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Higher Contraceptive Knowledge Not Associated with More Effective Method Use in a High-Risk Minority Population at an Urban Title X-Funded Teen Services Clinic

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Abstract

Higher Contraceptive Knowledge Not Associated with More Effective Method Use in a High-Risk Minority Population at an Urban Title X-Funded Teen Services Clinic

By Jessica Kaplan

Objectives:
The goal of this secondary analysis was to determine if contraceptive knowledge was associated with contraceptive method use in a high-risk African-American population at an urban Title X-funded teen clinic.

Methods:
We recruited females aged 14-19 years old from an urban teen clinic from April-September 2012 and asked them to complete a cross-sectional survey to assess contraceptive use. Questions assessed last birth control method (BCM) used, contraceptive attitudes and knowledge, and factors considered when choosing the last BCM. Logistic regression was used to analyze the data in SAS 9.4.

Results:
Of 350 participants, 258 had ever used contraception. Compared to those who had used a less effective or no method as their last BCM, those who had used a long-acting reversible contraceptive (LARC) had similar odds of having higher contraceptive knowledge (OR=1.04, 0.36-3.03), while those who had used the pill, injectable, ring, or patch had decreased odds of having higher knowledge (OR=0.40, 0.22-0.74) when controlling for age, education, pregnancy history, and previous clinic visits. Reasons cited as important in contraception decisions were efficacy at preventing pregnancy (63%), partner acceptability (25%), method accessibility and ease of use (42%), and ability to induce amenorrhea (37%).

Conclusions:
Higher contraceptive knowledge was not associated with LARC use in this population of minority adolescents at high risk for unintended pregnancy. While accurate knowledge of method efficacy may be one important factor for providers to address with adolescents, counseling approaches that aim to elicit and respond to patient values and preferences when selecting a contraceptive method may help to improve correct and consistent contraceptive use.

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INTRODUCTION

Rates of adolescent pregnancy in the U.S. have been declining but still remain the highest among industrialized countries [1, 2]. Each year, over 600,000 teens become pregnant [3] and give birth to 250,000 babies in the U.S. [4] Over 80% of teen pregnancies are unintended [5], and they are associated with medical, public health, social, and economic consequences [1, 2, 6]. Unintended pregnancy rates differ by race, ethnicity, and income; non-Hispanic Black and Hispanic women have two times higher rates of unintended pregnancy than white women in the United States [2-4].

Studies suggest these disparities may be at least partially explained by unequal utilization of effective methods of contraception. Long-acting reversible contraceptives (LARC), including the intrauterine device (IUD) and contraceptive implant, remain the most effective method of birth control and are considered first-line for adolescents [7, 8], yet usage is low amongst all adolescents in the U.S. [8, 9]. Furthermore, Hispanic and non-Hispanic Black women are more likely to use no contraception or less effective methods of contraception than to use a highly effective method compared to white women [10-13], and these disparities do not appear to be fully explained by socioeconomic status, reproductive characteristics, or utilization of healthcare [14]. These disparities are concentrated among young women ages 15-19 years [13]. Although we do not yet possess a full understanding of what underlies these discrepancies, differing patient attitudes towards and knowledge of contraceptive methods may be contributing factors [13].

Prior research examining contraceptive knowledge and attitudes amongst adolescents of all races and ethnicities have found generally low knowledge levels. Adolescents and young women aged 10-24 years demonstrated limited knowledge about contraceptive methods, contraceptive efficacy, and contraceptive side effects in a North American multi-center study [1]. In the U.S. National Survey of Reproductive and Contraceptive Knowledge, 18-19 year olds had

lower awareness of contraceptive methods and lower knowledge about individual methods compared with 20-29 year olds [15]. Studies regarding specific methods have found similar trends, including a lack of knowledge among teens and young adults regarding the contraceptive vaginal ring [16]; lower knowledge and awareness about the etonogestrel implant [17], intrauterine devices [18-20], and both implants and IUDs [21, 22].

Furthermore, differences exist in contraceptive knowledge between races and ethnicities. Hispanics had lower awareness and knowledge of contraceptive methods compared with white women, with older adolescents aged 18-19 years exhibiting more prominent disparities than young women ages 20-29 [15]; white teens are more likely to demonstrate higher LARC knowledge compared to other races [8]; African American adolescents and young women exhibited lower awareness of newer methods and significant concerns about side effects [23, 24], with participants sometimes equating effectiveness with seriousness of side effects [24]. Lower contraceptive knowledge, misconceptions, and safety concerns may be more prevalent in poor and minority communities, contributing to these method use disparities [12, 25].

An important question is whether contraceptive knowledge is associated with method use and can thus serve as a target for intervention in order to increase rates of effective method use in minority adolescents. There have been mixed results when assessing the association between knowledge levels and method use amongst young women, and most of these studies have included young adults (18-29 years) rather than younger adolescents (14-18 years). Even fewer studies have focused on racial differences between knowledge and method use in younger adolescents. In a population of 18-29 year olds surveyed in the National Survey of Reproductive Health and Contraceptive Knowledge, higher contraceptive knowledge was associated with reduced odds of expecting to have unprotected sex in the next three months and increased odds of currently using a hormonal or long-acting method [26]. In a subset of this same population, high IUD knowledge was associated with LARC use among 18-29 year old participants [27]. Ryan et

al. found an association between higher reproductive health knowledge and higher odds of having ever used contraception using data from the National Longitudinal Study of Adolescent Health (ages 15+) [28]. However, other studies report no or limited association between increased knowledge and contraceptive behavior. Rocca et al. found that lower contraceptive knowledge only partially explained Latinas' use of less effective methods in a mediation analysis using the National Survey of Reproductive Health and Contraceptive Knowledge data (18-29 year olds) and did not explain African American young women's use of less effective methods [12].

Whether contraceptive knowledge is associated with method use in minority adolescent populations needs further clarification in order to determine if improving knowledge may lead to increased use of effective methods. Literature evaluating contraceptive attitudes and knowledge among racial minority adolescents (15-19 years old) and their association with method use is limited. Additionally, most of the studies evaluating the ways in which minority adolescents choose contraceptive methods are qualitative [24]; adding quantitative studies to the existing literature will allow us to analyze opinions of greater numbers of adolescents and develop interventions that help adolescents choose effective methods, thus reducing disparities in adolescent reproductive health outcomes.

This study aimed to explore this association in an urban African-American adolescent population, a group at high risk for unintended pregnancy and lower usage of highly effective methods. We also examined factors that young women cited as influential in making their contraceptive decisions. We hypothesized that higher contraceptive knowledge would be associated with use of more highly effective contraceptive methods in this high-risk population. Provider visits are an opportunity to counsel adolescents, and we hoped to learn more about key targets for intervention during visits with adolescents in order to increase use of effective contraceptive methods and reduce rates of unintended pregnancy in this population.

METHODS:

Data Collection

This cross-sectional survey was part of a mixed methods study to assess attitudes and practices surrounding the prevention of pregnancy and sexually transmitted diseases (STDs) among African American adolescents. It was conducted at a Title-X funded hospital-based clinic serving a high-risk urban population. Survey participants were recruited between April and September 2012. Participants were eligible to participate if they were female, aged 14-19 years, had vaginal sex with a male partner within the past 6 months, self-identified as US-born African American, and sought clinical care on the day of recruitment. Institutional Review Board approval (including a waiver of parental consent to protect confidentiality of teens' service use) was given by the Centers for Disease Control and Prevention and Emory University.

Teens were approached in the clinic waiting area and, if interested, were taken to a private area to discuss the study with a member of the research team. Interested and eligible teens completed informed consent and assent. Participants completed the survey using an Audio Computer-Assisted Self-Interviewing platform with individual tablet computers and headset. All participants were given a $20 gift card.

Survey and Data Analysis

Survey topics included demographic characteristics, family background, reproductive history, contraceptive use, and knowledge and attitudes towards contraceptive methods. Knowledge of effective contraceptive methods (long-acting reversible contraceptives and hormonal methods) was assessed by asking if participants had ever heard of LARCs (IUD or implant), followed by 10 true/false statements that addressed common misperceptions about LARCs and hormonal methods (pill, injection, patch, vaginal ring), as well as factors thought to influence their use, developed from focus group discussions. Some questions were similar to those asked in the 2009 National Survey of Reproductive and Contraceptive Knowledge and the

2011-2013 National Survey for Family Growth (conducted by CDC's National Center for Health Statistics). Responses were coded as correct or incorrect. A composite knowledge score of the 10 true/false statements was calculated (# correct/10). An additional dichotomous variable was created encompassing high knowledge, meaning at least 8/10 of questions correct. This cut-off was determined by the investigators and established to include the respondents with the upper 33% of knowledge scores. Thus contraceptive knowledge was analyzed as both a continuous and dichotomous variables; both methods have been utilized in previous studies [8, 16, 17, 26, 27].

We created a 3-level variable for last contraceptive use based on efficacy according to the World Health Organization recommendations [29]: long-acting reversible contraceptives (IUDs and implants) as the most effective group, hormonal methods excluding implants (pill, patch, vaginal ring, injectable) as a moderately effective group, and condoms only/withdrawal/other method/no method as the least effective group. These last categories were grouped together so that we could analyze the use of the more effective contraceptive methods. If use of more than one method was reported, participants' responses were coded as using the most effective method.

Student t-tests for continuous variables and chi-square analyses for categorical variables (coded dichotomously) were used for descriptive statistics and to assess significance of bivariate relationships. We used multivariate logistic regression to estimate the association between method use, knowledge variables, and other covariates. Covariates for regression were selected based upon crude association with the outcome (method use) or exposure (mean knowledge and high knowledge), based on confounding triangle and directed acyclic graph analysis, and based on a priori selection from the literature. Variables included in logistic regression were age, education, history of prior pregnancy, and history of previous clinic visit. SAS version 9.4 (SAS Institute Inc, Cary, NC) was used for analyses.

RESULTS

Study Population

We approached 698 young women during the study period; 173 declined to be screened for eligibility. Of the 525 women screened, 374 (71%) were eligible and 350 (93% of all eligible) were enrolled. The most common reason for not being eligible was not having sex with a male partner in the past 6 months (78%, 118 of 151).

The demographic and descriptive characteristics of our participants are presented in Tables 1-2. Most participants were 17 years of age or older (65.1%; Table 1). The majority had some form of insurance (75.4%) and had completed part of 11th grade or more (54.9%). More than one-quarter (26.3%) of participants reported a previous pregnancy. More than 80% indicated they did not want a pregnancy in the next 6 months. 73.7% reported ever having used contraception, with the largest percentages having last used the injectable (35.7%), male condoms (18.9%), and the pill (17.4%); only a small minority had used IUDs (2.0%) or implants (5.1%), when multiple selections were allowed (data not shown). When analyzing the most effective last method used, 7.1% had used an IUD or implant, 59.1% had used the injection, pill, patch, or ring, and 33.7% had used condoms only, withdrawal, other methods, or no method at all (Table 1).

There were some trends in method use based on participant characteristics, and some of these associations did reach statistical significance by chi-square test (Table 1). Age, insurance status, ever being pregnant, and ever having been a patient at the clinic were all associated with method use. The mean and median composite knowledge score for all participants was 6.7 and 7.0 questions correct out of 10, respectively, with 36.9% achieving a 'high knowledge' score (Table 3). Overall, knowledge scores were similar by various participant characteristics. None of these reached statistical significance by t-test or chi-square test (Table 2).

Contraceptive Knowledge and Attitudes

The individual question analysis of contraceptive knowledge and attitudes statistics are presented in the Appendix. Less than half of the total sample had heard of an IUD or implant. Generally, a large majority of the participants answered each individual true/false statement correctly with one exception: only 21.1% knew that birth control pills could reduce the risk of some cancers. The percentage of adolescents answering each question correctly was similar when comparing different method users (IUD/implant users vs. pill/patch/ring/injectable users vs. condom only/withdrawal/other method/no method users).

Association between Contraceptive Knowledge and Last Contraceptive Method Used

Crude and adjusted analyses for the association between method use and contraceptive knowledge are presented in Table 3. IUD/implant users appeared to have a higher median composite knowledge score (8.0) compared with hormonal method users (7.0) and the least effective method users/no method group (7.0). Similarly, the IUD/implant users group included a greater percent of participants who were classified as having 'high knowledge' (56%) compared to hormonal method users (32.3%) and the condom only/withdrawal/other/no method group (40.7%). However, crude analyses with ANOVA for mean knowledge score and logistic regression for high knowledge revealed no significant association between knowledge level and last contraceptive method used. When adjusting for the covariates age, education, previous pregnancy, and previous clinic visit in multivariate logistic regression, although there was a trend towards higher knowledge for IUD/implant users compared with less effective method users/no method users, this did not reach statistical significance. However, there was a significant negative association between high knowledge and method use between hormonal users compared with the less effective method users/no method group.

Factors Influencing Adolescents' Decisions About Last Contraceptive Method Used

For adolescents who had previously used contraception (n=258), the majority had talked to a doctor, nurse, or health educator (58.9%) when deciding their last contraceptive method (Table 4), while a large number thought about how good the method was at preventing pregnancy (40.7%), and 21.3% had spoken with their partner about what he thought. Very few (9.7%) had gotten information from magazines, TV, the internet, school, or books. When examining these factors by method use, 92% of IUD/implant users had talked to a doctor, nurse, or health educator, compared to 58.5% of hormonal method users and 30.8% of condom only/withdrawal/other/no method users. Percentages were very similar for whether participants had thought about the efficacy of the method (44.0% of IUD/implant users, 40.1% of hormonal method users, 42.3% of condom only/withdrawal/other/no method users). The highest percentage of participants who had talked to their partner when deciding their method was the less effective method/no method group (38.5%) compared to hormonal method users (19.3%) and IUD/implant users (20.0%). Only 4% of IUD/implant users said that they did none of the things listed when deciding their last method, compared to hormonal method users (17.4%) and other users (23.1%).

The most commonly cited important reasons adolescents decided to use their last contraceptive method (Table 5) were that the method was effective at preventing pregnancy (63.2%), the method was easy to obtain and to use (41.9%), the method lightened menstrual cycles (37.2%), the method was acceptable to her partner (25.2%), and the participant did not have to do anything special to remember it (21.3%). Less commonly cited reasons were that the method did not have hormones (7.4%), no one knew she was using it (12.4%), and other people thought it was a good method (14.0%). When examining these factors by method use, 76.0% of IUD/implant users cited that efficacy was important, compared with 62.3% of hormonal method users and 57.7% of the less effective method/no method group. Her partner being accepting of the method was cited more frequently as important for the less effective method/no method group (50.0%) compared with hormonal method users (22.7%) and IUD/implant users (20%). The fact

that other people think it's a good method was not important to IUD/implant users (8%), hormonal method users (15.5%), or less effective method/no method users (7.7%). While the largest percentage of method users concerned with making their periods go away were IUD/implant users (44%), the largest percentage of method users concerned with still getting their periods was the condom only/withdrawal/other/none group (19.2%). Efficacy at preventing STDs was cited as important by 42.3% of the last group, whereas this was not important to hormonal method users (4.4%) or IUD/implant users (4%).

DISCUSSION

In this study we sought to assess whether higher contraceptive knowledge is associated with more effective method use in this high-risk population, as well as to describe factors that these young women cited as influential in making their contraceptive decisions. Our data showed that very few participants were using LARC methods (7%), and 26% were using no method of contraception. Older teens tended to use more effective methods, as did those with insurance, those who had received more than a 10th grade education, those who had ever been pregnant, and those who had ever been to clinic, which are trends that have been supported in other studies [13, 27]. Interestingly, there were very similar percentages amongst the three different method groups for participants who desired pregnancy in the next six months, did not desire pregnancy in the next six months, or were unsure, suggesting that differences in desiring pregnancy did not seem to be associated with differences in effective method use or length of contraceptive effect. This could be due to lack of knowledge about effective methods, but the crude numbers do not suggest that those desiring pregnancy or were unsure about pregnancy had lower knowledge scores. Previous studies have suggested that there may be racial/ethnic differences in pregnancy intentions [12] and that fatalistic attitudes about pregnancy and pregnancy ambivalence may be associated with less effective method use [21, 30].

When analyzing contraceptive knowledge and attitudes, our data showed that only a minority of participants had ever heard of LARC methods, and these percentages were lower than those in the 2009 National Survey of Reproductive and Contraceptive Knowledge, suggesting that general awareness of LARCS needs to be improved in this population. A large majority of the participants answered each individual true/false statement correctly, with the exception of the statement, "birth control pills reduce the risk of some cancers." Other studies also found that many adolescents were unaware of this benefit of some hormonal methods [15, 21], indicating that both the contraceptive and non-contraceptive benefits of contraceptive methods should be better publicized in educational efforts to promote these health benefits and to dispel

misinformation portraying negative side effects that might prevent adolescents from seeking birth control.

Generally, mean knowledge scores were very similar when analyzed by participant demographics, and we found no significant association between knowledge level and last contraceptive use in both our crude and adjusted analyses. This could have been a factor of sample size and limited power to detect a significant difference, as the LARC group was small (n=25). Alternatively, it could mean that knowledge is not that important in choosing more effective methods.

We did find an unexpected significant association between higher knowledge and less effective/no method use when compared with hormonal method use. Although this is more difficult to explain, it is not new to the literature. Ryan et al. found that better condom knowledge was actually associated with less consistent usage and suggested that knowledge alone is not enough to encourage adequate contraceptive use [28]. Another explanation for this negative association may be that some adolescents default to merely using any method if they are influenced by family members or peers who tell them they should be on birth control, even if they do not know about the various options; starting pills or injections may be more reasonable when the motivation is not internal.

Taken together, our findings suggest that higher contraceptive knowledge, as was measured in our study, is not associated with higher effective method use. A previous mediation analysis of 18-29 year olds had found that lower contraceptive knowledge partially explained Latinas' use of less effective methods, but it did not explain African American young women's use of less effective methods [12]. Other studies also suggest there may be racial/ethnic differences in factors contributing to contraceptive decisions, so it is possible that contraceptive knowledge is not as important in decision-making processes for African American 14-19 year olds.

If knowledge is not associated with choice of contraceptive method, then what does influence these adolescents' contraceptive decisions? Participants cited a number of factors as being important. Many thought about how good the method was at preventing pregnancy, and this percentage was equally spread amongst the three different method groups (Table 4). However, when asked which factors were most important to them in their decision process (Table 5), efficacy was most commonly cited as important to LARC users and less frequently cited as important to those using less effective methods. This suggests that (self-perceived) efficacy may not be equally important to all adolescents in this population when choosing a contraceptive method. Additionally, we would expect that adolescents definitively not desiring pregnancy in the next 6 months would be using more effective methods than those desiring pregnancy or those unsure of desiring pregnancy (Table 1). However, method use was remarkably similar amongst these groups. It's possible that all groups could benefit from improving education about method efficacy, but it is clear that patient values are part of this decision process and may not always center solely on efficacy, as they potentially do from the providers' standpoint. These theories have been supported in previous work [13, 31, 32] in which these differing patients and provider priorities may lead to varying opinions of LARCs.

Another factor important to adolescents was speaking to her partner about her contraceptive method. The less effective method users most commonly cited speaking with their partner as part of the process in choosing their last contraceptive method, compared with hormonal method users and LARC users. The less effective method users also most commonly cited her partner's acceptability of the method as important, compared with hormonal method users and LARC users. This finding probably is due to the nature of the method: conversations are needed to negotiate condom use or withdrawal, whereas a teen can use other methods without speaking to her partner. Nevertheless, a portion of IUD/implant users and hormonal method users still rated her partner's acceptability of the method as highly important to her. More information

would be needed to understand her partner's involvement, but this could be a sign of maturity in which adolescents communicated with their partners about healthier sexual lives.

The fact that the majority of LARC users and hormonal method users had spoken to a doctor, nurse, or health educator (compared with a lower percent of less effective method users) when deciding their last method is important but it is difficult to determine causality for this trend; speaking with a provider is a necessary step in securing a LARC or hormonal method and thus may be a consequence of the decision rather than a causal factor. Alternatively, it is possible that providers could play an important part in giving teens information and encouraging them to use more effective methods, especially since only 9% of teens said they got information from magazines, TV, the Internet, school, or books. However, it is difficult to know for certain given the study design.

It is interesting to note that whether other people thought the method was "a good method" was not important to any of the three groups. The question didn't specify whether perceptions were those of providers, family, or friends. But this finding has important implications, as perhaps the social network is not as influential in this patient population in terms of influencing contraceptive choice as it has been in populations of Hispanic teens [33] or mostly Caucasian teens [21, 26]. Alternatively, although the participant may not think it is important for her social network to believe this is a good method for her, her social network may have been influential in determining what she believes is a good method for herself [32].

Other reasons cited as important, including that the method was easy to obtain and to use, that it lightened menstrual cycles, and that she didn't have to do anything special to remember it, suggest that method attributes may be important factors in this decision process. Similarly, some attributes were not as important to these adolescents, like the presence of hormones, or its efficacy at preventing STDs. The fact that STD protection was not a priority in this group was concerning given the high rate of STDs in the clinic population and suggests that it would be

important to promote a dual protection strategy for this population (i.e. LARC + condoms, or hormonal method + condoms) to protect against both pregnancy and STD's.

Contraceptive knowledge may be important, in terms of promoting awareness of effective methods, educating teens on benefits of contraception, and dispelling common misperceptions. But is not the most important factor that influences this high-risk group of African American adolescents in their contraceptive decisions. The variety of other factors cited as important by these adolescents suggest that contraceptive decision-making is complex, based on patient preferences and values, and thus there is no single standard script for counseling all high-risk African American adolescents effectively.

There are some suggested patient-centered approaches in the literature that guide contraceptive counseling with adolescents. Dehlendorf et al. proposed a shared decision making model, in which counseling involves a "relational" component and a "task-oriented" component [13]. The relational component focuses on building rapport with adolescent patients, exploring their values, and eliciting and responding to their preferences. The task-oriented component involves giving information that will ultimately help with method selection, correct use, and consistent use. This approach may be valuable for this and other high-risk minority adolescent populations, in which eliciting the patient's values and concerns, communicating efficacy, dispelling myths about side effects, and attempting to understand barriers to using effective methods could help adolescents decide on the most appropriate method for them and use it consistently. Contraceptive knowledge is only one part of this approach.

There are limitations to this study. First, we were unable to determine the direction of cause and effect between our variables since our study was cross-sectional in design. Second, our indicator of method use, their "very last method used," may not be the best indicator of their current thoughts or desires for contraception. Third, our sample size was relatively small, especially the LARC users group. This may have limited our power to detect statistical

significance, and it also limited our ability to stratify method use by each individual method. Fourth, our methods of measuring attitudes and knowledge may not be the best way to assess these variables. We constructed knowledge questions based on themes from focus groups and used similar questions to those used in other studies (including national surveys) to evaluate knowledge. However, we are not aware of any validated tools to assess contraceptive knowledge in adolescents, and there is currently no standardized set number of questions that should be asked to calculate a valid knowledge score. Additionally, although respondents could skip questions, our questions did not include a 'don't know' response.' Thus some respondents may have guessed if they did not know the answer. Our data also relied on self-report, and although we have taken steps to increase comfort in disclosure by using the Audio Computer-Assisted Self-Interviewing platform, this remains a limitation, as does the fact that our respondents' answers may have been subject to recall bias. Finally, while findings from this convenience sample may help inform work in other urban African American adolescent populations, they may not be generalizable to other populations.

In order to more accurately assess contraceptive knowledge in a more standardized manner, future research should develop and test a validated survey tool. While we can gather important information from cross-sectional surveys, future prospective studies could better evaluate the temporality between contraceptive knowledge and its effect on contraceptive method choice, method continuation, consistency of use, and pregnancy outcomes. Finally, more research should be done to evaluate the efficacy of patient-centered counseling approaches in choosing contraceptive methods and to evaluate the previously mentioned factors.

The findings of this study suggest that contraceptive knowledge is not as centrally important to method use as we may have thought in this high-risk population of African American adolescents. As introduced in previous studies, providers should address contraceptive knowledge but also elicit and respond to patient values and preferences when counseling these young women to select a contraceptive method that is best for the individual adolescent.

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Table 1. Last Contraceptive Use* by Select Participant Characteristics (N=350)

		Method Use (n, %)			
Characteristic	**n, %**	**IUD/Implant**	**Hormonal**	**Other/None**	**Chi-Square Test**
Total Sample	350 (100%)	25 (7.1%)	207 (59.1)	118 (33.7)	
Age					
14-16 years	122 (34.9)	8 (32.0)	62 (30.0)	52 (44.1)	(Reference)
17-19 years	228 (65.1)	17 (68.0)	145 (70.0)	66 (55.9)	**p=0.04**
Health Insurance					
None	86 (24.6)	6 (24.0)	43 (20.8)	37 (31.4)	(Reference)
Public or Private Insurance, or Don't Know	264 (75.4)	19 (76.0)	164 (79.2)	81 (68.6)	p=0.10
Education					
10th Grade or Less	158 (45.1)	9 (36.0)	90 (43.5)	59 (50.0)	(Reference)
More than 10th grade	192 (54.9)	16 (64.0)	117 (56.5)	59 (50.0)	p=0.33
Ever pregnant					
No	258 (73.7)	12 (48.0)	144 (69.6)	102 (86.4)	(Reference)
Yes	92 (26.3)	13 (52.0)	63 (30.4)	16 (13.6)	**p<0.0001**
Mother completed HS or GED (n=333)**					
No	94 (28.2)	11 (44.0)	48 (24.4)	35 (31.5)	(Reference)
Yes	239 (71.8)	14 (56.0)	149 (75.6)	76 (68.5)	p=0.08
Previously been to clinic					
No	119 (34.0)	3 (12.0)	33 (15.9)	83 (70.3)	(Reference)
Yes	231 (66.0)	22 (88.0)	174 (84.1)	35 (29.7)	**p<0.0001**
Desires pregnancy in next 6 mos					
Definitely or probably "no"	288 (82.3)	21 (84.0)	171 (82.6)	96 (81.3)	(Reference)
Definitely or probably "yes," or Don't Know	62 (17.7)	4 (16.0)	36 (17.4)	22 (18.6)	p=0.93
Smoking in last 30 days					
No	27 (7.7)	23 (92.0)	187 (90.3)	113 (95.8)	(Reference)
Yes	323 (92.3)	2 (8.0)	20 (9.7)	5 (4.2)	p=0.21
Alcohol in last 30 days					
No	276 (78.9)	20 (80.0)	157 (75.9)	99 (83.9)	(Reference)
Yes	74 (21.1)	5 (20.0)	50 (24.2)	19 (16.1)	p=0.23
Drugs in last 30 days					
No	252 (72.0)	21 (84.0)	146 (70.5)	85 (72.0)	(Reference)
Yes	98 (28.0)	4 (16.0)	61 (29.5)	33 (28.0)	p=0.37

**Most effective method last used*
***Participants who answered 'don't know' were excluded*

Table 2. Knowledge Level by Select Participant Characteristics (N=350)

		Knowledge Measures			
Characteristic	**n, %**	**Mean Knowledge (Std Dev)**	**T-test/ANOVA**	**High Knowledge (n, %)**	**Chi-Square Test**
Total Sample	350 (100%)	6.7 (1.53)		129 (36.9)	
Age					
14-16 years	122 (34.9)	6.6 (1.51)	(Reference)	37 (30.3)	(Reference)
17-19 years	228 (65.1)	6.8 (1.55)	p=0.32 (t-test)	92 (40.4)	p=0.06
Health Insurance					
None	86 (28.5)	6.9 (1.63)	(Reference)	35 (40.7)	(Reference)
Public or Private Insurance, or 'Don"t Know'	216 (71.5)	6.7 (1.5)	p=0.35	94 (35.6)	p=0.40
Education					
10th Grade or Less	158 (45.1)	6.6 (1.48)	(Reference)	50 (31.7)	(Reference)
More than 10th grade	192 (54.9)	6.8 (1.57)	0.27	79 (41.2)	p=0.07
Ever pregnant					
No	258 (73.7)	6.7 (1.54)	(Reference)	96 (37.2)	(Reference)
Yes	92 (26.3)	6.8 (1.52)	p=0.62	33 (35.9)	p=0.82
Mother completed HS or GED (*n=333)					
No	94 (28.2)	6.5 (1.52)	(Reference)	30 (31.9)	(Reference)
Yes	239 (71.8)	6.8 (1.51)	p=0.15	93 (38.9)	p=0.23
Previously been to clinic					
No	119 (34.0)	6.5 (1.58)	(Reference)	36 (30.3)	(Reference)
Yes	231 (66.0)	6.8 (1.5)	p=0.06	93 (40.3)	p=0.07
Desires pregnancy in next 6 mos					
Definitely or probably "no"	288 (82.3)	6.7 (1.53)	(Reference)	110 (38.2)	(Reference)
Definitely or probably "yes," or 'Don't Know"	32 (9.1)	6.6 (1.56)	p=0.58	19 (30.7)	p=0.26
Smoking in last 30 days					
No	27 (7.7)	6.7 (1.53)	(Reference)	119 (36.8)	(Reference)
Yes	323 (92.3)	6.7 (1.57)	p=0.84	10 (37.0)	p=0.98
Alcohol in last 30 days					
No	276 (78.9)	6.7 (1.53)	(Reference)	100 (36.2)	(Reference)
Yes	74 (21.1)	6.7 (1.54)	p=0.98	29 (39.2)	p=0.64
Drugs in last 30 days					
No	252 (72.0)	6.7 (1.52)	(Reference)	90 (35.7)	(Reference)
Yes	98 (28.0)	6.8 (1.58)	p=0.44	39 (39.8)	p=0.48

**Participants who answered 'don't know' were excluded*

Table 3. Crude and Adjusted Associations between Method Use and Knowledge Level (N=350)

	n, %	Median Knowledge	Mean Knowledge (Std Dev)	ANOVA	High Knowledge (n, %)	Crude Logistic Regression	Adjusted Logistic Regression
Total Sample	350 (100%)	7.0	6.7 (1.53)		129 (36.9)		
Last Contraceptive Method Use*							
Condom Only, Withdrawal, Other, None	118 (33.7)	7.0	6.8 (1.55)	(Reference)	48 (40.7)	(Reference)	(Reference)
Hormonal Method	207 (59.1)	7.0	6.7 (1.53)	p=0.38	67 (32.3)	OR=0.70 (0.44, 1.12)	OR=0.40 (0.22, 0.74)
IUD/Implant	25 (7.1)	8.0	7.1 (1.44)	p=0.38	14 (56.0)	OR=1.86 (0.77-4.43)	OR=1.04 (0.36, 3.03)

**Most effective method last used*

Table 4. Things Participants Did* when Deciding Their Last Contraceptive Method for those who had Ever used Contraception, by Last Contraceptive Method Used ** (N=258)

		Method Use		
	All (n=258)	IUD/Implant (n=25)	Hormonal (n=207)	Other (n=26)***
Participants' Actions	n (%)	n (%)	n (%)	n (%)
Talked to a Doctor, nurse, or health educator	152 (58.9)	23 (92.0)	121 (58.5)	8 (30.8)
Got information from magazines, TV, the internet, school, or books	25 (9.7)	4 (16.0)	18 (8.7)	3 (11.5)
Talked to the guy you were having sex with about what he thought	55 (21.3)	5 (20.0)	40 (19.3)	10 (38.5)
Thought about how good the method is at preventing pregnancy	105 (40.7)	11 (44.0)	83 (40.1)	11 (42.3)
None of these, I really didn't think about it at all	43 (16.7)	1 (4.0)	36 (17.4)	6 (23.1)

**Multiple selections allowed*
***Most effective method last used*
****Condom only, withdrawal, other ('no method users' did not answer this question)*

Table 5. Important Reasons* Adolescents Cited when Deciding to Use Their Last Contraceptive Method for those who had Ever used Contraception, by Last Contraceptive Method Used (N=258)**

		Method Use		
	All (n=258)	IUD/Implant (n=25)	Hormonal Method (n=207)	Other (n=26)***
Reasons	n (%)	n (%)	n (%)	n (%)
It is very effective at preventing pregnancy	163 (63.2)	19 (76.0)	129 (62.3)	15 (57.7)
No one knows I'm using it	32 (12.4)	3 (12.0)	27 (13.0)	2 (7.7)
It is easy to get and use	108 (41.9)	9 (36.0)	87 (42.0)	12 (46.2)
It doesn't have hormones	19 (7.4)	6 (24.0)	10 (4.8)	3 (11.5)
My partner is ok with it	65 (25.2)	5 (20.0)	47 (22.7)	13 (50.0)
It is very effective at preventing STDs	21 (8.4)	1 (4.0)	9 (4.4)	11 (42.3)
I still get my period when I'm using it	34 (13.2)	2 (8.0)	27 (13.0)	5 (19.2)
It makes my periods get better or go away	96 (37.2)	11 (44.0)	81 (39.1)	4 (15.4)
Other people think it is a good method	36 (14.0)	2 (8.0)	32 (15.5)	2 (7.7)
I don't have to do anything special to remember it	55 (21.3)	7 (28.0)	44 (21.3)	4 (15.4)

**Multiple selections allowed*
***Most effective method last used*
****Condom only, withdrawal, other ('no method users' did not answer this question)*

Appendix: Questions Used to Evaluate Contraceptive Knowledge and Attitudes

Question	# Participants who answered question correctly, N=350 (n, %)
Before today, have you heard about the IUD, sometimes called Mirena or Paragard?	156 (44.6)
Before today, have you heard about the contraceptive implant, also known as Implanon?	142 (40.6)
A teenager can use an IUD, even if she has never had a child (T)	278 (79.4)
Long-acting methods like the implant or IUD can be removed early if a teenager changes her mind and wants to become pregnant (T)	288 (82.3)
All hormonal birth control causes weight gain (F)	245 (70.0)
Birth control pills reduce the risk of some cancers (T)	74 (21.1)
Most teenagers who use Depo-Provera lose their hair (F)	272 (77.7)
Using the pill and other hormonal methods reduces menstrual cramps and pain (T)	181 (51.7)
It is okay to take birth control that stops your period from coming (T)	218 (62.3)
Hormonal birth control and IUDs protect against STDs (F)	315 (90.0)
IUDs move around in a teenager's body (F)	261 (74.6)
Teenagers should "take a break" from hormonal birth control methods every couple of years (F)	222 (63.4)