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“I don’t know enough to feel comfortable using them:” Women’s knowledge of and perceived barriers to long acting reversible contraceptives on a college campus

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Abstract

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Objective—To assess multiple dimensions of long acting reversible contraception (LARC) knowledge and perceived multi-level barriers to LARC use among a sample of college women.

Study Design—We conducted an internet-based study of 1,982 female undergraduates at a large mid-western university. Our 55-item survey used a multi-level framework to measure young women's understanding of, experiences with intrauterine devices (IUD) and implants and their perceived barriers to LARC at individual, health systems, and community levels. The survey included a 20-item knowledge scale. We estimated and compared LARC knowledge scores and barriers using descriptive, bivariate, and linear regression statistics.

Results—Few college women had used (5%) or heard of (22%) LARC, and most self-reported “little” or “no” knowledge of IUDs (79%) and implants (88%). Women answered 50% of LARC knowledge items correctly (mean 10.4, range 0–20), and scores differed across sociodemographic groups (p -values<0.04). Factors associated with scores in multivariable models included race/ethnicity, program year, sorority participation, religious affiliation and service attendance, employment status, sexual orientation, and contraceptive history. Perceived barriers to IUDs included: not wanting a foreign object in body (44%); not knowing enough about the method (42%); preferring a “controllable” method (42%); cost (27%); and not being in a long-term relationship (23%). Implant results were similar. “Not knowing enough” was women's primary reason for IUD (18%) and implant (22%) nonuse.

Conclusion—Lack of knowledge (both perceived and actual) was the most common barrier among many perceived individual, systems, and community-level factors precluding these college women's LARC use. Findings can inform innovative, multi-level interventions to improve understanding, acceptability, and uptake of LARC on campuses.

Keywords

long acting reversible contraception; LARC; intrauterine device; implant; college campus; knowledge; barriers

1. INTRODUCTION

Leading health organizations have recognized long acting reversible contraception (LARC) as a strategic priority to reduce rates of unintended pregnancy among young women in the U.S and worldwide [1–4]. Intrauterine devices (IUDs) and implants are highly efficacious, safe, cost effective, and have higher satisfaction and continuation rates compared to other contraceptive methods [1–8]. Nonetheless, use of LARC remains low in the U.S. An estimated 6.4% and 0.8% of sexually active women use IUDs and implants, respectively [9]. Estimates are lower for adolescents and young adult women [10] and are similar for specific groups who are historically believed to have greater access to and knowledge of contraception, such as women in higher education programs [11]. In the most recent American College Health Association's (ACHA) National College Health Assessment (NCHA), 6.6% of sexually active females reported IUD use at last intercourse and 2.7% reported implant use [11].

College settings are an underutilized resource for improving young women's use of highly effective contraception. Women of 18–24 years experience the highest rates of unintended

pregnancy in the U.S. and comprise over half of the 18 million students attending U.S. colleges; thus, campuses offer a unique opportunity to reach large, diverse numbers of women and reduce unintended pregnancy among this high risk group [12,13]. The NCHA, the most comprehensive, recurring survey of college students' health, collects little information on family planning outcomes or contraception method awareness, experiences, and barriers to use [11]. An increasing body of research on IUDs, and to a lesser extent implants, from other contexts suggests that lack of knowledge and misconceptions are prevalent among young women generally; although these results have often been based upon studies with clinical settings, small sample sizes, limited measurement approaches, and inadequate attention to multiple dimensions of knowledge (e.g. mechanisms of action, efficacy, risks, benefits, use) [14–23]. Furthermore, research to date has not adequately considered young women's perspectives on the diverse factors operating across levels of their environment which influence LARC knowledge, attitudes, and uptake, especially in college contexts and among this high-risk age demographic.

We sought to describe knowledge, perceptions, and experiences regarding IUDs and implants among a sample of college women and identify women's perceptions of individual-, health systems- and community-level barriers to LARC use on campuses.

2. METHODS

2.1 Study Design and Sample

This study was part of a larger multi-phase, mixed-methods project aimed at identifying and addressing multi-level barriers to LARC in college settings. We conducted an internet-based survey of undergraduate females at a large mid-western U.S. university in Fall of 2013. All full-time enrolled female undergraduate students who were English-speaking and aged 18 years (n=13,693) were eligible and emailed a series of invitations to participate in a "survey on reproductive health" through the Office of the Registrar. The recruitment emails included general information about the study's focus on contraception use among college students, the informed consent, information on raffle prizes, and a link to the survey website. The survey was administered via Qualtrics. Among the 2,601 women who clicked on the survey link (19%), we limited our analytic sample to 1,982 who completed 50% of items, including LARC-related items. This study was approved by the University of Michigan's Institutional Review Board.

2.2 Measures

We designed the survey based upon our prior work in contraceptive knowledge measurement [15,22,23] and reproductive health services [24], a comprehensive review of LARC literature, existing family planning and college health surveys [11,17,21,25], and our LARC qualitative work conducted in tandem with this study, which explored key campus stakeholders' perspectives (e.g. students, administrators, faculty, university health center staff and providers) on LARC in college settings. We used a multi-level framework to assess factors impacting LARC understanding and use at the individual, health systems and campus community levels. The survey contained 55 items addressing: 1) knowledge, attitudes, experiences, and perceived barriers to LARC; 2) experiences with reproductive health

services on campus and elsewhere; 3) campus climate around sexual and reproductive health and contraception; 4) reproductive and health histories; and 5) sociodemographics.

For LARC knowledge, first all women were asked about general awareness of highly effective methods, “Have you ever heard of long acting reversible contraception, sometimes called LARC?” All women were also then asked, “The following questions about intrauterine devices (IUDs, such as Mirena, Paragard or Skyla) and contraceptive implants (such as Implanon or Nexplanon)...overall, how much you feel you know about IUDs and implants and how they are used,” on a 4-point Likert scale (nothing, a little, a lot, everything). Finally, a formal LARC knowledge scale comprising 20 true-false items further assessed comprehension of information about IUDs and implants, drawing content from standard contraceptive information sources [1–4]. We examined individual items but also constructed an additive index scale, in which each correct response corresponded with one point and possible scores could range from 0–20 (alpha 0.92).

Additional items assessed perceived barriers to IUD and implant use. Women were asked, “Which of the following reasons have ever prevented you from using an IUD (either now or in the past).” The same item assessed implant barriers. Responses included a diverse list of reasons, and women could select more than one. Women were further asked, “Which of those is the number one reason why you would not use that method,” for both IUDs and implants.

We pilot tested the survey in both written and electronic form among approximately 30 students and student team members and revised it based upon content and format feedback, as well as upon input from additional family planning experts at our institution. The survey was administered in English language, had a Flesch-Kincaid reading level of 8th grade, and took 17 minutes on average to complete.

2.3 Statistical Analysis

We used descriptive statistics to summarize LARC knowledge and barriers and bivariate tests (Student’s independent t-test and ANOVA) to compare LARC knowledge scores across sociodemographic and reproductive history groups. Multivariable linear regression further examined relationships between sociodemographic and reproductive factors and LARC knowledge scores. Covariates were considered for inclusion in regression models if their p-values (p) in bivariate tests were <0.25 and because we were interested in exploring all factors potentially associated with LARC knowledge, we present full models with these covariates included. Results are presented as adjusted beta coefficients (B) with 95% confidence intervals (CI). Data were analyzed with STATA 13.0 (College Station, TX).

3. RESULTS

3.1 Sample Characteristics

Characteristics of the sample (n=1,982) are presented in Table 1. The mean age was 19 years and women were dispersed evenly across years in their undergraduate programs. The majority were White (75%), insured (90%), employed (67%), had mothers with at least some college education (91%), and identified as heterosexual (87%). Significant proportions

resided on campus (43%), were not in a relationship (46%), were not religiously affiliated (34%), and never attended religious services (36%). Most women reported a history of sexual intercourse with a male partner (63%) but few reported a prior pregnancy (3%). Contraceptive experience was common (66%), with 5% having ever used a LARC method; 24% had considered LARC but decided against it.

While the University Registrar does not provide detailed demographic data on student non-respondents, publicly-available institutional aggregate data show that respondents were similar in regards to age and class year but were more likely to be White race/ethnicity compared to the general undergraduate population (75% versus 69%). Compared to female undergraduates participating in the 2013 NCHA (Table 1), we had higher proportions of women who were White race/ethnicity and age 18 but lower proportions who were married/engaged/cohabiting and heterosexual.

3.2 LARC Knowledge and Campus Climate

Less than one quarter of women had “heard of long acting reversible contraception or LARC” (22%) and most self-reported “little” or “no” general knowledge of IUDs (79%) and implants (88%). Nearly three quarters did not know that LARC methods are available at their university health center (73%). Approximately half of women reported “not knowing” how supportive they felt that the campus climate, faculty, student body, and university health center are about “helping student have access to the full range of birth control methods, including IUDs and implants” (range 40–57%). While the majority agreed that ensuring students’ sexual and reproductive health is a priority on campus (65%) and the climate encourages free and open discussions about sexual and reproductive health (70%) and birth control (65%), few agreed that there is a “generally positive attitude toward IUDs and implants on campus” (19%).

LARC knowledge scale items and scores are presented in Tables 2 and 3. The sample answered approximately 50% of items correctly, with a mean score of 10.4 (SD 5.7, range 0–20). Incorrect or “don’t know” responses were most common for mechanism of action, effectiveness, and side effect/health risk items (Table 2).

LARC knowledge scores differed across nearly all sociodemographic groups (p -values<0.04, Table 3). For instance, compared to their counterparts, scores were lower among younger, non-White, campus-residing, unemployed, single, heterosexual, and religious women. Scores were also lower among women not in a sorority, those with less educated mothers, and those without histories of sexual intercourse, contraception, and LARC use (Table 3). Factors associated with LARC knowledge scores were similar in multivariable regression models (Table 4).

3.3 Perceived Multi-Level Barriers to LARC

Among women who reported one or more individual, health systems, or community level barriers to LARC ($n=1,604$, Table 5), the most common barriers to IUDs included: not wanting a foreign object in your body (44%); not knowing enough about the method (42%); preferring to use a method you can control stopping and starting (42%); worries about pain (30%), side effects (28%), or serious health problems (27%); cost (27%); and not being in a

long-term relationship (23%). Implant results were similar (Table 5). “Not knowing enough about the method” was reported as the number one reason why women would not use LARC, for both IUDs (18%) and implants (22%).

4. DISCUSSION

Among this large sample of undergraduate women, knowledge of IUDs and implants was exceedingly low, estimated by both self-report and our formal LARC knowledge scale. In fact, women’s perceived knowledge was much lower than their measured knowledge and the most salient *individual-level perceived* barrier precluding IUD and implant use was “not knowing enough.” Moreover, misperceptions about side effects, pain, serious health problems, and method eligibility were other common barriers. These findings point to the role of *perceptions*, perhaps even more so than actual knowledge, as a determinant of LARC nonuse. Additionally, awareness of access to LARC was limited too, with three quarters not knowing that IUDs and implants are readily available to them on campus. Results are consistent with an increasing body of research describing young women’s general lack of LARC knowledge, misperceptions about IUD and implant side effects and ineligibility, and desire for more information on highly effective methods [14,15,17,19,20]. Our study expands this body of work by: 1) using a multi-dimensional, formal measurement approach that addresses knowledge of and barriers to LARC operating across multiple levels of women’s environments; 2) focusing on both IUDs and implants; 3) employing a large sample of both adolescent and young adult women; and 4) focusing on the college setting—an understudied but important context in population-based family planning research given the scope of reproductive aged women enrolled in higher education programs and the high rates of unintended pregnancy in this age demographic. Findings suggest that prior assumptions about *higher* levels of knowledge and access to highly effective contraceptives among educated and insured young women, and the potential impact on higher utilization rates, do not appear to hold true, at least for these college students. Further studies are needed to disentangle the meaning of perceived versus “actual” LARC knowledge and potential differences in the influence on use.

Some disparities in LARC knowledge were noted across sociodemographic groups. Racial/ethnic minority and religious women had slightly lower knowledge scores than White and non-religious women. Research has consistently reported inequities in unintended pregnancy, contraceptive knowledge and use, family planning service use rates among these groups [9,13,18,26]. The association between sexual minority orientation and higher LARC knowledge scores was unexpected. Very little research has focused on gay/lesbian and bisexual women’s experiences with LARC, and unfortunately our sub-sample sizes were inadequate to carefully investigate it here. The clinical significance of these relatively modest differences in knowledge across different groups of women are unclear, and research is needed to further explore whether disparities in contraceptive knowledge translate to disparities in outcomes.

From a community-level perspective (a major focus of our larger project), women had little awareness of the support for LARC on campus and less than a fifth perceived a positive climate around IUDs and implants. Residing on campus was negatively associated with

LARC knowledge scores, while participation in sororities was positively associated. Sororities often provide a strong, organized peer culture and circumscribed social setting in which exposure to sexual and reproductive health information may be more likely or frequent, both from informal and formal sources. The campus residence effect, on the other hand, may simply reflect the numbers of younger freshman and sophomore women living on campus who have lower rates of sexually activity compared to their elder counterparts. Regardless, social network and peer support effects warrant further investigation as potentially important areas to target in community-level interventions to increase LARC acceptability and uptake on campuses. Overall, findings on LARC knowledge determinants and disparities beg deeper consideration of the social, cultural, and environmental contexts that *uniquely* shape college women's family planning behaviors.

Beyond knowledge, we assessed other individual-level barriers to IUD and implant nonuse on campus. Several top-ranking reasons reflected women's *preferences*, including not wanting a foreign object in body and preference for a "controllable" method. These same barriers were found to predict IUD acceptability and interest among 382 young adults in another recent U.S. web-based LARC survey [20]. Related work suggests that patient-centered models of reproductive health care and contraceptive decision-making are urgently needed [24,27–31]. Promising research on IUD self-removal, for instance, may help reduce such barriers [31].

At the systems-level, while insurance coverage was nearly universal among our women, method cost was a considerable concern, and other health provider/services factors were noteworthy (Table 2). The roles of insurance coverage, co-pays, method cost-sharing, and confidentiality concerns with parental and school-based plans for younger women have received significant attention in light of the Affordable Care Act (ACA) [32,33]. Studies on the ACA and reproductive health have found that young women lack awareness and understanding of the ACA, family planning provisions under it, and even details of their own insurance plans [32]. Despite the overwhelming evidence supporting increased LARC uptake when cost-related barriers are removed [33,34], if women in real world contexts are not aware or knowledgeable of their contraceptive coverage, or alternatively, if their providers are not willing to offer the full range of methods [35], then improved utilization rates for the most effective methods cannot be realized at the population level. Research is needed to provide a more nuanced picture of the insurance landscape for college women and its impact on health care decision-making and behavior. Public health strategies that effectively educate young women on their *access to* contraceptive methods continue to be warranted.

Our study has notable limitations. We had a low response rate (though not dissimilar from the low rates documented in other web-based surveys, especially of college students [36,37]), fewer racial/ethnic minority women than those in the NCHA, and focused on a single campus, which limits generalizability. College students (ours and generally) may not reflect the perspectives or experiences of women not enrolled in higher education programs, especially younger, poor, and uninsured women, and those with reproductive histories. Thus, knowledge levels here may underestimate LARC knowledge among the broader population of young women. Our measures of LARC knowledge and experience were based upon self-

report, so response bias is possible. We attempted to use standard procedures for survey and knowledge scale design, but further psychometric analyses are required to determine the potential impact of question wording and format on LARC comprehension. Data were cross-sectional and did not account for changes in LARC understanding, attitudes, and experiences over time on our campus, both from individual and ecologic perspectives. Finally, while our study contributes new information on barriers operating at multiple levels as identified by women themselves, we did not independently investigate factors at the health systems and community levels here—though, this is an important complementary direction of our broader project and ongoing research.

Nonetheless, our findings reinforce the role of knowledge in influencing college women's contraceptive decision-making and behavior. Future studies using diverse samples, rigorously tested measures, and longitudinal designs can monitor young women's preferences for and experiences with IUDs and implants on college campuses. Health service models that provide the full range of methods at university health centers can increase students' awareness of and access to highly effective contraception. Ultimately, innovative, multi-dimensional, and multi-level strategies are required to promote positive campus climates around LARC and improved family planning outcomes among this substantial reproductive-aged population.

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IMPLICATIONS

Lack of knowledge of IUDs and implants served as a primary barrier to highly effective contraceptive use among these college women. Comprehensive, patient-centered, and multi-level educational public health strategies are needed to promote positive campus climates around LARC and improve family planning outcomes among this substantial reproductive aged population.

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Table 1

Characteristics of the study sample compared to women in the National College Health Assessment

Sociodemographics	Study Sample (N=1,982)	Study Sample	NCHA (N~62,269)
	n	%	%
Age			
18	433	21.9%	15%
19	405	20.4%	22%
20	424	21.4%	20%
21	409	20.6%	18%
22	170	8.6%	22%
Race			
White	1478	74.6%	68%
Black	55	2.8%	7%
Hispanic	47	2.4%	15%
Asian	181	9.3%	11%
Other	103	5.2%	10%
Year in undergraduate program			
First year	466	23.5%	28%
Second year	416	21.0%	24%
Third year	446	22.5%	24%
Fourth year	451	22.8%	19%
Fifth year or more	88	4.4%	6%
Lives on campus	852	43.0%	44%
Participates in a sorority	288	14.5%	11%
Relationship status			
Married/engaged	42	2.1%	7% ^a
Cohabiting	65	3.3%	12%
Long-term relationship	559	28.2%	38%
Casual	285	14.4%	
None	913	46.1%	50%
Employed (paid or volunteer)	1322	67.0%	57% ^b
Has health insurance (parental/school-based/self)	1790	90.3%	91%
Sexual orientation			
Heterosexual	1721	86.8%	92%
Gay/Lesbian	27	1.4%	2%
Bisexual	83	4.2%	4%
Unsure	36	1.8%	2%
Mother's education level high school graduate	172	8.7%	na
Mother gave birth before age 20	80	4.0%	na
Religious affiliation			na
Protestant	278	14.0%	
Catholic	448	22.6%	

	Study Sample (N=1,982)	Study Sample	NCHA (N~62,269)
Sociodemographics	n	%	%
Jewish	173	8.7%	
Muslim	24	1.2%	
Hindu	20	1.0%	
Other	245	12.4%	
None	670	34.0%	
Religious service attendance			na
Never attends services	715	36.1%	
Attends services < weekly	910	45.9%	
Attends services weekly or more frequently	233	11.8%	
Reproductive Characteristics			
Sexual intercourse with male partner ever	1243	62.7%	68%
Used contraception ever	1316	66.4%	56% ^c
Sex without contraception ever	540	27.3%	na
Pregnancy ever	56	2.8%	1% ^d
Unintended pregnancy ever	50	2.5%	1% ^d
Childbirth ever	27	1.4%	na
Miscarriage ever	20	1.0%	na
Abortion ever	36	1.8%	na
Long acting reversible contraceptive history			na
Never used LARC method	1395	70.4%	
Considered LARC use, decided against	472	23.8%	
Current/previous LARC user	92	4.6%	8% ^d

Results presented as frequencies and proportions of women in study sample and % female undergraduates who responded to corresponding items, where available, in the 2013 National College Health Assessment (NCHA) and does not include NCHA participants with unknown gender.

na = data not available in NCHA 2013 Undergraduate Group Reference Report.

Study sub-samples may not add up to 100% due to 0–7% missing data for demographic items.

^aProportion In NCHA is combined category for in a non-marital/non-cohabiting relationship.

^bProportion In NCHA is paid employment only.

^cProportions in NCHA are for contraceptive use and LARC use at last intercourse.

^dProportions in NCHA are for pregnancy in last 12 months.

LARC = long acting reversible contraception

Citation: American College Health Association. American College Health Association-National College Health Assessment II: Reference Group Data Report Undergraduate Students Spring 2013. Hanover, MD: American College Health Association; 2013.

Table 2

College women's knowledge of long acting reversible contraception

(n=1982)	False %	True %	Don't Know %	Incorrect %
1. All IUDs are banned from use in the U.S.	79.8 *	0.4	19.8	20.1
2. A woman cannot use an IUD if she has never given birth	74.7 *	2.0	23.2	25.2
3. Women who use IUDs cannot use tampons	69.6 *	2.9	27.1	30.0
4. An IUD can protect a woman from pregnancy for 3–10 years	8.3	62.8 *	28.8	37.0
5. An IUD or implant must be placed and removed by a health care provider	8.3	72.0 *	19.5	27.9
6. If a woman becomes pregnant with an IUD, it can cause an abortion	30.8 *	19.0	49.9	80.7
7. An IUD cannot be felt by a woman's partner during sex	11.0	60.6 *	28.2	39.2
8. An implant can protect a woman from pregnancy for at least 3 years	3.5	64.5 *	31.8	35.3
9. IUDs and implants are likely to move around in a woman's body	59.4 *	9.3	31.2	40.5
10. An IUD cannot be removed early, even if a woman changes her mind	69.4 *	6.7	23.7	30.4
11. If a woman uses an IUD, she is likely to get an infection	61.6 *	5.6	32.7	38.3
12. An IUD can cause infertility	38.7 *	18.6	42.4	61.0
13. IUDs and implants are likely to cause harmful bleeding patterns	52.5 *	7.4	39.8	47.2
14. IUDs are more effective than contraceptive pills at preventing pregnancy	17.1	40.7 *	42.1	59.2
15. The effects of the IUD cannot be reversed, even if it is removed	70.1 *	3.4	26.3	29.7
16. IUDs and implants are likely to make a woman gain weight	39.3 *	13.2	47.1	60.3
17. A woman is not a good candidate for an IUD if she has multiple sexual partners or does not always use condoms	52.0 *	11.0	36.8	47.8
18. Implants are less effective than IUDs because they are not placed inside the uterus	30.5 *	7.1	62.0	69.1
19. A woman is likely to experience side effects like hair loss, acne, or mood changes with an IUD or implant	34.5 *	16.2	49.1	65.3
20. IUDs and implants contain both estrogen and progesterone	14.6 *	30.5	54.7	85.2

Results are presented as proportions (%) selecting each response option.

Proportion incorrect is summary indicator of incorrect response plus "don't know" responses.

* Denotes correct response.

IUD = intrauterine device

Table 3

College women's LARC knowledge scores, by sociodemographic and reproductive characteristics

	Mean	SD	P-value
All women	10.4	5.7	
Age			<0.001
18	9.3	5.9	
19	9.2	5.9	
20	11.4	5.3	
21	11.5	5.0	
22	11.4	5.1	
Race			<0.001
White	11.0	5.3	
Black	8.6	5.5	
Hispanic	9.5	5.1	
Asian	6.8	6.1	
Other	10.1	5.8	
Year in undergraduate program			<0.001
First year	9.1	5.9	
Second year	9.3	5.9	
Third year	11.5	5.2	
Fourth year	11.3	5.0	
Fifth year or more	13.2	3.8	
Lives on campus	9.5	0.2	<0.001
Lives off campus	11.2	0.2	
Participates in a sorority	11.1	0.3	0.03
Not in sorority	10.3	0.1	
Relationship status			<0.001
Married/engaged	10.8	5.2	
Cohabiting	11.6	4.7	
Long-term relationship	11.2	5.3	
Casual	11.6	5.1	
None	9.5	5.8	
Mother's education level			0.04
high school graduate	9.6	0.4	
Mother with at least some college	10.5	0.1	
Mother gave birth before age 20	10.3	0.6	0.78
Mother gave birth at age 20 or older	10.5	0.1	
Any religious denomination affiliation	9.9	0.2	<0.001
No religious affiliation	11.5	0.2	
Religious service attendance			<0.001
Never attends services	11.3	5.3	
Attends services < weekly	10.4	5.5	
Attends services weekly or more frequently	8.4	6.2	

	Mean	SD	P-value
Employed (paid or volunteer)	10.8	5.5	<0.001
Not employed	9.6	5.7	
Has health insurance	10.5	0.1	0.65
Uninsured	10.1	0.8	
Sexual orientation			<0.001
Heterosexual	10.3	5.6	
Gay/Lesbian	13.0	3.4	
Bisexual	12.2	4.9	
Unsure	11.6	5.0	
Sexual intercourse with male partner ever	11.4	0.2	<0.001
Never	8.5	0.2	
Used birth control ever	11.4	0.1	<0.001
Never	8.2	0.3	
Sex without birth control ever	11.1	0.2	0.001
Never	10.1	0.2	
Pregnancy ever	11.6	0.6	0.10
Never	10.4	0.1	
Unintended pregnancy ever	11.4	0.7	0.25
Never	10.4	0.1	
Childbirth ever	11.4	0.8	0.33
Never	10.4	0.1	
Long acting reversible contraceptive history			<0.001
Never used LARC method	9.1	5.7	
Considered LARC use, decided against	13.4	3.6	
Current/previous LARC user	15.2	2.4	

Results presented as mean LARC knowledge scores with standard deviations (SD) and p-values.

Comparisons of means by student's t-tests and ANOVA. Two-tailed $p < 0.05$ significant indicated in bold.

Possible scores range from 0–20 and indicate the number of LARC knowledge questions answered correctly.

LARC = long acting reversible contraception

Table 4

Factors associated with college women's LARC knowledge scores

	Adj. Beta	95% CI	P-value
Age	-0.13	-0.33, 0.08	0.21
Race			
White	ref	ref	ref
Black	-1.55	-2.96, -0.15	0.03
Hispanic	-0.89	-2.37, 0.60	0.24
Asian	-3.32	-4.12, -2.52	<0.001
Other	-0.57	-1.58, 0.43	0.26
Year in undergraduate program			
First year	ref	ref	ref
Second year	-0.14	-0.89, 0.61	0.72
Third year	1.19	0.25, 2.14	0.01
Fourth year	1.18	0.10, 2.26	0.03
Fifth year or more	1.98	0.33, 3.63	0.02
Lives on campus	-0.04	-0.69, 0.61	0.90
Participates in a sorority	0.72	0.05, 1.39	0.04
Relationship status			
Married/engaged	ref	ref	ref
Cohabiting	-0.60	-2.70, 1.50	0.58
Long-term relationship	0.27	-1.52, 2.05	0.77
Casual	-0.86	-0.98, 2.70	0.36
None	0.04	-1.75, 1.83	0.96
Mother's education level high school graduate	-0.46	-1.28, 0.35	0.27
Religiously affiliated	-0.84	-1.47, -0.21	0.009
Religious service attendance			
Never attends services	ref	ref	ref
Attends services < Weekly	-0.06	-0.68, 0.56	0.86
Attends services weekly or more frequently	-1.05	-1.96, -0.16	0.02
Employed (paid or volunteer)	0.64	0.11, 1.17	0.02
Heterosexual sexual orientation	-1.19	-2.08, -0.31	0.008
Sexual intercourse with male partner ever	-0.16	-1.13, 0.80	0.74
Used contraception ever	1.25	0.27, 2.22	0.01
Pregnancy ever	0.08	-1.63, 1.78	0.93
Long acting reversible contraceptive history			
Never used LARC method	ref	ref	ref
Considered LARC use, decided against	3.21	2.62, 3.79	<0.001
Current/previous LARC user	4.92	3.76, 6.08	<0.001

Results are from multivariable linear regression models with LARC knowledge score modeled as outcome.

Results presented as adjusted beta coefficients with 95% confidence intervals (CI) and p-values.

P-values considered significant at alpha <0.05 indicated in bold font.

LARC = long acting reversible contraception

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Table 5

College women's perceived barriers to using the intrauterine device and implant

	Barrier to IUD use (%)	Main reason would prevent IUD use	Barrier to implant use	Main reason would prevent implant use
Individual Level				
You do not want a foreign object in your body	43.7	12.7	41.0	12.9
You would rather use a method that you are in control of stopping and starting	42.0	6.7	38.0	5.6
You do not know enough about that method to feel comfortable using it	41.9	17.5	41.2	22.0
You are worried about pain with having that method inserted	30.1	3.2	23.6	2.2
You are worried about side effects (i.e. weight gain, mood changes)	27.6	1.9	24.9	2.6
You are worried about serious health problems (i.e. blood clots, cancer)	26.8	3.5	23.9	3.2
You prefer not to have a method placed in that location in your body	26.8	2.8	23.6	2.7
You are worried about infertility	22.5	3.3	18.7	2.0
You are worried about irregular bleeding or spotting	18.1	0.6	14.1	0.8
You are worried about method interfering with your sexual life or enjoyment	11.0	0.3	8.8	0.1
You are not eligible for that method because you have never given birth	6.9	0.8	6.4	0.4
You are not eligible for that method because you've had gynecological problems	2.1	0.1	1.9	0.3
You had a bad experience with that method already	1.6	0.4	1.2	0.1
Health Systems Level				
You are worried about cost or insurance coverage	27.1	8.2	21.0	5.6
You do not want to go in to the clinic multiple times for counseling or insertion	21.4	0.4	18.6	0.6
You have to go to a health care provider to have that method inserted or removed	19.6	2.6	15.0	1.8
A health provider says you should not use that method	7.2	4.3	4.9	3.6
You do not have access to a health care facility that can give you that method	5.2	0.3	4.6	0.0
Community/Interpersonal Level				
You have not been in a long-term relationship	22.8	7.1	21.3	6.9
Your friends or relatives have had bad experiences with that method	12.5	2.0	5.4	0.9
You have heard bad things about that method on TV or in the newspaper	7.5	0.4	6.5	0.3
Your religion prevents you from using that method	3.7	1.4	3.7	1.3
Other				
You have some other reason	10.7	8.4	9.3	8.2
None of these or any other reasons have prevented you from using that method	13.0	7.5	12.0	8.0

Sub-sample is 1,604 women who reported one or more barriers to IUD or implant use.

Results are proportions (%) reporting each item as a barrier to IUD or implant use (multiple responses permitted) and % reporting each reason as main (number one) reason for IUD or implant nonuse (one response permitted).

Percentages for main reason may not add to 100% due to 0–4% missing data for survey items.

IUD = intrauterine device