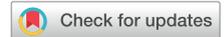




Editor's Choice

Associations between Pregnancy Intention, Attitudes, and Contraceptive Use among Women Veterans in the ECUUN Study



Tierney Wolgemuth, BS^{a,b}, Colleen Judge-Golden, BA^{a,b}, Lisa Callegari, MD, MPH^{c,d}, Xinhua Zhao, PhD, MPH^e, Maria Mor, PhD^e, Sonya Borrero, MD, MS^{a,b,e,*}

^a University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania

^b Center for Women's Health Research and Innovation, University of Pittsburgh, Pittsburgh, Pennsylvania

^c Departments of Obstetrics and Gynecology and Health Services, University of Washington, Seattle, Washington

^d Center for Veteran-Centered and Value-Driven Care, VA Puget Sound Health Care System, Seattle, Washington

^e Center for Health Equity Research and Promotion, VA Pittsburgh Healthcare System, Pittsburgh, Pennsylvania

Article history: Received 18 February 2018; Received in revised form 26 July 2018; Accepted 31 July 2018

A B S T R A C T

Background: Although pregnancy intention is strongly associated with contraceptive use, little is known about the interaction between pregnancy intention and attitude, or how they jointly affect contraceptive use.

Methods: Cross-sectional data from a national survey of women veterans who receive care within the Veterans Affairs Healthcare System were used to examine relationships among pregnancy intention (in next year, never, not sure), attitude toward hypothetical pregnancy (worst thing, neutral, best thing), and contraceptive use among women at risk for unintended pregnancy. Bivariate and multivariable analyses assessed associations between pregnancy intention and attitude, both separately and jointly, with contraceptive use. Multinomial regression assessed the relationship of intention and attitude with contraceptive method effectiveness.

Results: Among 858 women at risk of unintended pregnancy, bivariate analysis demonstrated that pregnancy intention and attitude were associated, but not perfectly aligned. In logistic regression models including both variables, intention of never versus in next year (adjusted odds ratio [aOR], 2.78; 95% confidence interval [CI], 1.34–5.75) and attitude of worst thing versus best thing (aOR, 2.86; 95% CI, 1.42–5.74) were each positively associated with contraception use. Among women using contraception, intention of never (aOR, 3.17; 95% CI, 1.33–7.59) and attitude of worst thing (OR, 2.09; 95% CI, 1.05–4.17) were associated with use of highly effective (e.g., intrauterine devices and implants) versus least effective (e.g., barrier) methods.

Conclusions: These findings support prior research suggesting that pregnancy intention alone does not fully explain contraceptive behaviors and imply that attitude toward pregnancy plays an important role in shaping contraceptive use independent of pregnancy intentions.

© 2018 Jacobs Institute of Women's Health. Published by Elsevier Inc.

This work was supported by the Department of Veterans Affairs, Veterans Health Administration, Office of Research and Development (VA Merit Award IIR 12-124, PI: Sonya Borrero); Colleen Judge is supported by the National Center For Advancing Translational Sciences of the National Institutes of Health (Award Number TL1TR001858, PI: Wishwa Kapoor). The views and opinions of authors expressed herein do not necessarily state or reflect those of the Department of Veterans Affairs or the United States Government. No competing financial interests exist.

* Correspondence to: Sonya Borrero, MD, MS, Center for Women's Health Research and Innovation, 230 McKee Place, Suite 600, Pittsburgh, PA 15213. Phone: +1 412 692 4841.

E-mail address: borrsp@upmc.edu (S. Borrero).

Correct and consistent use of contraception is the most effective means of preventing unintended pregnancy, yet many women who do not intend to get pregnant do not use contraception at all or use it inconsistently (Coombe, Harris, Wigginton, Lucke, & Loxton, 2016; Finer & Zolna, 2016; Moreau, Hall, Trussell, & Barber, 2013). Although affordable and convenient access to contraception, health care-related experiences and attitudes, and sociocultural, medical, and relationship contexts impact women's contraceptive decision making and use, a woman's intentions regarding pregnancy and strength of that intention are typically considered to be the most immediate determinants of contraceptive use (Jones, Tapales, Lindberg, & Frost, 2015; Masinter, Feinglass, & Simon, 2013; O'Rourke,

Roddy, Richman, & Custer, 2008). In actuality, the relationship between pregnancy intention and contraceptive use is complex (Aiken, Borrero, Callegari, & Dehlendorf, 2016; Moreau et al., 2013). Studies suggest that intention may be influenced by sometimes contradictory thoughts and attitudes toward pregnancy and childbearing informed by an individual's personal, social, and cultural circumstances or experiences (Downey, Arteaga, Villaseñor, & Gomez, 2017). Opposing cognitive and emotional factors may preclude a woman from having clear pregnancy intentions or plans. Moreover, some women may prefer a more passive approach to pregnancy owing to religious or cultural beliefs, or may believe that pregnancy is not within one's immediate control (Borrero et al., 2015). Others, particularly low-income women, may feel that planning a pregnancy requires prerequisite financial and relationship stability, and therefore may not be a realistic goal in the context of their lives (Borrero et al., 2015; Callegari, Aiken, Dehlendorf, Cason, & Borrero, 2017a). Finally, many women experience fluctuating intentions, perhaps based on shifting social support, financial stability, or relationship status (Jones et al., 2015; Jones, 2017a). Because pregnancy intention is neither static nor easily defined at a given point, discrepancies between women's reported intentions and their contraceptive use are not entirely surprising.

Such inconsistencies between women's stated pregnancy-related intentions and contraceptive behaviors have prompted work that evaluates how women's attitudes toward pregnancy, distinct from their intentions, may shape contraceptive use (Aiken et al., 2016; Callegari et al., 2017a; Jones, 2017b). Recognizing the limitations of pregnancy intention measures to fully explain fertility-related behaviors and outcomes, the National Survey of Family Growth began collecting information on women's happiness about pregnancy in 1995 (Centers for Disease Control and Prevention, 1995). Such efforts have increased understanding of how discrepancies between pregnancy intentions and attitudes toward a hypothetical pregnancy influence contraceptive use and reproductive outcomes (Kost & Lindberg, 2015; Vaughan & Stanford, 2005). Prior research suggests that happiness and unintended pregnancy can coexist, such that women who were not planning a pregnancy may still find conception to be a welcome, joyful event (Borrero et al., 2015). This phenomenon has been well-described among Latinas, among whom expression of happiness about a potential pregnancy is common even by those who do not plan to become pregnant for several years (Aiken, 2015; Aiken, Dillaway, & Mevs-Korff, 2015; Masinter et al., 2013). Existing literature predominantly focuses on the relationship between intention and seemingly opposite attitudes (such as happiness about an unintended pregnancy) after conception (Foster, Higgins, Karasek, Ma, & Grossman, 2012). However, little is known about how intention and attitudes may interact to shape contraceptive use before conception.

We, therefore, aimed to evaluate the relationship between pregnancy intention and attitude toward a hypothetical pregnancy, and the association of these factors with current contraceptive use, using survey data from a national sample of women veterans who use the Veterans Affairs (VA) Healthcare System for primary care. Women veterans use contraception and experience unintended pregnancy at rates comparable with the general population (Borrero et al., 2017). The use of a single, integrated health care system in which patients have low- or no-cost access to a wide range of contraceptive methods, are racially and ethnically diverse, and are geographically dispersed make women VA users a uniquely well-suited population in which to

study and build understanding of attitudinal factors that underlie contraceptive behaviors.

Methods

Study Design and Population

We conducted a secondary analysis of data from the Examining Contraceptive Use and Unmet Need among Women Veterans (ECUUN) Study. ECUUN is a cross-sectional survey that included a national sample of women veterans aged 18–44 years who received primary care at the VA within 12 months before the interview. We identified a random sample of women veterans quarterly using VA administrative data and mailed study invitation packets. We called all women who did not opt out to determine interest in participating, administer eligibility screening, and obtain verbal informed consent. A contracted professional survey research organization subsequently conducted 45- to 60-minute computer-assisted telephone interviews between April 2014 and January 2016. We compensated participants \$30 for their time. Interviews assessed women's contraceptive knowledge and use, as well as pregnancy history, intention, and attitudes (Borrero et al., 2017). The University of Pittsburgh and VA Pittsburgh Institutional Review Boards have approved this study.

A total of 2,302 women completed the survey, with a survey completion rate of 83% among enrolled women. Using VA administrative data, we compared study participants with non-participants from the random sampling frame and found them to be similar with regard to age, race/ethnicity, marital status, income, presence of medical and mental illness, and geographic area, suggesting that the ECUUN sample is representative of the larger population of women VA users of reproductive age (Borrero et al., 2017). This analysis was limited to women at risk for unintended pregnancy, defined as women who were sexually active with a man within the 3 months before the study interview, were not currently pregnant or actively trying to get pregnant, and who had no history of hysterectomy or infertility ($n = 1,173$). We further excluded women who reported relying on male or female sterilization procedures ($n = 304$), who did not report a specific method of contraception ($n = 4$), or who had missing data for a key independent variable ($n = 9$), resulting in an analytic sample of 858 women.

Measures

The key independent variables of interest were pregnancy intention and attitude toward a hypothetical pregnancy occurring within the next year, as assessed by two discrete, quantitative questions on the ECUUN survey. To assess pregnancy intention, we asked women, "Which of the following best describes your pregnancy plans?" Response options included "Currently trying to become pregnant," "Planning to get pregnant in the next year," "Not planning to get pregnant in the next year, but plan to get pregnant at some time in the future," "Do not plan to ever get pregnant in the future," and "Not sure." Because women currently trying to become pregnant were excluded, this variable was categorized as in next year, in more than 1 year, never in the future, and not sure. We assessed attitude toward a hypothetical pregnancy using the question "How would you feel if you became pregnant in the next year?" along a 7-point scale from 1 (it would be the worst thing that could happen to me) to 7 (it would be the best thing that could happen

to me). Based on the distribution of the responses, we categorized this variable as worst thing (1–2), neutral (3–5), and best thing (6–7).

Outcomes included current use of any contraception, defined as the use of a method in the month of interview, as well as tier of method effectiveness among women using contraception. Highly effective reversible methods included intrauterine devices and subdermal implants; moderately effective methods included the pill, ring, patch, and injection; and least effective methods included barrier methods (condoms, diaphragm, cervical cap), fertility awareness methods, spermicides, and withdrawal. We classified women who reported using more than one method according to their most effective method.

The following covariates were assessed: age, parity, income, education, marital status, and race/ethnicity. We also evaluated perceived susceptibility as a potential moderator of the relationship between intention, attitude, and contraceptive use. Recent literature has indicated a relatively high prevalence of perceptions of low susceptibility to pregnancy in U.S. populations, and, furthermore, it seems to be linked to contraceptive nonuse (Biggs, Karasek, & Foster, 2012; Foster et al., 2012). However, data suggest that approximately 85% of reproductive-aged women will become pregnant in a year of unprotected intercourse, making widespread perceptions of low susceptibility to pregnancy particularly concerning (Trussell, 2011). To assess perceived susceptibility, we asked women to report the likelihood of becoming pregnant if she were sexually active with a man for one year without using any form of contraception, using a 5-point scale from 1 (very unlikely to get pregnant) to 5 (very likely to get pregnant). Based on the distribution of responses, we dichotomized perceived susceptibility to pregnancy as either low perceived susceptibility (1–3) or high perceived susceptibility (4–5).

Analyses

We calculated proportions to describe sociodemographic characteristics of the study population overall and by the key independent variables (pregnancy intention and attitude toward a hypothetical pregnancy) and described the distribution of pregnancy attitudes by intention status to assess their association. We compared rates of any contraceptive use and method effectiveness among contraceptive users by both pregnancy intention and attitudes, and assessed differences between groups using χ^2 tests.

We used logistic regression models to evaluate the unadjusted and adjusted associations between each key independent variable and contraceptive use. Among women using contraception, we used multinomial logistic regression to evaluate both unadjusted and adjusted relationships between each key independent variable and contraceptive method efficacy, using the least effective methods as the reference group. In addition to these models, we also constructed similar models including both key independent variables together to estimate the associations between each predictor and contraceptive use while controlling for the other. We tested for interactions between pregnancy intention and attitude. Covariates that were associated with at least one of the key independent variables or outcome at the $p < .10$ level in bivariate analysis were included in the adjusted models. We tested for interactions between each key independent variable (intention and attitude) and perceived susceptibility and race/ethnicity to explore the role of these covariates as potential moderators. There were no significant interactions

between the key independent variables and perceived susceptibility or race/ethnicity; thus, these variables were included as covariates in these models and not considered as moderators. Tests for collinearity between intention and attitudes and all covariates were performed and indicated no significant collinearity (variance inflation factor (VIF) < 1.3 in all tests).

We also conducted an exploratory analysis examining bivariate relationships between pregnancy intention or attitudes with contraceptive use stratified by race/ethnicity to assess whether attitudinal factors affecting contraceptive use differ by race/ethnicity, which has been suggested in recent literature (Aiken, 2015; Callegari et al., 2017b). Small sample sizes for intention and attitude categories within each racial/ethnic group precluded multivariable analysis. All analyses were performed using STATA 14.2 (StataCorp, College Station, TX).

Results

Sample Characteristics

In our sample of 858 women, the mean age was 32.8 years, 62.4% were parous, and 21.0% had never been married. More than one-half (53.6%) were non-Hispanic White, one-quarter (25.9%) non-Hispanic Black, and 12.9% Hispanic. Overall, 9.4% of women were planning to get pregnant in the next year, 34.4% were planning to get pregnant more than 1 year from now, 40.4% never planned to get pregnant in the future, and 15.7% were unsure of their pregnancy intentions (Table 1). When asked about their attitude toward a hypothetical pregnancy in the next year, most women (54.3%) had neutral attitudes; 20.0% felt it would be the worst thing and 25.6% felt it would be the best thing. When asked about perceived susceptibility to pregnancy, 38.2% reported that they would be unlikely to become pregnant during 1 year of unprotected intercourse (Table 1).

Relationship between Pregnancy Intention and Attitude

Attitude toward a hypothetical pregnancy was strongly associated with pregnancy intention ($p < .001$; Figure 1). However, these variables were not perfectly aligned. Most women intending to become pregnant in the next year reported positive attitudes toward a hypothetical pregnancy (77%), yet positive attitudes were also reported among women planning to get pregnant more than 1 year from now (28%) and among women never planning to become pregnant (14%). In all categories except for planning in the next year, the majority of women reported neutral attitudes, and only 33% of women who planned no future pregnancies reported that pregnancy would be the worst thing.

Intention and Attitude with Contraceptive Use

In our sample of women at risk for unintended pregnancy, 84.3% were currently using contraception (Table 2). In bivariate analysis, pregnancy intention ($p < .001$) and attitude toward a potential pregnancy ($p < .001$) were each strongly associated with use of any contraception. Specifically, women intending pregnancy in the next year were less likely to use any contraception compared with those intending pregnancy in more than one year or never (66.7% vs. 86.8% vs. 86.2%; Table 2). Likewise, women who felt that pregnancy would be the worst thing had higher use of any contraception compared with women who had neutral attitudes or felt it would be the best thing (90.7% vs.

Table 1
Population Characteristics by Pregnancy Intention and Attitude among Women Veterans at Risk for Unintended Pregnancy (n = 858)

Characteristic	Total (N = 858)	Pregnancy Intention				p Value*	Attitude Toward Hypothetical Pregnancy			p Value*
		In Next Year (n = 81 [9.4%])	In >1 Year (n = 295 [34.4%])	Never (n = 347 [40.4%])	Not Sure (n = 135 [15.7%])		Worst Thing (n = 172 [20.0%])	Neutral (n = 466 [54.3%])	Best Thing (n = 220 [25.6%])	
Age, y						<.001				.14
20-29	240 (28.0)	38.3	44.8	13.3	23.0		31.4	27.5	26.4	
30-34	298 (34.7)	39.5	40.3	28.0	37.0		31.4	34.3	38.2	
35-39	210 (24.5)	14.8	11.9	34.0	33.3		19.8	25.3	26.4	
40-45	110 (12.8)	7.4	3.1	24.8	6.7		17.4	12.9	9.1	
Race						.47				.09
Hispanic	111 (12.9)	16.1	15.6	10.1	12.6		12.8	11.2	16.8	
Non-Hispanic White	460 (53.6)	55.6	53.2	54.5	51.1		48.8	56.2	51.8	
Non-Hispanic Black	222 (25.9)	23.5	22.7	28.5	27.4		32.6	25.1	22.3	
Non-Hispanic other	65 (7.6)	4.9	8.5	6.9	8.9		5.8	7.5	9.1	
Marital status†						<.001				<.001
Single, never married	180 (21.0)	16.1	33.6	12.1	19.3		25.2	20.2	19.6	
Married or cohabitating	462 (53.9)	65.4	42.4	62.4	50.4		38.0	56.4	60.9	
Formerly married	215 (25.1)	18.5	24.1	25.4	30.4		36.8	23.4	19.6	
Education						.26				.06
Bachelor's degree or more	433 (50.5)	56.8	46.1	51.9	52.6		43.0	53.7	49.6	
Income‡						<.001				.02
<\$20,000	184 (21.7)	20.0	31.2	14.5	20.6		28.1	21.0	18.3	
\$20,000-\$59,999	453 (53.5)	53.8	50.7	54.9	55.7		56.1	51.6	55.4	
≥\$60,000	210 (24.8)	26.3	18.2	30.5	23.7		15.8	27.4	26.3	
Parity‡						<.001				.71
≥1	534 (62.4)	58.0	43.9	76.9	68.2		59.7	63.2	62.7	
Perceived susceptibility to pregnancy‡						.37				.73
High	524 (61.8)	70.9	60.2	61.0	61.9		64.1	61.8	60.1	
Low	324 (38.2)	29.1	39.8	39.0	38.1		35.9	38.2	39.9	

* p Values are from χ^2 tests.

† Missing data: marital status (n = 1), income (n = 11), parity (n = 2), and perceived susceptibility (n = 10).

86.9% vs. 73.6%). Pregnancy intention ($p = .001$) and attitude ($p = .03$) were also associated with method effectiveness among women using contraception. Women who never planned to become pregnant were more likely to use highly effective methods than women planning to become pregnant in the next year (46.2% vs. 25.9%). Likewise, women who felt that pregnancy would be the worst thing were more likely to use highly effective contraception than women who felt it would be the best thing (46.8% vs. 32.1%).

Individual adjusted logistic regression analyses assessing the relationship between contraceptive use and pregnancy intention or attitude toward a hypothetical pregnancy controlling for age, education, income, parity, marital status, race/ethnicity, and perceived susceptibility are shown in Table 3. Compared with women planning to get pregnant in the next year, those planning

to get pregnant more than 1 year from now or never had significantly higher odds of using any contraception (adjusted odds ratio [aOR], 4.19; 95% confidence interval [CI], 2.20–7.97 and aOR, 4.81; 95% CI, 2.49–9.28, respectively). Compared with women who felt pregnancy would be the best thing, those who reported neutral attitudes toward pregnancy or that pregnancy would be the worst thing also had significantly higher odds of using any contraception (aOR, 2.48; 95% CI, 1.61–3.84 and aOR, 3.68; 95% CI, 1.95–6.95, respectively). Among women using contraception, those planning to become pregnant more than 1 year from now or never were significantly more likely than women planning pregnancy in the next year to report use of highly effective methods versus least effective methods (aOR, 2.25; 95% CI, 1.02–4.99 and aOR, 4.16; 95% CI, 1.84–9.36). For those intending to never become pregnant, the use of moderately effective methods was also significantly increased (aOR, 2.18; 95% CI, 1.02–4.67). Likewise, women with negative attitudes toward a hypothetical pregnancy had a greater odds of using highly effective methods (aOR, 2.92; 95% CI, 1.54–5.52) compared with women with positive attitude toward pregnancy. When both key independent variables (pregnancy intention and attitude) were included in the fully adjusted logistic and multinomial models, the associations with contraceptive use remained significant, with the exceptions of highly effective method use among women intending to get pregnant more than 1 year from now and moderately effective method use among women intending to never become pregnant.

Perceived susceptibility was independently associated with both any contraceptive use and tier of method effectiveness when both pregnancy intention and attitude were included in the model, such that women with high perceived susceptibility to pregnancy had increased odds of using any contraception

Pregnancy Attitude by Intention

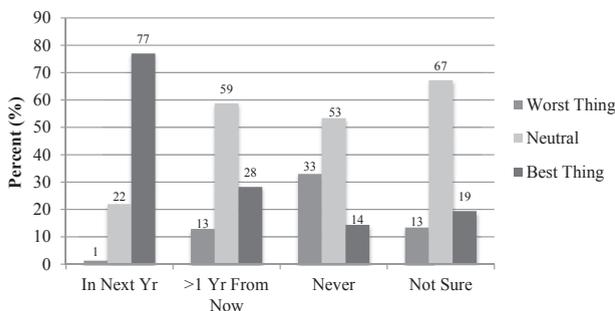


Figure 1. Attitude toward a hypothetical pregnancy within the next year stratified by pregnancy intention ($p < .001$).

Table 2
Contraceptive Use and Pregnancy Intention and Attitude among Veteran Women at Risk for Unintended Pregnancy

	Total Sample (N = 858)		Women Using Contraception (n = 723)			
	Any Method, n (%)	p Value*	Highly Effective, n (row %)	Moderately Effective, n (row %)	Least Effective, n (row %)	p Value*
Total	723 (84.3)		267 (36.9)	273 (37.8)	183 (25.3)	
Pregnancy intention						
In next year	54 (66.7)	<.001	14 (25.9)	20 (37.0)	20 (37.0)	.001
>1 year	256 (86.8)		80 (31.3)	107 (41.8)	69 (27.0)	
Never in the future	299 (86.2)		138 (46.2)	100 (33.4)	61 (20.4)	
Not sure	114 (84.4)		35 (30.7)	46 (40.4)	33 (29.0)	
Pregnancy attitude						
Worst thing (1–2)	156 (90.7)	<.001	73 (46.8)	54 (35.8)	29 (18.6)	.03
Neutral (3–5)	405 (86.9)		142 (35.1)	159 (39.0)	104 (25.7)	
Best thing (6–7)	162 (73.6)		52 (32.1)	60 (37.0)	50 (30.9)	

* p Values are from χ^2 tests.

versus none (aOR, 2.76; 95% CI, 1.87–4.32; data not shown) and increased use of a highly effective method versus a least effective method (aOR, 1.70; 95% CI, 1.13–2.62; data not shown) compared with women with low perceived susceptibility. Perceived susceptibility was the only covariate in our analysis that was independently associated with contraceptive use.

Bivariate Associations by Race/Ethnicity

Pregnancy intention and attitude toward a hypothetical pregnancy did not vary significantly by race/ethnicity (Table 1). In exploratory analyses examining bivariate associations

between pregnancy intention and attitude with contraceptive use stratified by race/ethnicity, we found that pregnancy intention and attitude were each significantly associated with contraceptive use for both Hispanic ($n = 111$) and White women ($n = 460$; Table 4). However, neither variable was associated with contraceptive use among Black women ($n = 222$). Similar variations were noted in bivariate associations of intention and attitude with method effectiveness. Among Hispanic women, only attitude toward pregnancy was associated with contraceptive method effectiveness ($p = .02$), whereas among White women both pregnancy intention ($p = .002$) and attitude ($p < .001$) were associated with method effectiveness. Neither intention nor attitude was significantly associated with method effectiveness among Black women.

Table 3
Adjusted Odds of Any Method Use and Method Effectiveness by Pregnancy Intention and Attitude toward a Hypothetical Pregnancy

	Logistic*	Multinomial†	
	Any Method vs. No Method, aOR (95% CI)	Highly Effective vs. Least Effective, aOR (95% CI)	Moderately Effective vs. Least Effective, aOR (95% CI)
Pregnancy intention			
In next year	REF	REF	REF
>1 year	4.19 (2.20–7.97)	2.25 (1.02–4.99)	1.88 (0.91–3.90)
Never	4.81 (2.49–9.28)	4.16 (1.84–9.36)	2.18 (1.02–4.67)
Not sure	4.05 (1.92–8.54)	1.98 (0.82–4.79)	1.86 (0.82–4.21)
Pregnancy attitude			
Best thing (6–7)	REF	REF	REF
Neutral (3–5)	2.48 (1.61–3.84)	1.24 (0.76–2.04)	1.18 (0.73–1.90)
Worst thing (1–2)	3.68 (1.95–6.95)	2.92 (1.54–5.52)	1.55 (0.85–3.05)
Intention and attitude			
Intention			
In next year	REF	REF	REF
>1 year	3.12 (1.59–6.11)	2.12 (0.93–4.82)	1.81 (0.85–3.85)
Never	2.78 (1.34–5.75)	3.17 (1.33–7.59)	1.93 (0.85–4.40)
Not sure	2.68 (1.21–5.92)	1.76 (0.70–4.43)	1.75 (0.74–4.12)
Attitude			
Best thing (6–7)	REF	REF	REF
Neutral (3–5)	1.96 (1.22–3.14)	1.06 (0.63–1.78)	1.06 (0.64–1.75)
Worst thing (1–2)	2.86 (1.42–5.74)	2.09 (1.05–4.17)	1.37 (0.67–2.75)

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval.

* Adjusted logistic regression model of any contraceptive method vs. no method. Adjusted for age, parity, race/ethnicity, education, income, marital status, and perceived susceptibility ($N = 834$).

† Adjusted multinomial regression model of method type among contraceptors with three levels of method effectiveness: highly effective (intrauterine devices, subdermal implants), moderately effective (pill, ring, patch, injection), and least effective (condoms, diaphragm, cervical cap, fertility awareness methods, spermicides, withdrawal). Models are adjusted for age, parity, race/ethnicity, education, income, marital status, and perceived susceptibility ($n = 716$).

Discussion

Among women veterans at risk for unintended pregnancy, we found that pregnancy intention and attitude toward a hypothetical pregnancy were each independently associated with contraceptive use and method effectiveness. This finding suggests that, along with the traditional concept of pregnancy intention, attitude toward a hypothetical pregnancy may be a valuable independent predictor for contraceptive use. Our results support previous findings that pregnancy intention and orientations toward a hypothetical pregnancy, although related, may not be perfectly aligned (Jones, 2017b). For example, we found that women never intending to become pregnant expressed more positive attitudes toward pregnancy than expected, with only one-third reporting that pregnancy would be the worst thing. Understanding the factors that are most salient to women's contraceptive use is critical to best supporting women in their contraceptive decision making.

Although previous studies on pregnancy intentions and attitudes have primarily been retrospective in nature (Centers for Disease Control and Prevention, 1995; Foster et al., 2012), our study assesses prospective intentions and attitudes, thus, providing a novel glimpse into the attitudes driving contraceptive use rather than evaluating the context of unintended pregnancies in hindsight. This study, therefore, has important clinical implications. Traditional contraceptive counseling focuses primarily on assessing and addressing a woman's pregnancy intentions and plans (Weisman, Maccannon, Henderson, Shortridge, & Orso, 2002). Indeed, numerous guidelines and organizations recommend that providers assist women in developing a reproductive life plan to establish the number, timing,

Table 4
Method Effectiveness and Pregnancy Intention and Attitude toward a Potential Pregnancy Stratified by Race/Ethnicity[†]

	Any Method		Highly Effective, n (row %)	Moderately Effective, n (row %)	Least Effective, n (row %)	No Method, n (row %)	p Value*
	n (%)	p Value*					
Hispanic (n = 111)							
Pregnancy intention							
In next year	7 (54)	.01	1 (8)	2 (15)	4 (31)	6 (46)	.11
>1 year	42 (91)		12 (26)	18 (39)	12 (26)	4 (9)	
Never in the future	30 (86)		11 (31)	12 (34)	7 (20)	5 (14)	
Not sure	12 (71)		3 (18)	5 (29)	4 (24)	5 (29)	
Pregnancy attitude							
Worst thing (1–2)	21 (95)	.01	10 (45)	8 (36)	3 (14)	1 (5)	.02
Neutral (3–5)	45 (87)		12 (23)	19 (37)	14 (27)	7 (13)	
Best thing (6–7)	25 (68)		5 (14)	10 (27)	10 (27)	12 (32)	
Non-Hispanic White (n = 460)							
Pregnancy intention							
In next year	32 (71)	.03	7 (16)	13 (29)	12 (27)	13 (29)	.002
>1 year	137 (87)		43 (27)	60 (38)	34 (22)	20 (13)	
Never in the future	166 (88)		81 (43)	56 (30)	29 (15)	23 (12)	
Not sure	59 (86)		19 (28)	23 (33)	17 (25)	10 (14)	
Pregnancy attitude							
Worst thing (1–2)	75 (89)	.001	39 (46)	21 (25)	15 (18)	9 (11)	<.001
Neutral (3–5)	234 (89)		83 (32)	98 (37)	53 (20)	28 (11)	
Best thing (6–7)	85 (75)		28 (25)	33 (29)	24 (21)	29 (25)	
Non-Hispanic Black (n = 222)							
Pregnancy intention							
In next year	13 (68)	.26	5 (26)	4 (21)	4 (21)	6 (32)	.33
>1 year	56 (84)		16 (24)	24 (36)	16 (24)	11 (16)	
Never in the future	83 (84)		38 (38)	28 (28)	17 (17)	16 (16)	
Not sure	33 (89)		9 (24)	14 (38)	10 (27)	4 (11)	
Pregnancy attitude							
Worst thing (1–2)	50 (89)	.17	19 (34)	22 (39)	9 (16)	6 (11)	.32
Neutral (3–5)	98 (84)		33 (28)	37 (32)	28 (24)	19 (16)	
Best thing (6–7)	37 (76)		16 (33)	16 (33)	10 (20)	12 (24)	

* p Values are from χ^2 tests.[†] Does not include women who reported race/ethnicity as "other" (n = 65).

and spacing of future pregnancies and then act in accordance with this plan, including engaging in contraceptive use (Gavin et al., 2014). However, both this study and others indicate that conscious intention may not be the only important factor influencing contraceptive use; subconscious or conscious attitudes toward a hypothetical pregnancy may also shape contraceptive behaviors. Counseling may, therefore, be more effective by utilizing open-ended questions to elicit and accommodate the range of women's thoughts and attitudes, beyond their plans, around pregnancy (Callegari et al., 2017a). This approach must also acknowledge that an individual's goals and attitudes about pregnancy may change over a short period of time, necessitating routine or frequent assessment. Altogether, a greater understanding of women's perceptions of pregnancy and the factors that affect contraceptive decision making and use will enable providers to better assist their patients in achieving their reproductive goals and desires.

Although not included as a key independent variable in this analysis, our results suggest that perceived susceptibility may also shape a woman's choice of method effectiveness. In one nationally representative study, 19% of young women reported believing they are very likely to be infertile (Polis & Zabin, 2012), despite research suggesting that only 8% of young women have impaired fecundity (Chandra, Martinez, Mosher, Abma, & Jones, 2005). Similar trends are noted in our study, with 38% of women reporting low perceived susceptibility to pregnancy. Such beliefs may be due to a family history of infertility, prior experiences of unprotected sex not resulting in conception, incorrect knowledge regarding the probability of pregnancy from unprotected intercourse, or an unrealistic optimism that unplanned pregnancy will not happen to

them (Polis & Zabin, 2012). These perceptions impact contraceptive behaviors, such that women at risk for unintended pregnancy commonly attribute engaging in unprotected intercourse to the belief that they could not get pregnant (Biggs et al., 2012; Borrero et al., 2015; Mosher, Jones, & Abma, 2015). Our results confirmed these associations in a population of women at risk for unintended pregnancy, further affirming the need for health providers to assess women's perceived fertility and improve counseling about the risk of pregnancy with unprotected intercourse. However, it is not readily apparent how providers can better communicate such issues to patients, and effective risk communication remains an area of active research (Garcia-Retamero & Cokely, 2011).

Beyond examining the influence of pregnancy attitudes on contraceptive use, the results of our exploratory analysis also suggest that the effect of these attitudes on contraceptive choices may vary by race/ethnicity. Research indicates that Black and Hispanic women are less likely than White women to use any contraception (Dehlendorf et al., 2014), which may be due in part to cultural variations in contraceptive preferences and beliefs (Callegari et al., 2017b). Prior work has also suggested that attitudes toward pregnancy may vary by race/ethnicity (Aiken et al., 2015); for example, Hispanic women have been shown to exhibit more positive orientations toward unintended pregnancy compared with White or Black women (Hartnett, 2012). We noted similar trends in positive attitudes about a hypothetical pregnancy among Hispanic women. We also found that associations of intention and attitude with contraception use varied by race/ethnicity, suggesting that the importance of certain attitudinal factors in driving contraceptive use may vary across groups. For example, neither intention nor attitude was significantly

associated with contraceptive use among Black women, perhaps suggesting that planning and pregnancy attitudes may have less of an impact on contraceptive use and method efficacy in this population. Improved understanding of racial/ethnic differences in pregnancy attitudes would allow for more culturally relevant and inclusive counseling strategies to help women to decrease their risk of undesired or unacceptable pregnancies.

Strengths of this study include a sample size that is both large and representative of the sizeable population of reproductive-aged female VA users, and the study's novel ability to relate prospective intentions and attitudes to current contraceptive use. This study also has several limitations. First, our study population of women veterans may limit generalizability to the overall population of U.S. women of reproductive age. Further research is needed to understand how the roles of attitude and intention in driving contraceptive use among VA users may differ from the general population. Another limitation of this study is that many women use contraception for reasons beyond pregnancy prevention. Research indicates that method efficacy is only persuasive to women if preventing pregnancy is a principal reason for use (Coombe, Harris, & Loxton, 2017). Therefore, the association of these predictors with contraceptive use is only pertinent if pregnancy avoidance is a primary goal of use, which we were unable to determine from our data. Despite these limitations, our study provides novel insight on attitudinal factors influencing contraceptive choices of a national sample of women veterans.

Implications for Practice and/or Policy

Contraceptive counseling that relies solely on the assessment of pregnancy intention may not appropriately evoke the full range of women's attitudes toward pregnancy, therefore limiting providers' ability to best guide patients in contraceptive decision making. Analysis of this unique dataset suggests that assessing attitudes toward potential pregnancy along with intentions may help to better guide discussions about potentially preparing for pregnancy and/or selecting a contraceptive method. Our data thus support eliciting women's orientations to a potential pregnancy as a key component of patient-centered counseling.

In addition to informing the broader literature on pregnancy intention and attitudes, this study provides insights that can inform VA efforts to improve reproductive health services. Women veterans in the ECUUN study face similar risks of unintended pregnancy as the general public despite greater access to contraception than many subsets of the general population, reinforcing that factors beyond access are critical in influencing contraceptive behavior (Borrero et al., 2017). Studies indicate that high-quality counseling is associated with both contraceptive method continuation and use of effective methods (Dehlendorf et al., 2016; Weisman et al., 2002). Current efforts are ongoing within the VA to build patient-centered communication tools that help women align their pregnancy attitudes with their contraceptive choices (Lisa Callegari, personal communication, February 2018).

Conclusions

We found that pregnancy intention and attitudes toward a hypothetical pregnancy are not always aligned for all women, and each is independently associated with any contraceptive use and effectiveness of method used. Further research is needed to more fully characterize the strength and interactions of each of these associations, as well as to understand the most effective

way to counsel women in their contraceptive decision making. Ultimately, assessing both pregnancy intentions and orientations toward pregnancy may enable providers to better support women—both among veterans and the general population—in achieving their ideal reproductive outcomes.

References

- Aiken, A. R. A. (2015). Happiness about unintended pregnancy and its relationship to contraceptive desires among a predominantly Latina cohort. *Perspectives on Sexual and Reproductive Health*, 47(2), 99–106.
- Aiken, A. R. A., Borrero, S., Callegari, L. S., & Dehlendorf, C. (2016). Rethinking the pregnancy planning paradigm: Unintended conceptions or unrepresentative concepts? *Perspectives on Sexual and Reproductive Health*, 48(3), 147–151.
- Aiken, A. R. A., Dillaway, C., & Mevs-Korff, N. (2015). A blessing i can't afford: Factors underlying the paradox of happiness about unintended pregnancy. *Social Science & Medicine*, 132, 149–155.
- Biggs, M. A., Karasek, D., & Foster, D. G. (2012). Unprotected intercourse among women wanting to avoid pregnancy: Attitudes, behaviors, and beliefs. *Women's Health Issues*, 22(3), e311–e318.
- Borrero, S., Callegari, L. S., Zhao, X., Mor, M. K., Sileanu, F. E., Switzer, G., ... Schwarz, E. B. (2017). Unintended pregnancy and contraceptive use among women veterans: The ECUUN Study. *Journal of General Internal Medicine*, 32, 900–908.
- Borrero, S., Nikolajski, C., Steinberg, J. R., Freedman, L., Akers, A. Y., Ibrahim, S., & Schwarz, E. B. (2015). "It just happens": A qualitative study exploring low-income women's perspectives on pregnancy intention and planning. *Contraception*, 91(2), 150–156.
- Callegari, L. S., Aiken, A. R. A., Dehlendorf, C., Cason, P., & Borrero, S. (2017a). Addressing potential pitfalls of reproductive life planning with patient-centered counseling. *American Journal of Obstetrics & Gynecology*, 216(2), 129–134.
- Callegari, L. S., Zhao, X., Schwarz, E. B., Rosenfeld, E., Mor, M. K., & Borrero, S. (2017b). Racial/ethnic differences in contraceptive preferences, beliefs, and self-efficacy among women veterans. *American Journal of Obstetrics and Gynecology*, 216(5), 504.e1–504.e10.
- Centers for Disease Control and Prevention. (1995). National Survey of Family Growth (NSFG): Female questionnaire. Available from: <https://www.cdc.gov/nchs/data/nsfg/nsfgqx95.pdf>. Accessed January 20, 2018.
- Chandra, A., Martinez, G., Mosher, W., Abma, J., & Jones, J. (2005). Fertility, family planning, and reproductive health of U.S. women: Data from the 2002 National Survey of Family Growth. *Vital Health Statistics*, 23(25), 1–160.
- Coombe, J., Harris, M. L., & Loxton, D. (2017). Who uses long-acting reversible contraception? Profile of LARC users in the CUPID cohort. *Sexual & Reproductive Healthcare*, 11, 19–24.
- Coombe, J., Harris, M. L., Wigginton, B., Lucke, J., & Loxton, D. (2016). Contraceptive use at the time of unintended pregnancy: Findings from the Contraceptive Use, Pregnancy Intention and Decisions study. *Australian Family Physician*, 45(11), 842–848.
- Dehlendorf, C., Henderson, J. T., Vittinghoff, E., Grumbach, K., Levy, K., Schmittiel, J., ... Steinauer, J. (2016). Association of the quality of interpersonal care during family planning counseling with contraceptive use. *American Journal of Obstetrics and Gynecology*, 215(1), 78.e1–78.e9.
- Dehlendorf, C., Park, S. Y., Emeremni, C. A., Comer, M. D., Vincett, M. K., & Borrero, S. (2014). Racial/ethnic disparities in contraceptive use: Variation by age and women's reproductive experiences. *American Journal of Obstetrics and Gynecology*, 210(6), 526.e1–526.e9.
- Downey, M. M., Arteaga, S., Villaseñor, E., & Gomez, A. M. (2017). More than a destination: Contraceptive decision making as a journey. *Women's Health Issues*, 27(5), 539–545.
- Finer, L. B., & Zolna, M. R. (2016). Declines in unintended pregnancy in the United States, 2008–2011. *New England Journal of Medicine*, 374(9), 843–852.
- Foster, D. G., Higgins, J. A., Karasek, D., Ma, S., & Grossman, D. (2012). Attitudes toward unprotected intercourse and risk of pregnancy among women seeking abortion. *Women's Health Issues*, 22(2), e149–e155.
- García-Retamero, R., & Cokely, E. T. (2011). Effective communication of risks to young adults: Using message framing and visual aids to increase condom use and STD screening. *Journal of Experimental Psychology: Applied*, 17(3), 270–287.
- Gavin, L., Moskosky, S., Carter, M., Curtis, K., Glass, E., Godfrey, E., ... Zapata, L. (2014). Providing quality family planning services: Recommendations of CDC and the U.S. Office of Population Affairs (Recommendations and Reports No. 63(RR04)) pp. (1–29). Centers for Disease Control. Available from: https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6304a1.htm?s_cid=rr6304a1_w. Accessed December 28, 2017.
- Hartnett, C. S. (2012). Are Hispanic women happier about unintended births? *Population Research and Policy Review*, 31(5), 683–701.
- Jones, R. K. (2017a). Are uncertain fertility intentions a temporary or long-term outlook? Findings from a panel study. *Women's Health Issues*, 27(1), 21–28.
- Jones, R. K. (2017b). Change and consistency in US women's pregnancy attitudes and associations with contraceptive use. *Contraception*, 95(5), 485–490.

- Jones, R. K., Tapales, A., Lindberg, L. D., & Frost, J. (2015). Using longitudinal data to understand changes in consistent contraceptive use. *Perspectives on Sexual and Reproductive Health*, 47(3), 131–139.
- Kost, K., & Lindberg, L. (2015). Pregnancy intentions, maternal behaviors, and infant health: Investigating relationships with new measures and propensity score analysis. *Demography*, 52(1), 83–111.
- Masinter, L. M., Feinglass, J., & Simon, M. A. (2013). Pregnancy intention and use of contraception among Hispanic women in the United States: Data from the National Survey of Family Growth, 2006–2010. *Journal of Women's Health* (2002), 22(10), 862–870.
- Moreau, C., Hall, K., Trussell, J., & Barber, J. (2013). Effect of prospectively measured pregnancy intentions on the consistency of contraceptive use among young women in Michigan. *Human Reproduction*, 28(3), 642–650.
- Mosher, W., Jones, J., & Abma, J. (2015). Nonuse of contraception among women at risk of unintended pregnancy in the United States. *Contraception*, 92(2), 170–176.
- O'Rourke, K., Roddy, M., Richman, A., & Custer, M. (2008). Does pregnancy/paternity intention predict contraception use? A study among US soldiers who have completed initial entry training. *Journal of Family Planning and Reproductive Health Care*, 34(3), 165–168.
- Polis, C. B., & Zabin, L. S. (2012). Missed conceptions or misconceptions: Perceived infertility among unmarried young adults in the United States. *Perspectives on Sexual and Reproductive Health*, 44(1), 30–38.
- Vaughan, B., & Stanford, J. (2005). Are all contraceptive failures unintended pregnancies? Evidence from the 1995 National Survey of Family Growth. *Perspectives on Sexual and Reproductive Health*, 31(5), 246–247.
- Trussell, J. (2011). Contraceptive failure in the United States. *Contraception*, 83(5), 397–404.
- Weisman, C. S., Maccannon, D. S., Henderson, J. T., Shortridge, E., & Orso, C. L. (2002). Contraceptive counseling in managed care: Preventing unintended pregnancy in adults. *Women's Health Issues*, 12(2), 79–95.

Author Descriptions

Tierney Wolgemuth, BS, is a medical student at the University of Pittsburgh School of Medicine. She is currently studying patient- and system-level factors influencing contraceptive use in the female veteran population.

Colleen Judge-Golden, BA, is an MD/PhD student at the University of Pittsburgh. She is currently completing her PhD in Clinical and Translational Science, and studies patient-, provider-, and system-level factors impacting contraceptive access and use.

Lisa Callegari, MD, MPH, is an Assistant Professor of Obstetrics and Gynecology, University of Washington and a Core Investigator, VA HSR&D Seattle-Denver Center of Innovation for Veteran-Centered and Value-Driven Care.

Xinhua Zhao, PhD, MPH, is a research health scientist at the Center for Health Equity Research and Promotion, VA Pittsburgh Healthcare System.

Maria Mor, PhD, is a Research Assistant Professor of Biostatistics, University of Pittsburgh and Director, Pittsburgh Biostatistics and Computing Core, Center for Health Equity Research and Promotion, VA Pittsburgh Healthcare System.

Sonya Borrero, MD, MS, is an Associate Professor of Medicine and Clinical and Translational Sciences and Director, Center for Women's Health Research and Innovation (CWHRI), University of Pittsburgh School of Medicine. She is the principal investigator of the ECUUN study.