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A Mixed Methods Study of Contraceptive Effectiveness in a Relationship Context Among Young Adult, Primarily Low-Income African American Women

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Abstract

Background—Unintended pregnancy is an important public health issue. Rates of unintended pregnancy are disproportionately higher among women from racial and ethnic minority groups among whom rates of contraceptive use are lower. Women’s multifaceted feelings about pregnancy and perceptions of their intimate relationships may influence contraceptive behavior.

Methods—We used mixed methods to examine women’s perceptions of pregnancy, motherhood, and contraceptives within the context of their intimate relationships. A convenience sample of 130 primarily low-income African American women ages 18–29 completed a cross-sectional, computerized survey; 12 women provided in-depth qualitative interview data. Generalized linear mixed models were used to identify associations between study variables and contraceptive effectiveness. Interview data were analyzed using qualitative descriptive methods and integrated with quantitative data.

Results—Higher positive pregnancy attitude [odds ratio (OR) 0.78; 95 % confidence interval (CI) 0.63, 0.98], lower contraceptive attitude (OR 1.17; 95 % CI 1.01, 1.36), and more than one recent sexual partner (OR 0.03; 95 % CI <0.01, 0.60) were associated with less effective contraceptive use. Qualitative results included three themes: *You get pregnant that’s on you*; *Motherhood means everything*; and *Make sure you’re stable*. Women’s qualitative reports primarily supported but occasionally diverged from quantitative findings, reflecting discrepancies from their stated ideals, personal goals, and behavior.

Conclusion—The incongruities between women’s ideals and their actual contraceptive behavior demonstrate the complexity of making reproductive decisions based on existing life circumstances and challenges. Health care providers should have broad understanding of women’s pregnancy

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Compliance with Ethical Standards All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

goals in order to recommend the most appropriate contraceptive methods and pre-conception counseling.

Keywords

Contraceptive; Pregnancy attitude; Motherhood; Mixed methods; Relationships

Introduction

Unintended pregnancy is an important public health issue in the USA. More than half of pregnancies in the USA are unintended [1]. Unintended pregnancy rates are highest among young adult women ages 18–29, and women from racial and ethnic minority groups experience disproportionately higher rates of unintended pregnancy [1]. Unintended pregnancy is associated with poor maternal and fetal outcomes. During unintended pregnancies, women are more likely to smoke cigarettes [2], use drugs [2], have late initiation of prenatal care [3], and suffer from prenatal [4] and postpartum depression [5, 6]. Subsequently, unintended newborns are at increased risk for low birth weight and preterm birth [7].

Unplanned pregnancy may be reduced through effective contraceptive use. Among women at risk for unintended pregnancy, 11.4 to 13 % of women ages 20–29 use no contraceptive method [8]. Contraceptive use is lower among African American women compared to other women [8, 9], even though 60 % of African American women ages 18–29 believe pregnancy planning is important and 80 % desire to avoid pregnancy [10]. Access-related challenges that may contribute to lower contraceptive use by African American women include limited knowledge about contraceptives and available methods [11, 12], transportation difficulties [12], lack of insurance or lack of coverage for the desired contraceptive method [12], difficulty getting an appointment [13], and concerns about privacy at a community-based clinic [11]. Thus, ineffective contraceptive use is a significant risk that contributes to unplanned pregnancy, particularly for young adult African American women [1, 14].

Health care providers play an important role in counseling women on contraceptives and pregnancy [15]. In this study we sought to better understand contraceptive use among a group of young adult, primarily African American women seeking clinical care; our goal was to identify areas for clinical intervention to increase contraceptive use. Women's use of contraceptives is influenced by a variety of individual and interpersonal factors [16]. Women have multifaceted attitudes about pregnancy that may exist across a continuum [17, 18], where a woman can both not want to be pregnant yet not be upset when it occurs [19]. A related but distinct concept is attitude toward motherhood. African American women describe motherhood as meaningful and a source of respect [20] and are more likely to perceive pregnancy as having positive consequences [21]; however, attitude toward motherhood has not been examined in relation to contraceptive use. These outlooks could impact decisions around contraceptive use, as could attitudes toward and past experience with contraceptives [22]. There is a gap in knowledge related to the combined influence of attitudes toward pregnancy, motherhood, and contraceptives, indicating a need to study these

concepts within the same model of contraceptive use in order to understand their combined influence.

Contraceptive use may also be affected by intimate relationships or other social factors [23–25] and should be considered within a relationship context. Women’s perceptions of relationship trust [21, 26], relationship commitment [27], and the male partner’s desire for a pregnancy [23] may play a role in contraceptive use. These relationship qualities have been independently examined in studies of contraceptive use, but there is a gap in knowledge related to their potential combined influence. Reproductive coercion is associated with unintended pregnancy [28–30] but has not been studied in relation to contraceptive use; however, intimate partner violence is associated with contraceptive use and unintended pregnancy [31]. Additional research is needed to better understand the contribution of relationship characteristics to contraceptive effectiveness [27] while also considering individual attitudes and goals around contraceptives and pregnancy [16].

The purpose of this study was to address these gaps in knowledge by examining effectiveness of contraceptive use in terms of the combined influence of and attitudes about pregnancy, motherhood, and contraceptives within a relationship context. Because a single method of data collection reveals only a portion of what influences contraceptive use, we used mixed methods to provide a more comprehensive understanding of contraceptive use for a primarily African American sample of young adult women.

Methods

Design and Sample

This cross-sectional triangulation study was approved by the institutional review boards for Johns Hopkins Medicine and the Maryland State Department of Mental Health and Hygiene. Participants were recruited between November 2011 and June 2012 from two OB/GYN clinics and one family planning clinic, each serving predominantly socioeconomically disadvantaged women in Baltimore, Maryland. Women were eligible to participate if they were ages 18–29, had engaged in penile-vaginal sex in the past 90 days, and understood English. Exclusion criteria included current pregnancy, pregnancy within the past 90 days, hysterectomy, tubal ligation, and infertility. We sought to include low-income and African American women whom we expected to be at high risk for unintended pregnancy based on previous studies [1, 8, 9, 14].

An a priori power analysis identified 120 participants were needed, assuming 80 % power and level of significance of 0.05. The study survey was piloted with 20 women, followed by cognitive interviewing to identify survey strengths and unexpected issues. These data were used to refine the survey to its final form. We then recruited 134 participants to account for attrition. After reviewing the data, we excluded two participants who completed less than half the survey and two who did not meet inclusion criteria, leaving a final sample of 130.

Quantitative Data Collection

At two sites, clinical staff asked age-eligible patients if they were interested in speaking with a recruiter about the study. With permission, the recruiter approached patients privately in

the exam room, provided study details and informed consent, and enrolled interested participants. At the other site, a recruiter approached patients in the clinic waiting room. Patients who expressed interest in the study were taken to a private office where they received study details and informed consent. At all sites, participants completed the survey in a private location using audio computer-assisted self-interview (ACASI) (QDS™ Version 2.5). Participants received a \$20 gift card upon survey completion.

Quantitative Measures

Effectiveness of Contraceptive Use—There is no universally agreed upon measure for contraceptive effectiveness. We classified participants as *highly effective contraceptive users* or *less effective contraceptive users* based on detailed questions about contraceptive use during the 90 days prior to survey completion. We first asked if the participant had used any method to prevent pregnancy in the past 90 days. If yes, she identified which of 14 possible methods she used and answered specific questions for each method identified. Classification of contraceptive effectiveness was guided by data on the likelihood of method failure within the next year [32] and agreed upon by three clinical experts. Participants who used an intrauterine device (IUD), implant, injectable contraceptive, ring, patch, or pill for the entire 90-day period prior to the survey were classified as highly effective users. Those who used male condoms, female condoms, rhythm/fertility awareness methods, withdrawal, or a diaphragm at *every act* of vaginal sex were also classified as highly effective users. Participants who inconsistently used male condoms, female condoms, rhythm/fertility awareness methods, withdrawal, or a diaphragm and those who used the sponge or spermicide with any degree of consistency were classified as less effective contraceptive users. Participants using multiple methods over the past 90 days were classified based on the most reliable method used; those who used a method for only a portion of the previous 90 days were classified based on the most current method used at the time of the survey.

Attitude Toward Pregnancy—The Attitude Toward Potential Pregnancy Scale (APPS) [33] is a five-item instrument that asks the degree to which a woman wants to become pregnant, wants to avoid pregnancy, and how happy, worried, or upset she would be about a pregnancy. Higher scores correspond to more positive pregnancy attitude. The scale has internal consistency of 0.86 in the present study.

Importance of Motherhood—Five questions from the National Survey of Fertility Barriers assessed importance of having and raising children and sense of fulfillment related to being a parent. Lower scores are associated with greater importance of motherhood. The scale has reliability of 0.86 with a nationally representative population [34]; internal consistency is 0.78 in the present study.

Contraceptive Attitude—This 32-item measure assesses attitudes toward use of contraceptives, as influenced by perceived effectiveness, impact on sexual experiences and relationships, side effects, and access to contraceptives [35]. Higher scores reflect more positive attitudes toward contraceptives. Internal consistency for the current study is 0.79.

Relationship Characteristics—Four variables were used to understand relationship characteristics between women and their sexual partners. We assessed each variable for up to three sexual partners within the past 90 days. *Relationship Duration* was calculated by asking the month and year participants began relationships with partners; results were dichotomized into less than 2 years versus 2 or more years. We measured *Relationship Commitment* with four questions that assessed the participant's level of commitment to her partner and investment in the relationship [36]; higher scores reflect higher commitment. Internal consistency for the current study is 0.73. *Relationship Trust* was measured with the Dyadic Trust Scale, an 8-item tool measuring the extent to which a person believes her partner to be truthful and benevolent [37]; lower scores indicate higher trust. The scale was developed with men and women ages 18–30 with internal consistency of 0.93. In the current study, internal consistency is 0.87. *Reproductive Coercion* was measured using nine questions with yes/no responses that assess pregnancy coercion and birth control sabotage in two subscales [28, 29], which we analyzed separately. Finally, we adapted the five questions from the APPS [33] to create the Perceived Partner Attitude Toward Potential Pregnancy Scale. This scale measured women's perceptions of their partners' positive and negative emotions toward potential pregnancy. Internal consistency for the scale is 0.83. Exploratory factor analysis showed support for construct validity.

Demographic and Pregnancy Variables—Participants reported age, race, education, monthly income, employment, health care coverage (medical assistance or private insurance), and perceived money and/or resources to obtain contraceptives. We accounted for pregnancy history, including ever having been pregnant or given birth, unplanned pregnancy, miscarriage, abortion, and number of abortions. Participants reported the number of sexual partners they had in the past 90 days, dichotomized into one partner versus more than one.

Quantitative Analysis

Analyses were conducted using Stata Statistical Software Release 11. Chi-square, Fisher's exact, and *t* tests were used to compare highly effective and less effective contraceptive users across demographic variables. We used a generalized linear mixed model [38] to study the associations between independent variables and contraceptive effectiveness. This model accounted for multiple recruitment sites and repeated measure data from participants with multiple sexual partners by including random effects for recruitment site and participant. The first stage consisted of building bivariate models. Predictor variables with $p < 0.15$ were entered into multivariate models adjusting for age, education, marital status, and health care coverage, each of which was known from previous studies to predict contraceptive use [16]. In the multivariate modeling, predictors significant at $p < 0.05$ were included and entered jointly into a main effects model with the same four core demographic variables. Akaike's Information Criteria (AIC) values were compared to assess model fit.

Qualitative Data Collection and Analysis

All participants were asked at time of enrollment if they were willing to participate in a follow-up interview. Participants were purposively selected for interview [39, 40] to achieve maximal variation in perspectives [39], using a three-tiered approach. Our first criterion was

to achieve representation from both highly effective and less effective contraceptive users and interview women with a wide range of scores on the APPS. Secondly, we included women with multiple sexual partners and those with and without children. Finally, we examined age range and education to ensure demographic variability. Interviews were conducted with a semi-structured interview guide, took place in person or via telephone and were audio recorded with participant permission. We interviewed 12 participants (Table 1), at which point the data were saturated with no new themes emerging [41]. Each interviewee received another \$20 gift card after the interview.

Interviews were organized in Atlas.ti version 6.2 and analyzed with qualitative descriptive methods [42, 43]. The first author analyzed the transcripts using open coding to identify preliminary themes and kept memos of responses to the data [41]. As new codes and themes were identified, previous transcripts were re-explored for these themes using constant comparison [44] and reviewed by two additional study team members with expertise in qualitative and mixed methods research. Upon completion of coding, themes were compared and collapsed [41] into a final list reviewed and agreed upon by the study team. The qualitative and quantitative were integrated after analysis by comparing and contrasting findings [45].

Results

Descriptive Data

Table 2 presents demographic characteristics for the sample. The mean age of the sample was 24.6 (range 18–29; standard deviation 2.98). Forty-nine percent of the sample was currently employed; 45 % had education beyond high school. Participants were primarily low-income; 68 % had either medical assistance or private insurance. Just over 43 % were co-habiting; an additional 7.7 % described themselves as married. There were no significant differences by demographic characteristics between groups. When recruitment sites were compared across demographic characteristics, only health care coverage was significantly different between sites.

Of the 130 participants, 101 (77.7 %) reported using a contraceptive method in the past 90 days. The main method used was an injectable contraceptive (24.6 %), followed by the male condom (19.2 %), pill (13.1 %), IUD (11.6 %), withdrawal (3.9 %), vaginal ring (2.3 %), patch (1.5 %), and implant (1.5 %). No participants used emergency contraception, female condom, rhythm or timing methods, spermicide, diaphragm, or sponge as their main contraceptive method. Eighty-one participants (62.3 %) were classified as highly effective contraceptive users. Thirty-two participants (24.6 %) had two or more sexual partners in the previous 90 days. A total of 20 participants (15.4 %) reported experience of reproductive coercion. Eighty-nine (68.5 %) of the 130 study participants had been pregnant at least once in the past. Of those, 68 (76.4 %) had experienced an unplanned pregnancy and 51 (57.3 %) reported having an abortion. The median number of children for the participants was 1 [inter-quartile range (IQR) 0–2]. The median number of abortions was also 1 (IQR 0–1).

Bivariate Analysis

Demographic Variables—No demographic or pregnancy variables were statistically associated with effectiveness of contraceptive use for the study sample (Table 3).

Attitude to Pregnancy and Contraceptives and Importance of Motherhood—Pregnancy attitude [odds ratio (OR) = 0.78; 95 % confidence interval (CI) 0.63, 0.98] and contraceptive attitude (OR = 1.17, 95 % CI 1.01, 1.36) were significantly associated with effectiveness of contraceptive use (Table 4), indicating that positive pregnancy attitude is associated with less effective contraceptive use and higher contraceptive attitude is associated with more effective contraceptive use. As the score increased for importance of motherhood, indicating that motherhood was less important, the odds of being a highly effective contraceptive user increased more than fourfold, but this result was not statistically significant (Table 4).

Relationship Characteristics—Perceived partner pregnancy attitude (OR = 0.86; 95 % CI 0.72, 1.02) was statistically significant at $p < 0.15$, indicating that as a woman perceives her partner's pregnancy attitude to be more positive, her effectiveness of contraceptive use decreases (Table 4). Also significant were the number of sexual partners in the past 90 days (OR = 0.03; 95 % CI <0.01, 0.60) and birth control sabotage (OR = 0.01, 95 % CI <0.01, 3.70). The odds ratios for relationship duration (OR = 1.87; 95 % CI 0.31, 11.37) and relationship commitment (OR = 1.78, 95 % CI 0.67, 4.74) suggest that women in longer relationships and those more committed to their relationship may be more effective contraceptive users; however, these results were not statistically significant nor were the results for level of trust in the sexual partner or pregnancy coercion (Table 4).

Multivariate Analysis

A thorough bivariate analysis revealed that pregnancy attitude, contraceptive attitude, birth control sabotage, number of sexual partners in the past 90 days, and perceived partner pregnancy attitude were significantly related to effectiveness of contraceptive use at $p < 0.15$ and were thus retained in the multivariate analysis. We calculated adjusted odd ratios (AOR) and CIs for each variable after controlling for age, health care coverage, education, and marital status (Table 4). Pregnancy attitude (AOR 0.77; 95 % CI 0.60, 0.98), contraceptive attitude (AOR 1.77; 95 % CI 1.04, 1.31), and number of partners (AOR 0.04; 95 % CI 0.003, 0.68) were significant at $p < 0.05$. Perceived partner pregnancy attitude was not significant nor was birth control sabotage. We estimated main-effects models using the three significant variables along with the four core demographic variables (age, health care coverage, education, and marital status). Based on the lowest AIC, the best fit occurred when all seven variables were accounted for in the model (Table 4).

Qualitative Results

Three themes emerged in the qualitative interviews: *You get pregnant, that's on you*; *Motherhood means everything*; and *Make sure you're stable*.

You Get Pregnant, That's on You—There was a strong sentiment among most participants in the study that if a woman engages in sex, it is her responsibility to protect

herself from unwanted pregnancy. As one 25-year-old highly effective contraceptive user put it,

If you're not doing nothing to prevent pregnancy and you get pregnant, that's on you.

Although participants set a high standard, protecting themselves from unwanted pregnancy was not an easy task. Eleven of the twelve interviewees discussed challenges with contraceptive methods. Participants had difficulty remembering to take the pill every day, found the IUD uncomfortable, did not like the feeling of condoms, reported weight gain and excessive bleeding with injectable methods, and aesthetic dislike of methods like the patch and ring. They expressed varying levels of willingness to put up with side effects.

Difficulty with contraceptives sometimes led to sexual risk-taking and unintended pregnancy. One woman recounted her experience forgetting to take birth control pills, which led to a pregnancy at age 14. This participant went on to have her baby, but another participant who became pregnant at 13 opted for an abortion. There was a pervasive idea that abortion was something to be avoided, yet many women in the study found themselves having to make the difficult decision to terminate a pregnancy because they knew they could not support a child. One 28-year-old participant recounted a recently planned and wanted pregnancy that ended in termination after her partner left her:

He knew he was getting me pregnant, but then, all of sudden, he just left. (less effective contraceptive user)

This participant perceived the burden of dealing with the pregnancy as hers alone. Many participants expressed an awareness that family help was not guaranteed in the event of an unplanned pregnancy. They also did not necessarily have social support surrounding contraceptive decision making. They were often not sure which contraceptive methods their friends used; several stated that they did not discuss contraception with friends. At best, some women heard rumors about different methods, which often consisted of worst-case scenarios. Because of the lack of shared information in their social community, contraceptive decision making was a responsibility many women in the study perceived as shouldering alone from an early age without the benefit of experience or support. When subsequent contraceptive use was less effective and resulted in unplanned pregnancy, they continued to perceive lack of social support related to the pregnancy.

Motherhood Means Everything—Most participants viewed motherhood as an important role, whether or not they had children. They described motherhood as a responsibility and lifetime commitment, in which potential or actual children were their highest priority. They wanted to be good mothers, desiring for their children to have more than they had themselves growing up. A 25-year-old mother of three said of motherhood,

It means everything to me. It's like I have somebody that looks up to me and depends on me, and I love that. I love being a mommy. I wouldn't change it for anything, even though I had my kids young, but I wouldn't change it for anything. (highly effective contraceptive user)

Many participants felt that other women in their communities had children for the wrong reason, including wanting to keep a partner, receive money from social services, dress up a baby, or because they were lonely. These participants were critical of what they perceived as mothering that failed to meet their standards and expressed disappointment in the way these women did not take being a mother seriously; being on and off with boyfriends, giving social services checks to a boyfriend instead of using it to meet children's needs, leaving the baby with someone else to go out at night, and lack of action to protect themselves from pregnancy were not regarded positively. Participants with these views desired to distance themselves from these women and focus on taking care of their own responsibilities. One 28-year-old participant applied her childhood experience observing her parents in the streets using drugs and seeing behaviors she did not like in other women as motivation to help her meet her own goals and ideals related to motherhood:

It changed my whole lifestyle, on how I decide on doing everything. It gives me the motivation to want to be a wonderful mother to my daughter, to strive to do more, just so I don't end up in the situations like they did. (highly effective contraceptive user)

In spite of positive feelings surrounding motherhood, the participants in the study described a range of feelings about potentially becoming pregnant. Some were adamant they did not want a pregnancy because they did not want more children. A few participants did not want a pregnancy now but felt that, if it happened, they would get through it. These participants tended to lack financial or relationship stability or were working on other goals, which led them to conclude it was not a good time for pregnancy. Others said they would be happy whether or not they were pregnant; these participants were often with a partner with whom they would like to have a child. Two participants stated they would be happy if they found themselves to be pregnant. One was in a new relationship and not using a contraceptive method. The other was in a long-term relationship and, although she found the idea of having a child appealing, she did not think it was the ideal time for pregnancy, financially. The participants' contraceptive use often did not match their expressed feelings about pregnancy. They tended to describe ideal circumstances, but real-life contraceptive decisions balanced these perspectives of motherhood with actual financial situations, career goals, current partners, and social support.

Make Sure You Are Stable—Most women in the study viewed the best time to have children as when they were in stable relationships with adequate income. They wanted to be in committed relationships involving trust, honesty, communication, and monogamy before getting pregnant. Participants perceived that their sexual partners could leave them at any time, which impacted decisions about contraceptives. One 28-year-old participant used an IUD to prevent pregnancy because,

Given time, he could just up and leave, in the middle of my pregnancy, or after I have the baby he could decide he don't want to be there anymore.

Many women in the study wanted to be married before having children to provide a solid foundation and greater resources for raising a child. One participant felt strongly that being married was not necessary, citing herself as an example, but believed that parents should be

truly partnered. The concept of raising a child in a committed two-parent family represented a critical source of stability for potential offspring. Many participants were raised in single-parent households or by other family members and did not want their children to have the same experience. For the participant who had recently had an abortion, the importance of a two-parent family contributed to her decision:

Because I didn't want my child to grow up without a father. I didn't want to put it through that. (less effective contraceptive user)

The participant was devastated at making this choice and desperately wanted to be a mother; she viewed the cost of not having a father as outweighing the benefit of continuing the pregnancy.

Discussion

Consistent with previous findings [46, 47], we found that contraceptive behavior and childbearing are highly complex. Schwarz and colleagues [48] found that women who were ambivalent about pregnancy were less likely to use an effective contraceptive method. This is similar to our finding that effectiveness of contraceptive use decreases as women's pregnancy attitude becomes more positive. Our finding that contraceptive attitude was associated with less effective contraceptive use is also consistent with previous research [49]. Our study also brings new knowledge. Our finding that women with more than one recent sexual partner were less likely to be effective contraceptive users could be a reflection of switching partners and subsequently changing contraceptive methods [50], but may also reflect other issues. In order to explore this further, detailed information about the timing of each sexual relationship and contraceptive method used is needed in future studies.

Motherhood was taken seriously by women in the study, and they placed responsibility on themselves and others to be good mothers. When they observed that other women in their environment did not live up to these expectations, their response was to withdraw socially and focus on making sure they did what was best for their own children. Although importance of motherhood did not reach statistical significance, the strong odds ratio and wide confidence interval suggest that it would be statistically significant with a larger sample.

Although in the best-fit model only pregnancy attitude, contraceptive attitude, and number of partners were significantly associated with effectiveness of contraceptive use for this sample, our qualitative findings indicate other important contributing factors. One explanation for this seeming discrepancy is the relatively small sample size for the study, which limits power to detect additional significant results. A better explanation may lie in understanding the discordance between what women want and their actual life circumstances and the difficulty of fully capturing this complexity through quantitative measures.

The women in the study reported their desire to have children in a stable relationship involving trust and commitment. In this context, trust would be an expected significant predictor; however, women in the study were not necessarily in sexual relationships with men they trusted. In the survey, we addressed participants' level of commitment to the

relationship but not their perceptions of their partners' commitment. The qualitative data showed that women's perceptions of partner commitment was a topic of importance and should be considered in future research. Despite participants' stated values regarding relationship stability, there was no discernible difference between highly effective and less effective contraceptive users in the qualitative data. This is consistent with the lack of statistically significant associations found in the quantitative analysis.

Another contributor to the incongruity between reported desires/ideals and behavior lies in the way the women saw themselves as solely responsible for contraceptive and reproductive decisions, a construct that crossed all the qualitative themes. Participants reported that women should use a contraceptive method if they do not want to be pregnant, and they reported making decisions about contraceptives without seeking social support from friends or community members. They saw themselves as being alone, generally opting to learn from their own negative contraceptive experiences, and rarely drawing from the experiences of others in their social communities. Ideologically, they did not support abortion but accepted that they sometimes had to terminate a pregnancy when they could not support a child, also making this value-laden and conflicted decision alone. Similar perceptions of perceived lack of social support have been described in other research with primarily low-income African American and Hispanic samples [51, 52]. This suggests a possible cultural or socioeconomic component to reproductive decision making. Women's identification of lack of social support may suggest a perceived benefit from improved social support, which should be explored in future studies.

This is not the first study to highlight the disagreement between ideal values and behaviors. Based on their work with African American women, Kendall and colleagues [53] suggested that women's perceived lack of control over their circumstances may contribute to contraceptive use. Participants in our study thought pregnancy should be planned, yet of those who had been pregnant all but one had experienced an unplanned pregnancy. Only one participant talked about actively planning a pregnancy. She was in an on-going state of trying to become a mother, an elusive goal due to lack of a stable relationship. Her story was consistent with those described by Dunlap and colleagues [54], who, in their work with inner-city women, discovered participants deeply desired to have a long-term relationship in which they could have a child. Participants in that study often thought they were in the right relationship and became pregnant, only to find that the relationship eventually dissolved, even before the child was born.

Although many of the variables in the survey did not contribute enough independently to achieve statistical significance, the combination of variables may be important. Given the extent to which women described the importance of motherhood and stability, including trust and commitment, it would be imprudent to discount these relationship qualities merely because they did not reach statistical significance in this study. Reproductive coercion was reported by 15.4 % of participants, which is comparable to other clinic-based studies [55–57] in which 5–16 % of participants reported experience of reproductive coercion. In a recent qualitative study, African American women were more likely than White women to describe reproductive coercion [58], suggesting a possible racial or ethnic health disparity that should be explored. Further model testing with a larger sample could help elucidate the

ways in which individual, social, and relationship characteristics contribute to contraceptive use.

There are several limitations to this study. The convenience sample is homogenous, recruited from one geographic area, and limited to women presenting for care in clinical settings. Effectiveness of contraceptive use was measured retrospectively and is subject to recall bias. Some interviews were fairly brief, possibly because women were not accustomed to discussing contraceptive and reproductive decisions with others. Additionally, important potential cultural differences in decision making have been highlighted that we are unable to link to contraceptive use due to sample composition. We recommend that future studies include a racially and ethnically stratified sample in order to make cultural comparisons across groups. This is particularly important given the known disparities in unintended pregnancies and racial/ethnic differences in contraceptive use [59, 60].

Strengths of the study include pilot testing the survey with cognitive interviewing, use of ACASI to collect data on sensitive topics, development of new scales to assess attitude toward pregnancy and perceived partner attitude toward pregnancy, measurement of effectiveness of contraceptive use in a clinically meaningful way, and the focus on and successful recruitment of a group of women at high risk for experiencing reproductive health disparities. Use of mixed methods to capture multiple facets of and underlying contributors to contraceptive behavior for young adult women was a particularly important aspect of our study, allowing for more nuanced understanding of women's experiences, identification and explanation of inconsistencies between ideals, behavior, and reality, and providing direction for future studies.

Conclusions

Contraceptive use is highly complex and influenced by individual and relationship factors. Our results indicate that attitudes toward pregnancy, motherhood, and contraceptives, as well as relationship characteristics, all combine to influence contraceptive use. In order to give the most relevant pregnancy prevention counseling, health care providers offering contraceptive services should have a broad-based understanding of women's pregnancy goals, their relationships, and their lives. Future studies should focus on development and testing of clinical tools that have the capacity to comprehensively assess women's pregnancy goals and contraceptive needs within the brief span allotted at clinical visits. Such tools may facilitate culturally appropriate, individualized counseling for young women at risk for unintended pregnancy and help them to have frank discussions about contraceptives, improving the relevance and focus of interactions with health care providers. There should also be a focus on developing interventions to assist women in achieving their goals to become good parents, have improved relationships, and achieve financial stability to promote positive reproductive health and social outcomes.

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Table 1Characteristics of women participating in qualitative interviews ($n = 12$)

Characteristic	Number	%
Effectiveness of contraceptive use		
High	7	58
Low	5	42
Age		
18–24	6	50
25–29	6	50
African American/Black	9	75
Education		
High school	5	42
Some college/trade school	5	42
2-year college	2	16
Has children	6	50
>1 recent sexual partner	7	58

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Table 2

Demographic characteristics of study sample

Variable	Overall		Highly effective		Less effective	
	n	%	n	%	n	%
Age in years, mean	24.6		24.7		24.5	
Race						
African American/Black	109	83.8	65	80.3	44	89.8
Other	21	16.1	16	19.7	5	10.2
Education						
High school	72	55.4	43	53.1	29	59.2
Some college/trade school	24	18.5	14	17.3	10	20.4
Completed 2-year college	34	26.1	24	29.6	10	20.4
Employed	64	49.2	43	53.1	21	42.9
Health Care Coverage						
Insurance/medical assistance	88	67.7	57	70.4	31	63.3
Income ^a						
\$708	68	53.1	40	50	28	58.3
\$709–908	22	17.2	13	16.3	9	18.8
\$909–6966	38	29.7	27	33.7	11	22.9
Relationship status						
Married/co-habitating	66	50.8	43	53.1	23	46.9
Never married	54	41.5	33	40.7	21	42.9
Other	10	7.7	5	6.2	5	10.2

^aTwo participants refused to answer, one from each group

Table 3

Unadjusted odds ratios and 95 % confidence intervals for effectiveness of contraceptive use by demographic and pregnancy variables (*n* = 130)

Variable	OR	95 % CI	<i>p</i> value
Race			
Other (ref)	1.0		
African American/Black	0.08	0.001, 4.66	0.23
Employed	4.11	0.27, 62.90	0.31
Income			
\$708 (ref)	1.0		
\$709–908	0.92	0.03, 32.92	0.96
\$909–6966	5.60	0.22, 140.40	0.30
Money/resources for contraceptives	1.02	0.02, 54.76	0.99
Ever pregnant	1.20	0.07, 20.43	0.90
Ever given birth	0.99	0.71, 1.40	0.97
Number of living children	1.00	1.00, 1.00	0.45
Previous unplanned pregnancy	0.98	0.70, 1.38	0.91
Previous abortion	0.96	0.69, 1.35	0.83
Number of abortions	1.00	1.00, 1.01	0.91

Data rounded to second decimal point

OR odds ratio, *CI* confidence interval

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Unadjusted odds ratios and 95 % confidence intervals for effectiveness of contraceptive use by major independent variables and the best-fit final adjusted main-effects model ($n = 130$)

Table 4

Variable	Unadjusted odds ratios			Final model		
	OR	95 % CI	p	AOR	95 % CI	p
Age	1.02	0.65, 1.59	0.93	0.97	0.62, 1.51	0.88
Health care coverage	3.58	0.22, 57.21	0.37	2.85	0.20, 41.05	0.44
Education						
High school (ref)	1.0			1.0		
Some college/trade school	0.83	0.03, 25.97	0.92	0.37	0.01, 9.63	0.55
2-year college	4.92	0.19, 129.66	0.34	2.72	0.11, 67.82	0.54
Relationship status						
Married/co-habiting (ref)	1.0			1.0		
Never married	0.52	0.04, 7.79	0.64	0.28	0.01, 5.43	0.40
Other	0.10	<0.001, 14.93	0.37	0.18	0.001, 30.16	0.51
Pregnancy attitude	0.78	0.63, 0.98	0.03	0.77	0.60, 0.98	0.04
Contraceptive attitude	1.17	1.01, 1.36	0.03	1.77	1.04, 1.31	0.01
Number of partners						
1 partner (ref)	1.0					
2 partners	0.03	<0.01, 0.60	0.02	0.04	<0.01, 0.68	0.03
Partner pregnancy attitude	0.86	0.72, 1.02	0.09	-	-	-
Birth control sabotage	0.01	<0.01, 3.70	0.12	-	-	-
Pregnancy coercion	0.08	<0.01, 3.99	0.20	-	-	-
Importance of motherhood	4.66	0.49, 43.89	0.18	-	-	-
Relationship duration						
<2 years (ref)	1.0					
2 years	1.87	0.31, 11.37	0.50	-	-	-
Relationship commitment	1.78	0.67, 4.74	0.25	-	-	-
Relationship trust	0.95	0.87, 1.04	0.25	-	-	-

Data rounded to second decimal point. Main-effects model adjusted for age, health care coverage, education, and marital status. Race, employment, income, money/resources for contraceptives, and pregnancy variables were considered for the final model but not included. Best-fit model determined by lowest AIC.

OR odds ratio, AOR adjusted odds ratio, CI confidence interval