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# Misunderstanding the Risk of Conception from Unprotected and Protected Sex

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A B S T R A C T

*Background:* Recent research suggests that lack of knowledge about the risks of conception from engaging in unprotected and protected sex is associated with not using contraception. A deeper understanding of women's knowledge of the risk of conception and the factors associated with such knowledge is needed.
*Methods:* Women with no history of abortion ($n$ = 1,472) at 13 family planning clinics were surveyed regarding their knowledge of the risk of conception from engaging in unprotected sex and while using condoms, oral contraceptive (OCs) pills, and intrauterine contraception (IUC).
*Findings:* Very few women (8%) accurately estimated the risk of conception from engaging in one act of unprotected sex. About one quarter (26%) of women correctly rated the effectiveness of condoms and over half correctly rated the effectiveness of OCs (61%) and IUCs (56%). Women who were African American or Latina, living in poverty, and had less than a college degree were more likely to overestimate the failure rate of condoms, OCS, and IUCs. Other factors associated with underestimating the effectiveness of these methods were being pregnant or seeking pregnancy and having recently engaged in unprotected sex. Women were significantly more likely to accurately assess the effectiveness of the method they planned to use.
*Conclusion:* These findings suggest that improving women's knowledge of the effectiveness of various methods may encourage more effective and consistent contraceptive use.


## Introduction

Over the past 20 years, the unintended pregnancy rate in the United States has remained steady at around 50 pregnancies per year for every 1,000 women (Finer & Zolna, 2011; Henshaw, 1998). Most recent estimates suggest that there were 3.2 million unintended pregnancies out of a total of 6.7 million pregnancies in the United States (Finer & Zolna, 2011). The reasons for the high rate of unintended pregnancy include lack of contraceptive use, contraceptive failure, and contraceptive misuse (Robbins, Chao, Frost, & Fonseca, 2005; Rosenberg, Waugh, & Long, 1995). According to the National Survey of Family Growth, approximately 7% of women not seeking pregnancy had unprotected sex in the past 3 months, a rate that remained about the same in 2002 and 2006 through 2008 (Mosher & Jones, 2010). In our recent work on the frequency and attitudes toward unprotected sex among abortion and family planning clients, we found that nearly nine in ten abortion clients and about half of family planning clients recently engaged in unprotected sex; many reported that they were willing to do so again in the near future (Foster, Higgins, Karasek, Ma, & Grossman, 2012; Biggs, Karasek, & Foster, 2012).

There are many reasons why couples not wanting to get pregnant may not use contraception. Such reasons can range from barriers accessing contraceptives, challenges negotiating birth control use, lack of knowledge or negative attitudes about contraception, and perceived benefits to having unprotected sex (Cheung & Free, 2005; Clark, 2001; Coles, Makino, & Stanwood, 2011; East, Jackson, O'Brien, & Peters, 2007; Foster, Higgins, Karasek, et al., 2012; Paterno & Jordan, 2012). Even couples with access to contraceptives who want to avoid pregnancy may still engage in unprotected sex. In a study of female and male family planning clients with free access to contraception and desiring to avoid pregnancy, half reported that they thought it was likely they would engage in unprotected sex in the near future (Foster, Higgins, Biggs, et al., 2012). One of the top reasons reported by women for not using contraception is the belief that they cannot become pregnant (Ayoola, Nettleman, & Brewer, 2007; Mosher & Jones, 2010; Nettleman, Chung, Brewer, Ayoola, & Reed, 2007).

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Furthermore, in our work surveying abortion and family planning clients, many women not desiring pregnancy held positive beliefs regarding unprotected sex, such as the feeling that it feels better and is more natural, is safe certain times of the month, and enhances one's relationship (Biggs et al., 2012; Foster, Higgins, Karasek, et al., 2012). In these two studies, the perceived benefits to having sex without contraception were associated with not using contraception. Moreover, a large proportion of women underestimated the risk of conception from engaging in unprotected sex and underestimated the protected effects of birth control at preventing pregnancy. Misperceptions of risk were highly correlated with engaging in or planning to engage in unprotected sex in the near future. These findings suggest that women's perceived beliefs about the risk of conception may influence their birth control use. The study results prompted our desire to gain a deeper understanding of women's knowledge of the risk of conception from unprotected sex and the protected effects of birth control use and the factors associated with such knowledge. Understanding women's perceptions of their risk of conception from either unprotected sex or from sex while using birth control is crucial to understanding why couples risk an unintended pregnancy. Contraceptive attitude studies repeatedly demonstrate that the perceived effectiveness of methods heavily influences the type of methods women choose (Brown, Ottney, & Nguyen, 2011; Frost & Darroch, 2008; Stanwood & Bradley, 2006). Because couples frequently do not use contraception because they do not believe they can become pregnant, their knowledge of the risk of conception from unprotected and protected intercourse is likely to influence their contraceptive use. In focus groups with adult women, Nettleman, Brewer and Ayoola (2007) found that some women reported engaging in unprotected intercourse (UI) because they lacked confidence about the effectiveness of contraception. This view stemmed from having become pregnant or knowing others who became pregnant when using birth control.

A few studies have looked at women's knowledge regarding the chances of becoming pregnant from unprotected sex or when using contraceptives. About 60% of women responding to a survey administered in 5 U.S. shopping malls in 2001 correctly reported that they believed oral contraceptive pills (OCs) to be more effective than condoms (Lamvu, Steiner, Condon, & Hartmann, 2006). Participant exposure to health care providers was not associated with knowledge about contraceptive effectiveness. The study did not examine whether client demographic characteristic were associated with knowledge of contraceptive effectiveness. In a recent mail-in survey of 12,500 randomly selected households in the St. Louis area, nearly two thirds (61%) of women underestimated the effectiveness of intrauterine contraception (IUC), 13% underestimated the effectiveness of OCs, and 64% overestimated the effectiveness of condoms (Hladky, Allsworth, Madden, Secura, & Peipert, 2011). In a study of young pregnant women, 58% of women presenting for abortion or prenatal care who had heard of IUCs did not know how effective IUCs are at preventing pregnancy (Stanwood & Bradley, 2006). A survey of women in two family practice clinics in Wisconsin found that about half overestimated the effectiveness of condoms and nearly half wrongly believed that condoms were as effective as OCs (Schrager & Hoffmann, 2008). Our recent study of family planning clients found that approximately three fifths of reproductive age women are aware of the risk of conception while using condoms (57%), OCs (62%), and IUC (57%). Together, these studies indicate that knowledge of contraceptive effectiveness varies by study population and method, but that in general knowledge regarding the effectiveness of OCs and condoms is generally greater than knowledge of IUC effectiveness. Still, there is a need to consider to what extent client characteristics are associated with knowledge of the risk of conception from unprotected and protected sex. In this study, we sought to expand our understanding of the factors associated with women's knowledge about the risks of conception from engaging in unprotected sex and when having sex while using condoms, OCs, and IUCs.

## Methods

### *Procedures*

Data for this analysis were collected as part of a larger study of family planning clients. Between January and May 2011, women seeking services at 13 family planning clinics were asked to complete a survey in the waiting room. The clinics were located in California, Colorado, Tennessee, New Jersey, Florida, and Michigan. Women ages 15 and over who spoke either English or Spanish were eligible to participate. The survey was divided into two parts. One part of the survey was related to abortion stigma and was completed only by women who had had an abortion. The other part of the survey was only completed by women who had never had an abortion and included items about contraceptive attitudes. The questions of interest for this study were those included in the "contraceptive attitudes" arm of the survey and thus only women who had never had an abortion were included in this analysis. The contraception survey contained questions about the chances of becoming pregnant from unprotected sex and with various birth control methods, as well as a series of contraceptive attitude questions. The survey was programmed into iForm Builder to be self-administered by women on iPad devices. Participants, first oriented to the iPad by a research assistant, read through an information sheet about the study on the iPad and gave electronic consent before starting the survey. Women received $20 for completing the survey. No identifying information was collected. The study protocol was approved by the Committee for Human Research at the University of California, San Francisco.

### *Measures*

#### *Number of acts of UI*

Women were asked to report the frequency with which they had sex in the previous 3 months and the percentage of times that they used a contraceptive method. The percentages were listed in 10% intervals ranging from 0% to 100%. Combining the responses to coital frequency and percent of UI, we estimated the number of episodes of UI in the previous 3 months. Women who reported that they were pregnant or trying to become pregnant were counted as having zero acts of UI in the past 3 months.

#### *Knowledge of risk of conception*

The survey defined UI as "sex without using condoms or any other type of birth control." To gauge attitudes toward risk of pregnancy from UI, respondents were asked to indicate on a scale of what they thought the probability of conception was for a single act of UI, a year of having UI, a year of condom use, a year of OC use, and a year of IUC use. The scale offered respondents a choice of ten, 10% intervals (0%–10%, 10%–20%, 20%–30%, etc.). The questions for UI were worded as follows:

"What are the chances of becoming pregnant after ONE SINGLE ACT of unprotected sex (sex without any method of birth control)?" and "Overall, if a couple is having sex regularly and the woman is NOT using a method of birth control, what are the chances of her becoming pregnant IN A YEAR?" The question regarding condom use was thus worded: "If a couple is having sex regularly and using CONDOMS regularly what are the chances of the woman becoming pregnant in a year?", and similarly worded for OC and IUC use. Lacking validated measures of perceived pregnancy risk, we chose cutoff points that were broad enough to capture responses that were within a reasonable range. We established cutoff points that were approximately 10 to 15 percentage points beyond the established measures of pregnancy risk, rounding to the nearest tenths place. We defined perception of risk of conception from one act of UI to be a gross *overestimate* if the answer was more than 20% (the true figure is 3%–5%) and to be within the correct range if less than 20%. The perception of risk from a year of UI was considered an *underestimate* if the answer was less than 70% (the true figure is 85%), and to be within the correct range if 70% or more. The perception of risk from a year of condom use was considered a gross overestimate if the answer was more than 30% (the true figure for "typical use" is 15%), to be within the correct range if between 10% and 30%, and an underestimate if less than 10%. The perception of risk from a year of OC use was considered a gross overestimate if the answer was more than 20% (the true figure for "typical use" is 8%), and the perception of risk from a year of IUC use to be a gross overestimate if the answer was more than 10% (the true figure for "typical use" is 0.2%–0.8%; Hatcher, Trussell, Nelson, Cates, Stewart, & Kowal, 2007).

*Types of contraceptive methods women plan to use*

Women were asked "Do you plan to use some type of birth control method to prevent pregnancy after today". Women planning to use a method were asked to pick from a list of 15 options (including an open-ended "other option") the method they are considering. For analysis purposes, methods were grouped based on their efficacy with IUCs, OCs, and condoms separated out so that we could test associations between the method women plan to use and their knowledge of the effectiveness of that method. The proportion of women planning to use a sterilization method (1.5%) or implants (2.7%) was too low to merit its own "high-efficacy" category; thus, these methods were grouped with other medium-efficacy methods. The five final categories include 1) IUCs, 2) OCs, 3) condoms, 4) other medium- and high-efficacy methods, which include the vaginal ring, contraceptive patch, injections, implant, and/or male or female sterilization, and 5) no or low-efficacy methods, which include natural family planning, withdrawal, diaphragm, or the sponge, and women who were undecided.

*Analyses*

Using SAS 9.2 software (SAS, Inc., Chicago, IL), tests of statistical difference for all bivariate analyses were conducted using chi-square analyses. Multiple logistic regressions using the SURVEYLOGISTIC procedure with the CLUSTER option to account for clustering by site, were used to estimate the odds of overestimating or underestimating the risk of conception from UI or when using contraceptives. Significant associations between each participant characteristic and perception of the risk of conception from UI and from using birth control were tested and the 95% Wald confidence intervals (CIs) were calculated.

## Results

*Study Population*

Eighty percent ($n = 2{,}195$) of the 2,745 women eligible for the larger study of family planning clients agreed to participate, of whom 1,543 women completed the contraceptive attitude arm of the survey, indicating that they had not had a previous abortion. Women who did not answer the questions regarding perceived risk of conception (4%) were excluded from the analysis leaving a final study sample of 1,472 family planning clients. See Table 1 for a description of participant characteristic and their bivariate associations with perceived risk of conception.

*Knowledge of the Risk of Conception from UI and Birth Control Use*

Eight percent (8%) of women accurately assessed that the chances of pregnancy from one act of unprotected sex to be under 20% and 92% greatly overestimated the risk of conception from one UI act, assessing it as over 20% (Figure 1). When asked about the chances of pregnancy from 1 year of UI, 24% greatly underestimated their chances of pregnancy perceiving it to be less than 70%. Sixteen percent (16%) of women correctly stated that the chances of pregnancy from 1 year of condom use was between 10% and 20%, 10% rated the risk as being between 20% and 30%, 30% underestimated the chances of pregnancy rating it at less than 10%, and 44% overestimated the risk of conception from condom use, rating it to be over 30%. Nearly half (48%) of women correctly stated that the chances of conception from 1 year of OC use to be under 10%; 13% rated it between 10% and 20%, and 39% greatly overestimated the chances of pregnancy from OC use, rating it to be over 20%. Over half of women (56%) correctly stated the chances of pregnancy from 1 year of IUC use as between 0% and 10%, and the remaining 44% overestimated the risk of conception from IUC use.

*Multivariate Analyses*

In multivariate logistic regression analyses, race/ethnicity, educational level, number of previous acts of UI, and pregnancy status were associated with perceived risk of conception from 1 year of UI (Table 2). Compared with non-Hispanic Whites, women who did not engage in UI, women with a college degree, and women who were not pregnant or not seeking pregnancy, African American women (odds ratio [OR], 1.4; 95% CI, 1.1–2.0), women who recently engaged in UI (ORs, 1.4 and 2.1; 95% CIs, 1.0–2.0 and 1.6–2.9), women with a high school diploma or less (OR, 2.0; 95% CI, 1.1–3.5) and women who were pregnant or trying to get pregnant (OR, 2.4; 95% CI, 1.5–3.7) were significantly more likely to underestimate the risk of conception from 1 year of UI. Teens (OR, 2.8; 95% CI, 1.1–7.3) and women with some college (OR, 1.8; 95% CI, 1.3–2.5) were significantly more likely than older women and college graduates to overestimate the risk of conception from one UI act. Women who engaged in three or more UI acts (OR, 0.4; 95% CI, 0.2–0.7) or preferred not to report the number of UI acts (OR, 0.4; 95% CI, 0.3–0.8), who were pregnant/seeking pregnancy (OR, 0.4; 95% CI, 0.2–0.9), and women planning to use no method or a low efficacy method (OR, 0.6; 95% CI, 0.2–1.7) were significantly less likely to overestimate the risk of conception from one UI act than women who engaged in fewer

**Table 1**
Participant Characteristics and Their Bivariate Associations with Perceived Risk of Conception from Unprotected Intercourse (UI) and from Using Condoms, Oral Contraceptive Pills (OCs), and Intrauterine Contraceptives (IUCs)

| Participant Characteristics | Total | | Underestimate Conception Risk from 1 Year of UI ($n$ = 1,470) | | Overestimate Conception Risk from | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 act of UI ($n$ = 1,472) | | Condom Use ($n$ = 1,468) | | OC Use ($n$ = 1,467) | | IUC Use ($n$ = 1,467) | |
| | $n$ | % | Row % | | Row % | | Row % | | Row % | | Row % | |
| Total | 1,472 | 100 | 24 | — | 92 | — | 44 | — | 39 | — | 44 | — |
| Age (yrs) | | | | | | | | | | | | |
| 15–19 | 377 | 26 | 26 | * | 93 | — | 53 | *** | 47 | ** | 55 | *** |
| 20–24 | 527 | 36 | 25 | — | 92 | — | 44 | — | 39 | — | 40 | — |
| 25–29 | 294 | 20 | 21 | — | 93 | — | 36 | — | 31 | — | 33 | — |
| 30–39 | 182 | 12 | 24 | — | 90 | — | 41 | — | 37 | — | 47 | — |
| 40–60 | 90 | 6 | 29 | — | 83 | — | 39 | — | 35 | — | 48 | — |
| Race/ethnicity | | | | | | | | | | | | |
| White/non-Hispanic | 620 | 42 | 22 | * | 93 | * | 36 | *** | 28 | *** | 35 | *** |
| African American/Black | 306 | 21 | 31 | — | 87 | | 59 | — | 53 | — | 56 | — |
| Latina | 398 | 27 | 22 | — | 92 | | 49 | — | 47 | — | 48 | — |
| Asian/Pacific Islander | 77 | 5 | 27 | — | 92 | | 38 | — | 36 | — | 45 | — |
| Other/multirace/Native American | 71 | 5 | 24 | — | 94 | | 36 | — | 41 | — | 53 | — |
| Educational level | | | | | | | | | | | | |
| Less than high school/high school diploma/GED | 505 | 34 | 31 | *** | 89 | ** | 50 | *** | 50 | *** | 56 | *** |
| Some college, tech or associates | 652 | 44 | 22 | — | 94 | — | 46 | — | 39 | — | 40 | — |
| College degree | 312 | 21 | 18 | — | 90 | — | 30 | — | 23 | — | 33 | — |
| Federal poverty level | | | | | | | | | | | | |
| >200% | 336 | 23 | 24 | | 93 | | 32 | *** | 26 | *** | 32 | *** |
| <200 | 872 | 59 | 24 | — | 92 | — | 47 | — | 41 | — | 45 | — |
| Do not know income | 252 | 18 | 26 | — | 90 | — | 51 | — | 51 | — | 55 | — |
| Parity | | | | | | | | | | | | |
| 0 | 1,073 | 73 | 23 | — | 92 | — | 43 | — | 38 | — | 43 | — |
| ≥1 | 396 | 27 | 27 | — | 90 | — | 47 | — | 48 | — | 47 | — |
| Number of UI acts in past 3 months | | | | | | | | | | | | |
| None | 906 | 62 | 20 | *** | 93 | * | 42 | * | 35 | *** | 39 | *** |
| 1–2 | 140 | 10 | 26 | — | 92 | — | 54 | — | 49 | — | 54 | — |
| ≥3 | 375 | 25 | 33 | — | 88 | — | 44 | — | 45 | — | 52 | — |
| Preferred not to answer | 51 | 3 | 31 | — | 88 | — | 53 | — | 43 | — | 51 | — |
| Method planning to use after today | | | | | | | | | | | | |
| Other medium- and high-efficacy methods[†] | 372 | 26 | 21 | — | 94 | *** | 48 | — | 44 | * | 44 | *** |
| None/undecided/low-efficacy methods[‡] | 166 | 11 | 27 | — | 81 | — | 45 | — | 45 | — | 50 | — |
| Condoms | 111 | 8 | 32 | — | 87 | — | 39 | — | 44 | — | 53 | — |
| Oral contraceptive pill | 702 | 48 | 23 | — | 93 | — | 43 | — | 35 | — | 44 | — |
| IUC | 107 | 8 | 28 | — | 94 | — | 38 | — | 36 | — | 24 | — |
| Pregnant or trying to get pregnant | | | | | | | | | | | | |
| No | 1,331 | 90 | 23 | *** | 92 | ** | 43 | — | 38 | * | 43 | — |
| Yes | 141 | 10 | 36 | — | 84 | — | 52 | — | 48 | — | 50 | — |

*Abbreviations:* UI, unprotected intercourse; IUC, intrauterine contraception; OC, oral contraceptive.
*$p < .05$; **$p < .01$; ***$p < .001$ (chi-square).
[†] Includes vaginal ring, contraceptive patch, injections, implant, and male or female sterilization.
[‡] Includes no method, undecided, and planning to use a low efficacy method such as natural family planning, withdrawal, diaphragm, and sponge.

UI acts, not seeking pregnancy, or women planning to use other birth control methods.

Characteristics that significantly predicted overestimating the risk conception from 1 year of condom, OC, and IUC use included race/ethnicity, educational level, poverty level, frequency of UI, pregnancy status and the method women planned to use. Compared with White women, African-American women, Hispanic women, and women from other racial ethnic/racial groups were more likely to overestimate the risk of conception from 1 year of condom, OC, and IUC use. Compared with women with a college degree and above 200% of the federal poverty level, having a lower educational level, being below 200% of the federal poverty level or not knowing one's income, and being pregnant or seeking pregnancy was significantly associated with overestimating the risk of conception from 1 year of condom, OC, and IUC use. Women who recently had unprotected sex were more likely to overestimate the risk of conception from 1 year of condom, OC, and IUC use than women who did not engage in UI. Planning to use a given method was significantly associated with being less likely to misunderstand that method's effectiveness. Women who were pregnant/seeking pregnancy were significantly more likely to overestimate the risk of conception from using each of the three methods. Parity was not a significant predictor for any of the five outcome variables.

## Discussion

This study sought to understand women's perceptions of the likelihood of pregnancy from engaging in unprotected or protected sex. We found that most women believe that the chance of pregnancy from one act of UI is far greater than it actually is. This perception was particularly prevalent among teens and women who did not recently engage in UI. Estimates of the risk of conception from one act were so high that they were very similar to the risk women reported for 1 year of UI,

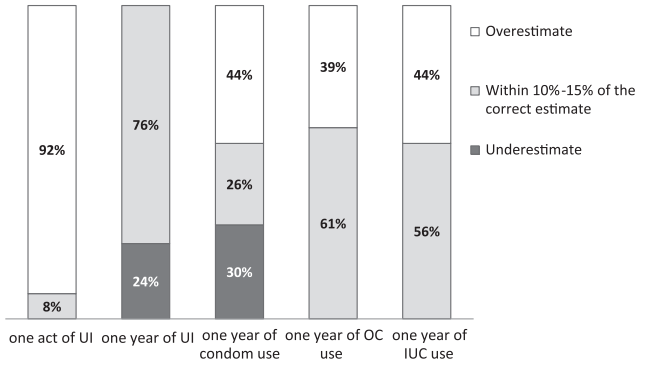


**Figure 1.** Women's ratings of the chances of pregnancy from unprotected intercourse (UI) and typical birth control use ($n = 1,472$).

suggesting that there is a lack of understanding with regard to the high cumulative risk from repeating a low-risk activity. Women who repeatedly engaged in UI were more likely to underestimate the risk of pregnancy from 1 year of UI. Although we did not expect women to precisely estimate the chances of pregnancy, the association with risk taking behavior indicates that women who place themselves at risk of an unintended pregnancy do not fully understand the risks they are taking. Many couples, including nearly half of the women in this sample, engage in unprotected sex because they do not think they will become pregnant (Biggs et al., 2012). This is reflected in other studies that have found that women who underestimate their fertility potential are less likely to use contraception (Oddens, 1997). Women's concerns about infertility probably stem from previous episodes of UI in which they did not become pregnant. Failing to get pregnant from unprotected sex has been found to be associated with misperceptions about fertility and pregnancy risk (Hoggart & Phillips, 2011). Another important finding is that many women—particularly ethnic minority, less educated, lower income women, and those who more frequently engaged in UI—doubted the effectiveness of condoms, OCs, and IUCs,

**Table 2**
Five Multivariate Logistic Regression Models Predicting Perceived Risk of Conception from Unprotected Intercourse (UI) and Birth Control Use

| Predictor Variables | Underestimate Conception Risk from 1 Year of UI ($n = 1,441$) | | | Overestimate Risk of Conception from | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1 Act of UI ($n = 1,442$) | | | Condom Use ($n = 1,439$) | | | OC Use ($n = 1,438$) | | | IUC Use ($n = 1,438$) | | |
| | OR | CI | | OR | CI | | OR | CI | | OR | CI | | OR | CI | |
| Age (yrs) | | | | | | | | | | | | | | | |
| 15–19 | 0.7 | 0.3 | 1.4 | 2.8* | 1.1 | 7.3 | 1.5 | 0.8 | 2.8 | 1.0 | 0.5 | 1.9 | 1.0 | 0.5 | 1.9 |
| 20–24 | 0.8 | 0.4 | 1.4 | 1.9 | 0.8 | 4.7 | 1.1 | 0.5 | 2.1 | 1.0 | 0.5 | 2.0 | 0.7 | 0.4 | 1.3 |
| 25–29 | 0.7 | 0.4 | 1.3 | 1.8 | 0.7 | 5.1 | 1.0 | 0.5 | 2.3 | 1.0 | 0.5 | 2.0 | 0.7 | 0.3 | 1.4 |
| 30–39 | 0.8 | 0.5 | 1.5 | 1.4 | 0.5 | 3.7 | 1.0 | 0.5 | 2.1 | 1.1 | 0.5 | 2.3 | 1.1 | 0.6 | 2.1 |
| 40–60 (reference) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Race/ethnicity | | | | | | | | | | | | | | | |
| White/non-Hispanic (reference) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| African American/Black | 1.4* | 1.1 | 2.0 | 0.5 | 0.3 | 1.1 | 2.4*** | 1.5 | 3.7 | 2.6*** | 2.0 | 3.3 | 2.1*** | 1.4 | 3.3 |
| Latina | 0.9 | 0.7 | 1.2 | 1.0 | 0.5 | 1.9 | 1.5*** | 1.3 | 1.7 | 2.0*** | 1.5 | 2.6 | 1.5*** | 1.2 | 2.0 |
| Asian/Pacific Islander | 1.3 | 0.7 | 2.5 | 1.0 | 0.4 | 2.3 | 1.0 | 0.7 | 1.6 | 1.3 | 0.8 | 2.2 | 1.4 | 0.9 | 2.3 |
| Other/multirace/Native American | 1.2 | 0.7 | 1.9 | 1.2 | 0.4 | 3.5 | 0.8 | 0.5 | 1.3 | 1.4 | 0.8 | 2.6 | 1.7* | 1.1 | 2.7 |
| Educational level | | | | | | | | | | | | | | | |
| Less than high school/high school diploma/GED | 2.0* | 1.1 | 3.5 | 0.9 | 0.6 | 1.4 | 1.5* | 1.0 | 2.2 | 2.3*** | 1.7 | 3.1 | 1.7** | 1.2 | 2.4 |
| Some college, tech, or associates | 1.2 | 0.8 | 1.7 | 1.8** | 1.3 | 2.5 | 1.6** | 1.1 | 2.2 | 1.8** | 1.2 | 2.5 | 1.1 | 0.8 | 1.5 |
| College degree (reference) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Federal poverty level | | | | | | | | | | | | | | | |
| >200% (reference) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| ≤200% | 0.8 | 0.6 | 1.1 | 0.8 | 0.6 | 1.1 | 1.6*** | 1.3 | 1.9 | 1.4** | 1.1 | 1.9 | 1.4*** | 1.2 | 1.8 |
| Do not know income | 0.9 | 0.6 | 1.3 | 0.7 | 0.4 | 1.4 | 1.7* | 1.1 | 2.5 | 2.1** | 1.3 | 3.4 | 1.8* | 1.1 | 3.0 |
| Parity | | | | | | | | | | | | | | | |
| 0 (reference) | | | | | | | | | | | | | | | |
| ≥1 | 1.0 | 0.6 | 1.6 | 1.2 | 0.7 | 2.2 | 1.1 | 0.8 | 1.6 | 0.9 | 0.6 | 1.4 | 1.1 | 0.7 | 1.8 |
| Number of UI acts in past 3 months | | | | | | | | | | | | | | | |
| None (reference) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 1–2 | 1.4* | 1.0 | 2.0 | 0.9 | 0.4 | 1.9 | 1.5* | 1.1 | 2.2 | 1.6** | 1.2 | 2.1 | 1.7*** | 1.3 | 2.2 |
| ≥3 | 2.1*** | 1.6 | 2.9 | 0.4** | 0.2 | 0.7 | 1.1 | 0.9 | 1.3 | 1.5** | 1.2 | 1.8 | 1.7*** | 1.2 | 2.2 |
| Preferred not to answer | 2.0 | 0.6 | 6.0 | 0.4** | 0.3 | 0.8 | 1.5 | 0.9 | 2.5 | 1.3 | 0.7 | 2.3 | 1.4 | 0.8 | 2.3 |
| Method planning to use after today | | | | | | | | | | | | | | | |
| Other medium and high efficacy methods† (reference) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| None/undecided/low-efficacy methods‡ | 0.9 | 0.6 | 1.4 | 0.4 | 0.2 | 0.8 | 0.8 | 0.6 | 1.2 | 0.9 | 0.6 | 1.3 | 1.0 | 0.7 | 1.4 |
| Condoms | 1.4 | 0.9 | 2.2 | 0.6** | 0.2 | 1.7 | 0.6* | 0.4 | 0.9 | 0.9 | 0.6 | 1.4 | 1.2 | 0.7 | 2.1 |
| Oral contraceptive pills | 1.2 | 0.9 | 1.6 | 0.8 | 0.5 | 1.3 | 0.9 | 0.8 | 1.1 | 0.8* | 0.6 | 1.0 | 1.1 | 0.8 | 1.6 |
| IUC | 1.5 | 0.9 | 2.5 | 1.1 | 0.5 | 2.3 | 0.7* | 0.5 | 1.0 | 0.7 | 0.5 | 1.2 | 0.4*** | 0.2 | 0.6 |
| Pregnant or trying to get pregnant | | | | | | | | | | | | | | | |
| No (reference) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| Yes | 2.4*** | 1.5 | 3.7 | 0.4* | 0.2 | 0.9 | 1.6* | 1.1 | 2.3 | 1.5* | 1.0 | 2.2 | 1.5* | 1.1 | 2.0 |

*Abbreviations:* CI, confidence interval; UI, unprotected intercourse; IUC, intrauterine contraception; OC, oral contraceptive; OR, odds ratio.
*$p = .05$; **$p < .01$; ***$p < .001$.
† Includes vaginal ring, contraceptive patch, injections, implant, and male or female sterilization.
‡ Includes no method, undecided and planning to use a low efficacy method such as natural family planning, withdrawal, diaphragm, and sponge.

which may contribute to the low levels of use. Although most women correctly rated IUCs as the most effective method, followed by OCs, and condoms, still a large proportion of women grossly underestimated the effectiveness of IUCs, which are among the most effective methods available (Hatcher et al., 2007). Those groups of women known to experience the highest rates of unintended pregnancy: African American, Latina, poor, and less educated women (Finer & Zolna, 2011), were the groups most likely to underestimate the effectiveness of all three methods. Knowledge of birth control effectiveness by race/ethnicity is somewhat consistent with the birth control methods women use at a national level. According to National Survey of Family Growth data, when compared with other racial/ethnic groups a smaller proportion of African-American women report current condom and IUC use and a larger proportion of White women report current OC use (Mosher & Jones, 2010). Similarly in this study, African-American women are less likely to trust the effectiveness of condoms and IUCs and white women were the most likely to trust the effectiveness of OCs, suggesting that contraceptive use may be influenced by the women's attitudes about the efficacy of these methods.

Other studies have shown that contraceptive users are more likely to hold positive contraceptive attitudes than those who do not use contraception (Bryant, 2009). This association is also reflected in our study; women planning to use a particular method more accurately estimated the effectiveness of that method. However, we do not know whether women's knowledge about contraceptive effectiveness preceded their decision to use a method or if the knowledge about the method's efficacy was gained after having chosen the method. Prior studies have found that perceived method efficacy influences the women's birth control choices (Lete et al., 2007; Wiebe, Trouton, & Dicus, 2010). Women may not be motivated to use contraception if they do not appreciate the effectiveness of using contraception (Nettleman, Brewer, & Ayoola, 2007).

The findings presented here should be considered in context with the study's limitations. Ideally, this study would have surveyed all women at family planning clinics. By restricting the sample to women who have never had an abortion, we missed the opportunity to learn about abortion clients' perceptions regarding the risk of conception. It is likely that women who have had an abortion have very different perceptions of pregnancy risk than women who have not. Furthermore, our questions assessing perceptions of risk of conception were developed for this study owing to the lack of other appropriate, validated measures. The development of validated measures to assess perception of risk would help to strengthen our understanding of the usefulness of this construct in understanding reproductive risk taking behaviors.

## Implications for Practice

Our findings suggest a need to strengthen women's knowledge about method effectiveness, particularly among women of lower educational and income levels and ethnic minority women. Improved understanding of the risks women take when they engage in unprotected sex and of the protective effects of using higher efficacy birth control methods has the potential to ensure more consistent contraceptive use. Enhancing women's knowledge about contraceptive efficacy and the risks of UI will enable women to make more informed decisions when deciding whether to engage in unprotected sex and choosing a method. Improving women's confidence in their ability to prevent pregnancy through contraceptive use may motivate women to use contraception when they do not desire pregnancy.

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