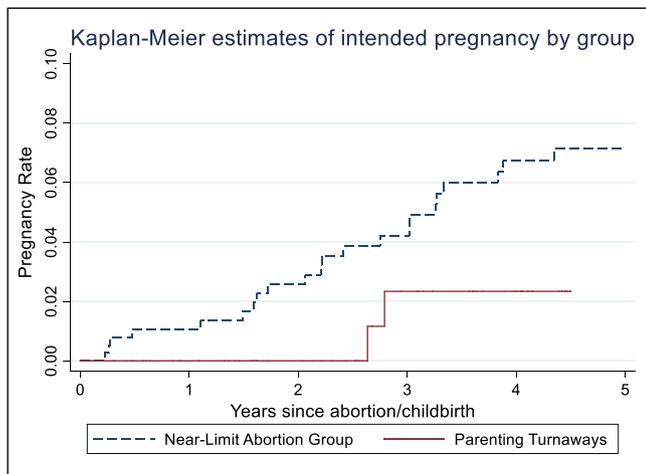
#### 3.4. Adjusted rates of pregnancy and intended pregnancy

An adjusted survival model confirmed the lower rates of any pregnancy among Parenting Turnaways [adjusted hazards ratio (aHR)=

**Table 3**

Adjusted predicted probabilities of trying to become pregnant

Study group	Time since abortion/childbirth									
	1 week	0.5 years	1 year	1.5 years	2 years	2.5 years	3 years	3.5 years	4 years	4.5 years
Near-Limit Abortion	1.3	1.3	1.3	1.4	1.6	2.3	2.8	2.8	3.5	4.3
Parenting Turnaway	0.1	0.2	0.3	0.5	0.8	2.2	3.6	3.6	5.6	8.2
p value	.021	.012	.014	.032	.113	.380	.916	.563	.289	.179



**Fig. 2.** Kaplan–Meier failure estimates of *intended* pregnancy over 5 years after receiving or being denied an abortion, by study group. Note: For probabilities of unintended pregnancy, see [6].

0.69 vs. Near-Limit Abortion, 95% confidence interval (CI): 0.54–0.89]. An adjusted survival model also confirmed the lower rates of intended pregnancy among Parenting Turnaways (aHR=0.29 vs. Near-Limit Abortion, 95% CI: 0.10–0.85) (Table 4). A visual examination of the Schoenfeld residuals, used to test proportionality of the survival curves, confirmed that the Non-Parenting Turnaway group's hazard was not proportional to the other groups. In a sensitivity analysis model, when we removed the Non-Parenting Turnaway group, the results were consistent, with study group as the most significant predictor of intended pregnancies (not shown).

#### 4. Discussion

In this study, women who received wanted abortions were more likely to have an intended pregnancy over the next 5 years than women who were denied them. Enabling women to have abortions when they want them appears to increase the likelihood that women will become pregnant later when they intend to be, likely under more favorable circumstances. The higher intended pregnancy rate among the Near-Limit Abortion Group could not be fully explained by a higher likelihood of wanting to become pregnant again as the differences in trying to become pregnant were significant only initially but dissipated after 1.5 years. The Near-Limit Abortion Group's higher rates of intended pregnancy appears to be mostly due to higher desire for pregnancy in the short term and higher risk of pregnancy in the longer term.

The demands of giving birth and raising a young child might be one explanation for why Parenting Turnaways were less likely than the

Near-Limit Abortion Group to be trying to become pregnant. Having to carry an unwanted pregnancy to term may make women feel less capable of taking care of another child. Indeed, a recent analysis from the same study found that those who were denied an abortion were more likely to be unemployed, to report not having enough money to meet basic living expenses, and to live in poverty compared to those who obtained an abortion [14]. All of these factors may reduce women's willingness to have another child within the 5 years. Additionally, Parenting Turnaways may have achieved (or exceeded) their desired family size with their last birth and subsequently reduced their risk of pregnancy through increased contraceptive use. These results are consistent with analyses finding that Turnaways who gave birth were more likely to be relying on sterilization (often offered immediately after childbirth) than the Near-Limit Abortion Group [28]; women who carry an unwanted pregnancy to term may remove themselves from the risk of pregnancy by being sterilized.

This is the first long-term study of intended pregnancy after abortion. The study had a high retention rate with no differential participation by study group, strengthening the validity of our findings. However, we followed women for only 5 years, and some may not be ready for a pregnancy until after 5 years. Another limitation is the lack of an appropriate prospective measure of pregnancy intention in the survey instrument. As an imperfect proxy, we used whether the woman was trying to get pregnant. This measure likely captures only those who are most resolute about wanting to become pregnant. Certainly, there were some participants who wanted to become pregnant but were not "trying" at the point of the follow-up interview due to lack of appropriate partner or a variety of other reasons. Additionally, this study relies on self-reported measures of pregnancy, which could be underreported especially for pregnancies ending in abortion. However, the risk of such underreporting in this study, that is known to the participants to be focused on abortion, is likely to be low.

Women make decisions about childbearing based on their personal circumstances, including resources, relationships and life plans [2,29]. Given that one of the most common reasons for abortion is that the pregnancy did not occur at the right time, enabling women to have an abortion when she feels she cannot raise a child or another child will likely improve her chances of having a child when she feels she is more able to support and nurture one.

#### Acknowledgments

The authors thank Rana Barar, Heather Gould and Sandy Stonesifer for study coordination and management; Mattie Boehler-Tatman, Janine Carpenter, Undine Darney, Ivette Gomez, Selena Phipps, Brenly Rowland, Claire Schreiber and Danielle Sinkford for conducting interviews; Michaela Ferrari, Debbie Nguyen, Jasmine Powell and Elisette Weiss for project support; Jay Fraser and John Neuhaus for statistical and database assistance; and all the participating providers for their assistance with recruitment. The authors thank Brenly Rowland also for research assistance. This study was supported by research and institutional grants from the Wallace Alexander Gerbode Foundation, the David and Lucile Packard Foundation, The William and Flora Hewlett Foundation and an anonymous foundation. The funders had no role in the study design, data collection and analysis, the writing of the report or the decision to submit the paper for publication.

#### References

- [1] Biggs MA, Gould H, Foster DG. Understanding why women seek abortions in the us. *BMC Womens Health* 2013;13(29).
- [2] Jones RK, Frohwirth LF, Moore AM. "I would want to give my child, like, everything in the world" – how issues of motherhood influence women who have abortions. *J Fam Issues* 2008;29:79–99.
- [3] Upadhyay UD, Brown BA, Sokoloff A, Raine TR. Contraceptive discontinuation and repeat unintended pregnancy within 1 year after an abortion. *Contraception* 2012; 85:56–62.

**Table 4**

Adjusted hazard ratios of subsequent pregnancy and subsequent intended pregnancy within 5 years of receiving or being denied a wanted abortion ( $n=798$ )

Study group	Any pregnancy		Intended pregnancy	
	aHR	95% CI	aHR	95% CI
First-Trimester Abortion Group	0.89	(0.69–1.15)	1.51	(0.84–2.72)
Near-Limit Abortion Group	Reference	(1.00–1.00)	Reference	(1.00–1.00)
Parenting Turnaway	0.69**	(0.54–0.89)	0.29*	(0.10–0.86)
Non-Parenting Turnaway	0.72	(0.46–1.13)	0.99	(0.35–2.79)

Hazards model adjusted for baseline age, race/ethnicity, education, marital status, school/work status, parity, having a toddler at home, history of abortion, history of child abuse/neglect and history of depression/anxiety.

\*  $p<.05$ .

\*\*  $p<.001$ .

- [4] Harper CC, Rocca CH, Thompson KM, et al. Reductions in pregnancy rates in the USA with long-acting reversible contraception: a cluster randomised trial. *Lancet* 2015; 386:562–8.
- [5] Shlay JC, Zolot L, Bell D, Maravi ME, Urbina C. Association between provision of initial family planning services and unintended pregnancy among women attending an std clinic. *J Womens Health (Larchmt)* 2009;18:1693–9.
- [6] Aztlan EA, Foster DG, Upadhyay U. Subsequent unintended pregnancy among us women who receive or are denied a wanted abortion. *J Midwifery Womens Health* 2018;63: 45–52.
- [7] Boardman LA, Allsworth J, Phipps MG, Lapane KL. Risk factors for unintended versus intended rapid repeat pregnancies among adolescents. *J Adolesc Health* 2006;39: 597.e1–8.
- [8] Lindberg L, Scott RH. Effect of ACASI on reporting of abortion and other pregnancy outcomes in the US National Survey of Family Growth. *Stud Fam Plann* 2018;49 (3):259–78.
- [9] Rocca CH, Kimport K, Roberts SC, Gould H, Neuhaus J, Foster DG. Decision rightness and emotional responses to abortion in the United States: a longitudinal study. *PLoS One* 2015;10:e0128832.
- [10] Biggs MA, Upadhyay UD, McCulloch CE, Foster DG. Women's mental health and well-being 5 years after receiving or being denied an abortion: a prospective, longitudinal cohort study. *JAMA Psychiat* 2017;74:169–78.
- [11] Biggs MA, Upadhyay UD, Steinberg JR, Foster DG. Does abortion reduce self-esteem and life satisfaction? *Qual Life Res* 2014;23(9):2505–13.
- [12] Foster DG, Biggs MA, Raifman S, Gipson J, Kimport K, Rocca CH. Comparison of health, development, maternal bonding, and poverty among children born after denial of abortion vs after pregnancies subsequent to an abortion. *JAMA Pediatr* 2018 [Epub ahead of print].
- [13] Upadhyay UD, Biggs MA, Foster DG. The effect of abortion on having and achieving aspirational one-year plans. *BMC Womens Health* 2015;15(102).
- [14] Foster DG, Biggs MA, Ralph L, Gerds C, Roberts S, Glymour MM. Socioeconomic outcomes of women who receive and women who are denied wanted abortions in the United States. *Am J Public Health* 2018:e1–7.
- [15] Upadhyay UD, Weitz TA, Jones RK, Barar RE, Foster DG. Denial of abortion because of provider gestational age limits in the United States. *Am J Public Health* 2014;104(9): 1687–94.
- [16] Dobkin L, Gould H, Barar R, Ferrari M, Weiss E, Foster DG. Implementing a prospective study of women seeking abortion in the United States: Understanding and overcoming barriers to recruitment. *Womens Health Issues* 2014;24(1):e115–23.
- [17] Jatlaoui TC, Shah J, Mandel MG, et al. Abortion surveillance – United States, 2014. *MMWR Surveill Summ* 2017;66:1–48.
- [18] Barrett G, Smith SC, Wellings K. Conceptualisation, development, and evaluation of a measure of unplanned pregnancy. *J Epidemiol Community Health* 2004;58: 426–33.
- [19] Morof D, Steinauer J, Haider S, Liu S, Darney P, Barrett G. Evaluation of the London measure of unplanned pregnancy in a United States population of women. *PLoS One* 2012;7:e35381.
- [20] Hall JA, Barrett G, Copas A, Stephenson J. London measure of unplanned pregnancy: guidance for its use as an outcome measure. *Patient Relat Outcome Meas* 2017;8: 43–56.
- [21] Jones RK, Singh S, Finer LB, Frohvirth LF. Repeat abortion in the United States. Report no: 29, 29, November 2006. New York, NY: Guttmacher Institute; 2006.
- [22] Magnusson BM, Masho SW, Lapane KL. Adolescent and sexual history factors influencing reproductive control among women aged 18–44. *Sex Health* 2011;8: 95–101.
- [23] Magnusson MB, Sjoberg A, Kjellgren KI, Lissner L. Childhood obesity and prevention in different socio-economic contexts. *Prev Med* 2011;53:402–7.
- [24] Dietz PM, Spitz AM, Anda RF, et al. Unintended pregnancy among adult women exposed to abuse or household dysfunction during their childhood. *JAMA* 1999;282: 1359–64.
- [25] Steinberg JR, McCulloch CE, Adler NE. Abortion and mental health: findings from the national comorbidity survey-replication. *Obstet Gynecol* 2014;123:263–70.
- [26] Walsemann KM, Perez AD. Anxiety's relationship to inconsistent use of oral contraceptives. *Health Educ Behav* 2006;33:197–214.
- [27] Cleves M, Gutierrez RG, Gould W, Marchenko YV. The Cox model: diagnostics. An introduction to survival analysis using Stata. 3rd ed. College Station, Texas: Stata Press; 2010.
- [28] Moseson H, Foster DG, Upadhyay UD, Vittinghoff E, Rocca CH. Contraceptive use over five years after receipt or denial of abortion services. *Perspect Sex Reprod Health* 2018;50(1):7–14.
- [29] Lavender T, Logan J, Cooke A, Lavender R, Mills TA. "Nature makes you blind to the risks": an exploration of womens' views surrounding decisions on the timing of childbearing in contemporary society. *Sex Reprod Healthc* 2015;6:157–63.