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# Certainty and intention in pregnancy decision-making: an exploratory study

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## Abstract

**Objective**—Abortion is often characterized as an inherently difficult decision, despite research demonstrating high decision certainty among abortion patients. Minimal research has examined decision certainty among people planning to continue a pregnancy. We examined whether women seeking abortion experience lower decision certainty than those planning to continue pregnancies and whether certainty differs by pregnancy intendedness.

**Study Design**—We administered the Decisional Conflict Scale (DCS) to pregnant women (n=149) at eight U.S. primary and reproductive health clinics. Using Poisson regression models adjusted for sociodemographic and pregnancy characteristics, we evaluated differences in DCS scores (<25/100 vs. 25/100) by pregnancy decision and whether pregnancy intention modified the effect of pregnancy decision on certainty.

**Results**—Over one-half (58%) of respondents planned to have an abortion, 32% to continue the pregnancy, and 10% were unsure. DCS scores were low overall (median 9.4/100; IQR: 1.6, 25.0), indicative of high certainty, and the percentage scoring 25/100, reflecting any uncertainty, did not differ by pregnancy decision (23% abortion vs. 19% continuing, p=0.55). In a multivariable model, there was no statistically significant interaction between pregnancy decision (abortion vs. continuing pregnancy) and intention. However, the predicted percentage reporting any uncertainty among respondents with intended pregnancies was comparable among those decided on abortion (13%) and continuing the pregnancy (16%). Among those with unintended pregnancies, these figures were 25% among those decided on abortion vs. 36% among those continuing.

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Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests.

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**Conclusion**—Levels of certainty about a pregnancy decision were high and appeared to depend more on whether the pregnancy was intended or unintended than on the pregnancy decision itself.

**Implications**—Similar levels of uncertainty among individuals who decided to have an abortion versus continue a pregnancy challenge the narrative that abortion is a particularly difficult medical and personal decision. The prevalence of some uncertainty among respondents continuing pregnancies suggests voluntary options counseling may be useful for some patients in prenatal care settings.

#### Keywords

Pregnancy decision-making; Decision conflict; Decision certainty; Abortion; Prenatal; Pregnancy intention

#### 1. INTRODUCTION

Decision-making around pregnancy is shaped by many factors, including an individual's pregnancy circumstances, preferences, and values [1–3]. As with other health care decisions, those deciding whether to continue a pregnancy or seek an abortion weigh these myriad factors, and in doing so, may experience conflict [4,5]. Decision conflict refers to a state of uncertainty about a course of action when the options involve risk, loss, or a challenge to personal values [6]. Measuring decision conflict, or its corollary certainty, provides an assessment of crucial components of decision making, including how informed a person feels about their options, knowledge of the benefits and risks of each option, and perceived support for their decision [7]. As with other health care decisions, assessing and responding to decision conflict is routine in abortion care, and is done through pregnancy options counseling or as part of obtaining informed consent for any care provided [8,9].

Public policy can also shape an individual's decision-making, particularly around abortion. A majority of states enforce laws targeting the abortion decision through mandatory waiting periods, state-scripted counseling, or ultrasound viewing requirements [10,11]. Implicit in these laws is that people seeking abortion are uncertain about their decision and will universally benefit from additional time or information beyond what is typically offered as part of existing practices. Previous research documents high levels of decision certainty among women accessing abortion, levels comparable to patients making other medical decisions [9]. Research has also documented that these targeted laws do not appear to dissuade most of those who present for abortion care from obtaining their abortions [12]. Still, these laws continue to be implemented across the country.

Pregnant people who have decided to continue the pregnancy do not face a similar set of constraints on their decision-making, and little is known about how their levels of uncertainty compare to those of people seeking abortion. To our knowledge, only one study has explored decision certainty among women continuing pregnancies. It found that while the majority of those continuing pregnancies express high decision certainty, a small minority experience low levels of certainty about their decision to give birth, indicating a need for additional options counseling [4,12]. Further, having an unintended pregnancy, as compared to an intended one, was significantly associated with decision uncertainty [4].

Given the strong relationship between pregnancy intention and pregnancy decision [13], the contribution of pregnancy intention to decision certainty merits further study.

In this exploratory study, we examine whether abortion patients experience higher levels of decision conflict than those choosing to continue their pregnancies. In addition, we assess the interaction of a key contextual feature – pregnancy intention – with decision certainty. We hypothesized that among those with unintended pregnancies, those choosing to continue would report greater conflict than those choosing abortion, while among those with intended pregnancies, those choosing abortion would report greater conflict than those choosing to continue. Results can be used to better understand pregnancy decision making and to inform appropriate pregnancy options counseling.

#### 2. MATERIALS AND METHODS

#### 2.1. Sample and study procedures

We conducted a cross-sectional study examining women's pregnancy preferences and intentions and, among those pregnant, timing of pregnancy suspicion and confirmation [14]. Women (N=810) were recruited from eight reproductive and primary health care facilities in Arizona, New Jersey, New Mexico, South Carolina, and Texas in 2016 and 2017. Clinic front desk staff gave potentially eligible patients a flyer describing the study. Trained research assistants then approached those with a flyer to assess eligibility. Eligibility criteria included being sexually active in the last year, not sterilized, able to speak and read English or Spanish, and aged 15 to 45. To align with the patchwork of minor consent laws across study states, we recruited minors only from clinics in states where they could legally consent to receive facility services; we thus included minors aged 15–17 from all sites except in South Carolina, where minors aged 15 were excluded. This analysis focuses on respondents who reported being pregnant at the time of recruitment (n=196). For our primary analyses, we further restricted the study sample to pregnant women in their first or second trimester of pregnancy (n=149), for whom abortion was still an option (most states do not allow abortion past 24 weeks gestation)[15].

After providing verbal informed consent, eligible women completed a 30-minute anonymous survey on a tablet and received a \$20 gift card. The study received approval from the University of California San Francisco Institutional Review Board (#15–16504).

#### 2.2. Measures

**2.2.1. Outcome variable**—Certainty about the pregnancy decision was assessed using the 16-item Decisional Conflict Scale (DCS), which has demonstrated reliability and validity in assessing certainty about health care decisions [7,16,17], including abortion [9]. We calibrated DCS scores to range from 0 to 100, as recommended by scale developers [7]. Higher scores reflect more conflict, or less certainty, about the decision. In other studies, scores less than 25 were associated with implementing a decision, whereas scores over 37.5 were associated with decision delay or feeling unsure [7]. In our sample, DCS scores were heavily skewed towards lower scores, and few respondents scored above 37.5. We thus used

the lower cutoff of 25, with scores < 25/100 categorized as highly certain and scores 25/100 reflecting *any* uncertainty.

**2.2.2. Independent variables**—Our primary independent variable was the respondent's decision about the current pregnancy. Options included having and raising the baby, abortion, adoption, or "don't know." We assessed pregnancy intention as a secondary independent variable of interest using the London Measure of Unplanned Pregnancy (LMUP) [13], a six-item retrospective measure of pregnancy intentions [13,18,19]. LMUP scores can range from 0 to 12, with higher scores indicating more intended pregnancies. LMUP scores were heavily skewed toward lower scores indicating more unintended pregnancies. We thus compared unintended pregnancies (LMUP 3) to more intended pregnancies (LMUP > 3) [20].

**2.2.3. Covariables**—We examined sociodemographic and pregnancy-related characteristics that we hypothesized could confound the relationship between pregnancy decision and decision certainty, including respondent's age, race/ethnicity, parity, and relationship status. Measures of economic wellbeing included federal poverty level (FPL) and past year household food insecurity and ability to pay bills.

Gestational duration was calculated in one of two ways. If a respondent had an ultrasound, we used their gestation and date of ultrasound to calculate current gestation. If no ultrasound was reported, we used their last menstrual period (LMP). The amount of time elapsed since respondents first suspected they were pregnant – and therefore had time to consider their options – was calculated as the time between the date they reported first suspecting they were pregnant and the date they completed the survey.

#### 2.3. Statistical analyses

We described the study sample and tested for differences in sociodemographic and pregnancy characteristics by pregnancy decision (abortion, continue pregnancy, not sure) using a series of multinomial logistic regression models. For descriptive purposes, we examine differences in mean and median DCS scores by pregnancy decision (abortion vs. continue pregnancy) using bivariable linear regression models (mean) and the Hodges-Lehmann method for non-parametric data (median). We then used Poisson regression models to assess the bivariable relationship between sociodemographic and pregnancy characteristics and decision certainty. Because we hypothesized that intention would modify the relationship between decision and certainty, we also fit two separate sets of Poisson regression models stratified by intention (unintended vs. more intended).

We examined the overall relationship between decision, intention and certainty, adjusted for potential confounders, with a multivariable Poisson regression model that included interaction terms of intention x decision. The model adjusted for age, race/ethnicity, parity, marital status, food insecurity and time since first pregnancy suspicion. Time since first pregnancy suspicion was highly collinear with gestational duration; we therefore did not include gestational duration in the multivariable model. Given significance on one of the intention x decision interaction terms, we then re-estimated multivariable models stratified by pregnancy intention. After each stratified model, we estimated the marginal predicted

percentages of any uncertainty for both abortion and continuing pregnancy respondents. Finally, we conducted a sensitivity analysis including respondents in their third trimester (n=27) in the multivariable models to see if results were consistent.

All analyses accounted for non-independence of observations (clustering by recruitment site) using generalized estimating equations (GEE). Stata version 15 was used for all analyses [21].

#### 3. RESULTS

Among 196 eligible pregnant respondents, we excluded 20 who were missing data on our primary dependent or independent variables and 27 who were in their third trimester of pregnancy, for a final sample of 149. Respondents were racially and ethnically diverse: 44% identified as Latina, 28% as non-Latina White, and 18% as non-Latina Black. Median age was 25 years, and more than half (55%) were parous. One-third (34%) experienced food insecurity in the last year. Median gestational duration was 8.6 weeks, and most (77%) respondents were in their first trimester of pregnancy at the time of recruitment (not shown).

Over half of respondents (58%) had decided to have an abortion, 31% had decided to continue the pregnancy, and 10% were not sure. The sociodemographic and pregnancy profiles of respondents differed somewhat by pregnancy decision (Table 1). For instance, less than half of those choosing abortion were married or cohabitating (43%), compared to over three-quarters of those continuing pregnancies (77%, p<0.001).

Scores on the DCS were heavily skewed toward lower scores, indicative of more certainty (median = 9.4/100; mean = 13.2/100, IQR: 9.4-25.0). Twenty-five percent were categorized as having any uncertainty (DCS score 25/100), with 7% scoring 37.5. The proportion reporting any uncertainty (DCS 25/100) was similar between respondents choosing abortion (21%) and those continuing their pregnancies (19%) (p=0.54). Although mean DCS scores were comparable between respondents choosing abortion (13.0/100) and those continuing their pregnancies (10.2/100, p=0.25), median DCS scores differed between respondents choosing abortion (10.2/100) and those continuing their pregnancies (5.0/100) (p=0.02).

Just over one-half (55%) indicated the pregnancy was unintended (LMUP 3). Of those choosing to have an abortion or unsure of their decision, the majority reported having unintended pregnancies (74% and 63%, respectively); conversely, a minority of those continuing pregnancies had unintended pregnancies (17%, p<0.001).

In bivariable analyses overall (Table 2) and stratified by pregnancy intention (Table A.1), differences in decision certainty by sociodemographic and pregnancy characteristics were largely non-significant.

In the full multivariable model testing for interaction, counter to our hypothesis, there was no statistically significant interaction between deciding on carrying to term versus abortion and pregnancy intention. However, the interaction term between being not sure versus abortion and pregnancy intention was significant at p 0.01 (not shown). In a stratified model

among those with intended pregnancies, the predicted percentage reporting any uncertainty was comparable among those who had decided on abortion (16%) and continuing the pregnancy (13%). Among those with unintended pregnancies, the predicted percentage reporting any uncertainty was 25% among those decided on abortion and 36% among those decided on continuing the pregnancy (Table 3). In sensitivity analyses, when we included individuals in the third trimester of pregnancy, these figures were largely comparable, though the predicted percentage with any uncertainty decreased to 32% (from 44%) among those continuing unintended pregnancies (not shown).

#### 4. DISCUSSION

In this study of pregnant women seeking health care services, we found no significant differences in decision certainty between women who had decided to have an abortion vs. those who had decided to continue their pregnancies, with about one-fifth of each expressing at least some amount of uncertainty about their decision. Women with unintended pregnancies, however, experienced higher levels of uncertainty, regardless of pregnancy decision. Our hypothesis entering this study was that conflict would be elevated when there was an apparent disconnect between pregnancy decision and intention, i.e. when people were continuing unintended pregnancies or having an abortion in the context more intended pregnancies. This hypothesis was partially supported by our data, as the highest levels of uncertainty were found among those carrying unintended pregnancies to term. However, levels of conflict did not differ by pregnancy decision among women with intended pregnancies. Thus, our findings suggest that the experience of an unintended pregnancy may undergird pregnancy decision conflict, not the decision to have an abortion.

The low average DCS score in this study population, as well as the low prevalence of DCS scores that the scale authors have indicated are associated with decision delay, aligns with previous research establishing high decision certainty among women presenting for abortion care [9] and those in prenatal care continuing their pregnancies [4]. Together, these findings demonstrate that mandatory options counseling for all people seeking abortion is not evidence-based. Still, uncertainty was not absent. Decision certainty is a reflection of how informed an individual feels about their options and how supported they feel in their decision-making. For some, uncertainty may be present because neither abortion nor continuing the pregnancy fits their needs or values. A small degree of uncertainty may thus be expected for some patients across all pregnancy decisions [22].

This study had several limitations. First, the cutoffs recommended by DCS scale authors force a dichotomy on certainty that may not be meaningful; here, there were so few respondents who described levels of conflict associated with decision delay that we were unable to use this cut-off in our analyses. The use of the LMUP to measure pregnancy intention also has minor limitations. Most items address pro-pregnancy sentiments and may not detect more nuanced differences in preferences among those with unintended pregnancies [23,24]. Furthermore, the LMUP measures retrospective, pre-conception pregnancy intention. Pre-conception pregnancy intention may be less relevant to decision certainty than current, post-conception feelings about pregnancy [25], which may have been shaped at least in part by the decision made [26]. Future analyses should consider how

people feel about a pregnancy once they experience one, as circumstances and people's feelings about their pregnancies can change over time. Other limitations include a small sample size and the omission of measures of abortion stigma and beliefs or perceived accessibility of abortion services, which have been shown to affect pregnancy decision-making [1]. Our findings have internal validity but are not generalizable to all people making pregnancy decisions in the U.S. Finally, this cross-sectional survey captures respondents' pregnancy decisions at a point in time; particularly for those early in pregnancy, their decision-making process may continue after completing our survey.

This exploratory study suggests two key clinical and policy implications. First, clinicians should recognize that pregnant people choosing birth may also be experiencing decision uncertainty. Some of these people may thus benefit from options counseling in prenatal care settings. Second, the degree to which pregnancy was intended may drive uncertainty more than making any particular decision. These findings challenge the narrative that abortion is a particularly difficult medical and personal decision.

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## Appendix

#### Table A.1:

Bivariable relationships between decision certainty and sociodemographic and pregnancy characteristics, stratified by pregnancy intention

Characteristic	More intended pregnancy <sup>a</sup> (n=67)			Unintended pregnancy <sup>a</sup> (n=82)		
	Highly <sub>b</sub> certain	Any uncertainty	P value	Highly <sub>b</sub> certain	Any uncertainty	<i>P</i> value <sup>c</sup>
	n (%) n (%)			n (%)	n (%)	
Age			0.57			0.47
15–19	7 (87.5)	1 (12.5)		7 (77.8)	2 (22.2)	
20–24	19 (82.6)	4 (17.4)		20 (71.4)	8 (28.6)	
25–34	20 (71.4)	8 (28.6)		24 (72.7)	9 (27.3)	
35+	7 (87.5)	1 (12.5)		7 (58.3)	5 (41.7)	
Race/Ethnicity			0.20			0.91
Latina	24 (77.4)	7 (22.6)		24 (70.6)	10 (29.4)	
Non-Latina White	12 (75.0)	4 (25.0)		18 (72.0)	7 (28.0)	
Non-Latina Black	11 (78.6)	3 (21.4)		8 (66.7)	4(33.3)	

Characteristic	More intended pregnancy <sup>a</sup> (n=67)			Unintended pregnancy <sup>a</sup> (n=82)		
	Highly <sub>b</sub> certain	Any uncertainty	<i>P</i> value	Highly <sub>b</sub>	Any uncertainty	P value <sup>c</sup>
	n (%)	n (%)		n (%)	n (%)	
Multiple/other	6 (100)	0 (0)		7 (70.0)	3 (30.0)	
Parity			1.0			0.67
Nulliparous	26 (78.8)	7 (21.2)		24 (72.7)	9 (27.3)	
Parous	26 (78.8)	7 (21.2)		32 (68.1)	15 (31.2)	
Relationship status	47 (71.2)	8 (44.4)	0.08	26 (41.3)	13 (50.0)	0.70
Dating, or no relationship	15 (65.2)	8 (34.8)		33 (71.7)	13 (28.3)	
Married or cohabitating	35 (85.4)	6 (14.6)		25 (69.4)	11 (30.6)	
Experienced food insecurity in last year	25 (37.9)	8 (44.4)	0.81	21 (33.9)	12 (46.2)	0.48
No	34 (79.1)	9 (20.9)		38 (73.1)	13 (26.9)	
Yes	16 (76.2)	5 (23.8)		19 (65.5)	10 (34.5)	
Time since first suspected pregnancy, weeks (median)	5.7	2.7	0.78	2.8	2.0	0.95
Pregnancy Decision			< 0.01			< 0.01
Abortion	19 (86.4)	3 (13.6)		49 (76.6)	15 (23.4)	
Continue Pregnancy	33 (84.6)	6 (15.4)		5 (62.5)	3 (37.5)	
Not Sure	1 (16.7)	5 (83.3)		4 (40.0)	6 (60.0)	

Notes: All percentages are row percentages

<sup>a</sup>Pregnancy intention assessed using London Measure of Unplanned Pregnancy (LMUP) (Hall et al., 2017). Scores 3 were considered unintended, scores > 3 were considered more intended.

<sup>b</sup>Highly Certain defined as Decision Conflict Scale (DCS) score < 25/100; Any Uncertainty defined as DCS 25/100.

 $^{c}P$  values are from Poisson regression models to adjust for clustering of observations by recruitment facility.

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#### Table 1:

Demographic and pregnancy characteristics of study respondents by pregnancy decision (N=149)

Characteristic	Pregnancy Decision				
	Abortion (n=86)	Continue pregnancy (n=47)	Not sure (n=16)	P value <sup>a</sup>	
	n (%)	n (%)	n (%)		
Age, years (median, range)	24.5, 21.0-30.0	25.0, 22.0–31.0	26.0, 24.0–30.0	0.35	
Race/ethnicity (n=148)				< 0.01	
Latina	33 (38.8)	27 (57.5)	5 (31.3)		
Non-Latina White	28 (32.9)	6 (12.8)	7 (43.8)		
Non-Latina Black	12 (14.1)	11 (23.4)	3 (18.8)		
Multiple / Other	12 (14.1)	3 (6.4)	1 (6.3)		
Parous (n=146)	44 (52.4)	24 (52.2)	12 (75.0)	0.06	
Married or cohabitating (n=146)	37 (43.0)	34 (77.3)	6 (37.5)	< 0.01	
Living below 100% of Federal Poverty Level (FPL) (n=145)				0.44	
Yes	30 (35.3)	24 (54.6)	8 (50.0)		
No	39 (45.9)	14 (31.8)	7 (43.8)		
Declined to state / missing / don't know income	16 (18.8)	6 (13.6)	1 (6.3)		
Experienced food insecurity in last year (n=145)	30 (35.3)	15 (34.1)	5 (31.3)	0.93	
Unable to pay mortgage, rent or bills in last year (n=142)	17 (20.2)	12 (27.9)	4 (26.7)	0.60	
Gestational duration, weeks (median, range) (n=145)	11.4, 1.3–26.1	11.4, 1.3–27.0	6.9, 2.4–23.6	0.21	
Time since first suspected pregnancy, weeks (median, range) (n=142)	2.7, 0.1–23.9	9.7, 0.4–23.4	2.6, 0.6–18.1	< 0.01	
Pregnancy Intention b				< 0.01	
More intended	22 (25.6)	39 (93.0)	6 (37.5)		
Unintended	64 (74.4)	8 (17.0)	10 (62.5)		
Decision certainty <sup>c</sup>				< 0.01	
Highly certain	68 (79.1)	38 (80.9)	5 (31.3)		
Any uncertainty	18 (20.9)	9 (19.2)	11 (68.8)		

Notes: All percentages are column percentages.

 $^{a}P$  values are from multinomial logistic regression model to adjust for clustering of observations by recruitment facility.

<sup>b</sup>Pregnancy intention assessed using London Measure of Unplanned Pregnancy (LMUP) (Hall et al., 2017). Scores 3 were considered unplanned, scores > 3 were considered more intended.

<sup>c</sup>Decision certainty measured using Decision Conflict Scale (DCS). Highly certain defined as DCS score < 25/100; any uncertainty defined as DCS 25/100.

#### Table 2:

Bivariable relationships between decision certainty and sociodemographic and pregnancy characteristics

Characteristic	Highly certain <sup>a</sup> (n=111)	Any uncertainty <sup>b</sup> (n=38)	P Value <sup>c</sup>
	n (%)	n (%)	
Age			0.40
15–19	14 (82.4)	3 (17.6)	
20–24	39 (76.5)	12 (23.5)	
25–34	44 (72.1)	17 (27.9)	
35+	14 (70.0)	6 (30.0)	
Race/Ethnicity			
Latina	48 (73.9)	17 (26.5)	0.90
Non-Latina White	30 (73.2)	11 (26.8)	
Non-Latina Black	19 (73.1)	7 (26.9)	
Multiple/other	13 (81.2)	3 (18.8)	
Nulliparous			0.65
Yes	50 (75.8)	16 (24.2)	
No	58 (72.5)	22 (27.5)	
Married or cohabitating			0.06
Yes	60 (77.9)	17 (22.1)	
No	48 (69.6)	21 (30.4)	
Experienced food insecurity in last year			0.38
No	72 (75.8)	23 (24.2)	
Yes	35 (70.0)	15 (30.0)	
Time since first suspected pregnancy, weeks (median, range)	3.7, 2.0–7.9	2.4, 1.6–7.1	0.66
Pregnancy Intention <sup>d</sup>			0.13
More intended	53 (79.1)	14 (20.9)	
Unintended	58 (60.7)	24 (29.3)	
Pregnancy Decision			< 0.01
Abortion	68 (79.1)	18 (20.9)	
Continue Pregnancy	38 (80.9)	9 (19.2)	
Not Sure	5 (31.3)	11 (68.8)	

Notes: All percentages are row percentages

<sup>*a*</sup>Highly certain defined as Decision Conflict Scale (DCS) score < 25/100

<sup>b</sup>Any uncertainty defined as DCS 25/100

 $^{C}P$  values are from Poisson regression models to adjust for clustering of observations by recruitment facility.

 $d^{P}$  Pregnancy intention assessed using London Measure of Unplanned Pregnancy (LMUP) (Hall et al., 2017). Scores 3 were considered unintended, scores > 3 were considered more intended.

#### Table 3:

Multivariable Poisson regression models examining the relationship between pregnancy decision and decision uncertainty, stratified by pregnancy intention<sup>a</sup>

	aPR <sup>c</sup>	95% CI	Predicted percentage reporting any uncertainty
More intended pregnancies $(n=67)^{b}$			
Decision			
Abortion	REF		16%
Carry to term	0.88	0.20-3.38	13%
Not Sure	10.99	3.58-33.7	76%
Unintended pregnancies (n=82) <sup>b</sup>			
Decision			
Abortion	REF		25%
Carry to term	1.48	0.44-4.99	36%
Not Sure	2.55	1.24-5.27	68%

#### Notes:

<sup>a</sup>Any uncertainty defined as Decisional Conflict Scale (DCS) score 25/100; Models adjusted for age, race/ethnicity, parity, marital status, food insecurity, and time since first suspected pregnancy.

<sup>b</sup>Pregnancy intention assessed using London Measure of Unplanned Pregnancy (LMUP) (Hall et al., 2017). Scores 3 were considered unintended, scores > 3 were considered more intended.

 $^{C}aPR = adjusted Prevalence Ratio$