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Authors

Gibbs, Susannah E
Rocca, Corinne H
Bednarek, Paula
[et al.](#)

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Long-Acting Reversible Contraception Counseling and Use for Older Adolescents and Nulliparous Women

Susannah E. Gibbs, M.S.P.H.^{a,*}, Corinne H. Rocca, Ph.D., M.P.H.^a, Paula Bednarek, M.D., M.P.H.^b, Kirsten M. J. Thompson, M.P.H.^a, Philip D. Darney, M.D., M.Sc.^a, Cynthia C. Harper, Ph.D.^a

^aBixby Center for Global Reproductive Health, Department of Obstetrics, Gynecology and Reproductive Sciences, University of California, San Francisco, California

^bDepartment of Obstetrics and Gynecology, Oregon Health & Science University, Portland, Oregon

Abstract

Purpose: The majority of pregnancies during adolescence are unintended, and few adolescents use long-acting reversible contraception (LARC) due in part to health care providers' misconceptions about nulliparous women's eligibility for the intrauterine device. We examined differences in LARC counseling, selection, and initiation by age and parity in a study with a provider's LARC training intervention.

Methods: Sexually active women aged 18–25 years receiving contraceptive counseling (n = 1,500) were enrolled at 20 interventions and 20 control clinics and followed for 12 months. We assessed LARC counseling and selection, by age and parity, with generalized estimated equations with robust standard errors. We assessed LARC use over 1 year with Cox proportional hazards models with shared frailty for clustering.

Results: Women in the intervention had increased LARC counseling, selection, and initiation, with similar effects among older adolescent and nulliparous women, and among young adult and parous women. Across study arms, older adolescents were as likely as young adults to receive LARC counseling (adjusted odds ratio [aOR] = .85; 95% confidence interval [CI]: .63–1.15), select LARC (aOR = .86; 95% CI: .64–1.17), and use LARC methods (adjusted hazard ratio [aHR] = .94; 95% CI: .69–1.27). Nulliparous women were less likely to receive counseling (aOR = .57; 95% CI: .42–.79) and to select LARC (aOR = .53; 95% CI: .37–.75) than parous women, and they initiated LARC methods at lower rates (aHR = .65; 95% CI: .48–.90). Nulliparous women had similar rates of implant initiation but lower rates of intrauterine device initiation (aHR = .59; 95% CI: .41–.85).

Conclusions: Continued efforts should be made to improve counseling and access to LARC methods for nulliparous women of all ages.

*Address correspondence to: Susannah E. Gibbs, M.S.P.H., Department of Obstetrics, Gynecology and Reproductive Sciences, University of California, San Francisco, CA. sgibbs@jhu.edu (S.E. Gibbs).

Registered with clinicaltrials.gov. Identifier: .

Keywords

Adolescent; Nulliparous; Long-acting reversible contraception

Most adolescents are not trying to become pregnant, yet they rarely use the most effective methods of contraception. More than three quarters of pregnancies to adolescents aged 18–19 years and about two out of three of those to young women aged 20–24 years in the United States are unintended [1]. Many young people become sexually active during adolescence, and sexually active adolescents and young women aged less than 25 years have a higher risk of unintended pregnancy than older sexually active adults [2]. Long-acting reversible contraception (LARC)—intrauterine devices (IUDs) and subdermal implants—is highly effective, with less than 1% of users becoming pregnant within the first year of use compared to about 9% of pill, patch, or ring users and 18% of condom users [3]. For both condoms and the pill, younger users have higher risk of method failure [4]. Data from the National Survey of Family Growth indicate a gradual increase in use of LARC methods among women ages 18–19 years from less than 1% in 2002 [5] to 6.6% of all contraceptive use by 2009 [6]. Use among young women aged 20–24 years also increased from 1.9% in 2002 to 8.3% in 2009 and then to 14% in 2012 [6,7].

Nulliparous women also have historically low usage of LARC methods despite lack of medical contraindication. Compared to women who have given birth, nulliparous women are significantly less likely to use LARC methods [7-9]. Recent surveys have estimated the prevalence of LARC use among nulliparous women at 5.9% nationally [7].

Despite the low use of LARC methods among adolescents and nulliparous women, several studies have found that they have high rates of continuation [10,11] that generally do not differ from those of parous and older women [11,12]. Furthermore, among adolescents, LARC continuation is much higher than continuation of other methods such as the pill or the injectable [10,13].

Several professional organizations have issued guidelines supporting LARC use among adolescents and nulliparous women. The American College of Obstetricians and Gynecologists supports LARC use for adolescents and nulliparous women and recognizes the need for health care provider training that increases accurate knowledge relating to LARC provision for adolescents [14,15]. The American Academy of Pediatrics supports IUD and implant use among adolescents [16], and the Centers for Disease Control and Prevention (CDC) also indicate that both the IUD and the implant are appropriate contraceptive methods for adolescents and nulliparous women [17].

Despite these guidelines, misperceptions and negative attitudes about the suitability of the IUD and implant for adolescents and nulliparous women persist among patients and providers. Adolescents are less likely to have accurate knowledge about LARC methods [18,19]. Among clinic-based samples of adolescents and young adult women in New York, less than half of the participants had heard of the implant [20], and fear of pain and side effects were identified as predominant barriers to IUD use [21]. In a clinic sample of adolescents and young adults in California, less than half had heard of the IUD, but

participants were more likely to express interest in using it if they were parous and had heard about it from a health care provider [22].

Health care providers' knowledge and attitudes can be barriers to including LARC methods in the full range of methods available to adolescent and nulliparous patients. In fact, one of the major concerns that clinicians may have with discussing LARC with adolescents and young adults may be related to misinformation about the suitability of LARC methods for nulliparous women. Clinician surveys have shown lack of awareness of medical eligibility criteria and widespread reticence to recommend LARC to adolescent and nulliparous patients [23-25]. Some providers are concerned about multiple sexual partners and reduced condom use [26]. Provider training on LARC methods, both in residency and continuing education, is associated with more evidence-based practices and higher provision [24,25,27,28]. Addressing other barriers to LARC access is also critical to young women's access, including the high upfront cost of these methods [29].

Interventions have attempted to address barriers to LARC access for young women. A brief clinic-based patient education intervention for young women, with a pre- and post-test design, resulted in immediate improvements in knowledge and attitudes toward LARC [30], but the study did not assess method use. The CHOICE Project in St. Louis, an observational cohort study of women initiating a new method that provided no-cost contraception, had high interest from adolescents in LARC methods, with younger adolescents preferring the implant and older adolescents preferring the IUD [31].

The Adolescent Family Life Program [32] and the Colorado Adolescent Maternity Program [33,34] focused on pregnant and postpartum adolescents with resource-intensive strategies including home visiting and case management. While evaluations of these programs have shown promising results for improving LARC access and prevention of subsequent pregnancy [32-34], they did not address LARC use among nulliparous adolescents.

We conducted a cluster randomized trial of a clinic-wide training intervention to increase accurate knowledge of medical eligibility for LARC use and to build counseling and clinical skills. Overall trial results showed that participants at intervention clinics were more than three times as likely to be counseled on LARC and almost twice as likely to select an LARC method [35]. Women at intervention clinics also had higher rates of LARC method initiation [29]. Here, we present a prespecified subanalysis of the trial data by age group and parity to provide evidence for practices aimed at increasing access to LARC methods for adolescents and nulliparous women.

Methods

Our cluster randomized trial took place in 40 Planned Parenthood health centers serving low-income, diverse patient populations throughout the United States. Clinics were located in 15 states across geographic regions of the United States (California, Colorado, Connecticut, Florida, Hawaii, Idaho, Michigan, Minnesota, New Jersey, New Mexico, North Carolina, Ohio, Oregon, Pennsylvania, and Washington). Eligible sites had 400 annual patients; 20% of patients receiving IUDs or implants; no ongoing LARC interventions; and

no shared staff with another study clinic. Clinics were randomly allocated to receive the intervention training or to serve as control sites. Randomization was stratified by clinic size. Allocation assignment was concealed until the study began. The intervention consisted of a half-day continuing medical education–accredited training for all clinic staff, including clinical providers, health educators, and administrators. The evidence-based training was a session on updated indications of LARC methods, medical eligibility, and case studies, guided by the CDC’s U.S. Medical Eligibility Criteria for Contraceptive Use [17]. The training encouraged a patient-centered counseling approach with reproductive life planning, ethics on LARC methods including removal at patient request, and showed the World Health Organization tiers of effectiveness chart [36]. Training materials were suitable for older adolescents and young adults and presented recommendations based on research about this population. Clinicians received hands-on training on all available IUDs, and if interested, were scheduled for hands-on training for the subdermal implant with the manufacturer. Intervention clinics were asked to show a patient education video in the waiting room that included peers who used LARC methods and all other contraceptives. Clinics maintained real-world settings, including usual cost for contraceptive care.

After the training session took place at intervention sites, 1,500 participants were enrolled across the 40 study sites and followed for 1 year. Women were eligible to participate if they were aged 18–25 years, at risk of pregnancy, did not desire pregnancy in the next year, and received contraceptive counseling at the visit. Patients were recruited from 17 abortion care sites and 23 family planning clinics. Women who agreed to participate in the study provided written informed consent. Participants completed a baseline survey after their visit that included questions on sociodemographics, sexual and reproductive health history, contraceptive counseling received, as well as prior and intended contraceptive method use. Research assistants contacted participants to complete phone or online follow-up surveys at 3, 6, 9, and 12 months to assess contraceptive method use. A medical record review was conducted for participants for 12 months following enrollment.

Participants received a \$20 gift card for each survey completed and a \$30 gift card for each of two home pregnancy tests. Ethical approval was obtained from the University of California, San Francisco’s Committee on Human Research and Allendale Investigational Review Board for Planned Parenthood.

Measures

Dependent variables for this analysis were counseling on LARC methods; selection of an LARC method; and actual LARC initiation over 1 year. LARC counseling was assessed in the baseline survey with a question to participants as to whether a nurse, doctor, or counselor had discussed the IUD or implant during the clinic visit. Data were missing for less than 1% (10/1,500) participants on this variable. LARC selection was ascertained at baseline by asking participants what method they decided to use at the visit. We created a dichotomous variable for selection of an LARC method. Data were available for all participants on this variable. Actual LARC initiation was assessed using data from the follow-up surveys asking participants which methods they had used since the previous survey. We also used data from

medical records documenting IUD and implant insertions, so data were available for all participants on this variable.

The independent variables of interest were age (adolescent aged 18–19 years vs. young adult aged 20–25 years) and parity (nulliparous vs. parous). We also included controls for race/ethnicity (white, black, Hispanic, other), health insurance (private insurance, Medicaid/state insurance, no insurance, do not know), multiple sexual partners in past 3 months, pregnancy happiness (participant would be happy or very happy if she got pregnant in the next year vs. unhappy or very unhappy), and LARC use in the 3 months prior to study enrollment. We controlled for whether the participant was recruited from a family planning or abortion care setting and whether the clinic was located in a state with a family planning Medicaid expansion program, a factor found to be strongly associated with LARC use [29]. The clinic intervention variable, study arm, was included in all models.

Analysis

Analyses were conducted on an intent-to-treat basis, accounting for the clustering of participants within clinical sites. Analysis populations included participants with data on each outcome variable. We used a generalized estimating equation approach to account for clustering, with robust standard errors. To estimate differences in LARC counseling and selection, by age and parity, we used logistic regression models with generalized estimating equation and included control variables in addition to age, parity, and study arm. We tested interaction terms between the intervention and age group and, separately, the intervention and parity. We used multiple imputation for missing data in multivariable analyses.

To assess LARC initiation rates by age and parity, we used life table analyses and estimated multivariable Cox proportional hazards models with shared frailty to account for clustering or nonindependence of observations among participants within sites. Participants contributed observation time to the analysis until they received an LARC method, became pregnant, or exited the study at 1 year. We again tested intervention by age group and intervention by parity interactions. Participants already using an LARC method at enrollment were excluded ($n = 22$). Schoenfeld residuals were used to confirm whether proportional hazards assumptions were met. All analyses were repeated examining IUD and implant outcomes separately. We used Stata, version 14.0, for analyses (College Station, TX) and reported results at the $p < .05$ level.

Results

A total of 1,500 women were enrolled, 802 from intervention sites and 698 from control sites. Participants were on average age of 21 years, with 22% adolescents (Table 1). Seventy-one percent of participants were nulliparous.

Adolescents

LARC counseling, selection, and initiation were higher at intervention clinics compared to control clinics for both adolescents and young adults (Table 2). Both adolescents and young adults in the intervention were more likely to report that a provider had discussed LARC methods with them compared to those in control clinics (66% vs. 33% for adolescents and

73% vs. 41% for young adults). Intervention adolescents and young adults were also more likely to select an LARC method at their enrollment visit compared to participants at control clinics (27% vs. 12% for adolescents and 28% vs. 18% for young adults). Actual initiation rates of LARC methods were higher in intervention compared to control for each age group as well (23/100 person-years [PY] vs. 14/100 PY for adolescents and 21/100 PY vs. 19/100 PY for young adults).

In multivariable models showing main effects (no interaction), adolescents were similar to young adults in receipt of LARC counseling (adjusted odds ratio [aOR] = .85; 95% CI: .63–1.15), LARC selection (aOR = .86; 95% CI: .64–1.17), and LARC initiation (aHR = .94; 95% CI: .69–1.27; Tables 3 and 4). Models with interaction terms between age and study arm showed that the interactions were not significant for any of the three LARC outcomes, indicating that the intervention had a similar effect for adolescents as for young adults (Tables 3 and 4).

Nulliparous women

Both nulliparous and parous women had higher levels of LARC counseling, initiation, and selection in intervention clinics compared to those in control clinics (Table 2). Those in the intervention were more likely to receive counseling about LARC during their enrollment visit (69% vs. 34% for nulliparous and 76% vs. 51% for parous) and were more likely to select an LARC method (22% vs. 12% for nulliparous and 46% vs. 27% for parous) than those in the control. Initiation of an LARC method during the study period was also higher among both nulliparous and parous women at intervention clinics compared to control clinics (19/100 PY vs. 13/100 PY for nulliparous $p = .12$ and 32/100 PY vs. 29/100 PY for parous $p = .52$).

In adjusted analyses, nulliparous women, compared to parous women, had lower receipt of LARC counseling (.57; 95% CI: .42–.79), lower LARC selection (aOR = .53; 95% CI: .37–.75), and lower LARC initiation (aHR = .65; 95% CI: .48–.90; Tables 3 and 4). Interaction terms between parity and study arm were not significant for LARC counseling, selection, and initiation, indicating that the intervention effect was similar for nulliparous and parous women.

Intrauterine device and implant initiation

When examining outcomes separately for the IUD and implant, study findings were generally similar to results for the combined LARC outcomes. Among all women, those at intervention clinics had higher implant counseling, selection, and initiation. IUD counseling and selection were also higher among women at intervention clinics while IUD initiation was not significantly different. Interaction models indicated that the intervention effect on IUD and implant outcomes was similar between adolescent and young adult women, and between nulliparous and parous women.

Across study arms, there were no significant differences between adolescents and young adults in initiation rates for the IUD (aHR = .83; 95% CI: .56–1.21) or for the implant (aHR = 1.29; 95% CI: .79–2.09). Nulliparous women had a lower rate of IUD initiation in both

intervention and control (aHR = .59; 95% CI: .41–.85). In contrast, there was no difference in implant initiation by parity (aHR = .98; 95% CI: .55–1.73).

Discussion

Improving health care providers' knowledge and skills on LARC methods has the potential to increase access to the full range of contraceptive methods, allowing women to make informed choices about contraceptive use, particularly for adolescents and nulliparous women, who have low knowledge of LARC methods [18,19]. This provider's training intervention increased LARC counseling, selection, and initiation among young women [29,35]. In this analysis, we found that intervention effects were similar comparing adolescents and young adults, and nulliparous and parous women.

The significant intervention effect on LARC counseling suggests that this intervention can increase access to the full range of contraceptive methods for adolescents and nulliparous women. These findings are encouraging, considering that health care providers' lack of accurate knowledge and reticence to offer LARC to adolescents and nulliparous women [23-25] may provide barriers to these women's ability to make a fully informed choice from the range of options.

There are important concerns about overpromotion of LARC methods to the exclusion of other methods that need to be considered in any contraceptive intervention, especially since these methods require a clinician for placement and removal [37]. Published data from this intervention showed a greater range of methods offered to women, including IUDs and implants, without reduced counseling on more common methods such as oral contraceptives; women in intervention had higher contraceptive knowledge, which allowed for more informed choices, and also reported high autonomy in decision-making [35]. Low rates of LARC use among adolescents and nulliparous women [6] accompany low levels of knowledge about these methods [18,19] and supporting shared or autonomous decision-making while increasing knowledge is especially important among adolescent patient populations.

Adolescents in our study were somewhat more likely to use the implant, though the differences in selection and initiation did not reach statistical significance. These findings are consistent with patterns of LARC selection among adolescents enrolled in the CHOICE Project, where implant use was high among adolescents [38]. Qualitative findings from the CHOICE Project indicate that adolescent LARC users value the high effectiveness of their method and that contraceptive counseling is important in method selection [39]. Additional factors, including funding, are demonstrated as very important both in the CHOICE study and in our study with varied funding contexts [29]. Many studies, including ours, demonstrate that same-day provision is important for adolescents and young women choosing IUDs and implants to actually be able to use them, especially for postabortion contraception [40].

Nulliparous women were less likely than parous women to receive counseling and to subsequently select and use LARC in our study. Lower levels of LARC counseling among

nulliparous women may be a result of provider attitudes but may also be due to women's own stated preference at the time of counseling. Nulliparous women may differ from parous women in their contraceptive preferences for a number of reasons and may have a preference for shorter acting methods if they are intending pregnancy within the next several years. Several previous interventions have addressed LARC use among parenting adolescents [32,33], but few specifically addressed barriers faced by nulliparous adolescents. Nulliparous women, like adolescents, should receive accurate information about medical eligibility for the IUD and implant as recommended by the American College of Obstetricians and Gynecologists and the CDC [15,17].

This study has several limitations. The age range of the study is from 18 to 25 years, and younger adolescents were not included due to concerns about collecting sensitive information from minors. There were relatively few implant initiators in the study, which were designed to assess the LARC methods together, rather than individually. Despite these limitations, our study design and sample size allowed us to examine the associations of age and parity with contraceptive outcomes in a geographically diverse sample that included participants from sites throughout the United States.

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IMPLICATIONS AND CONTRIBUTION

This analysis provides insight into long-acting reversible contraception counseling and use among adolescent and nulliparous women in the context of an easily scalable and effective health care provider training. Efforts should be made to increase access to the implant for adolescents and to equip providers to counsel and offer intrauterine devices to nulliparous women.

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Table 1

Baseline characteristics by age group

Characteristic	Older adolescents (aged 18–19 years; n = 336)	Young adults (aged 20–25 years; n = 1,164)	Total; (n = 1,500)	p value
Age (years); mean (SD)	18.5 ± .52	22 ± 1.7	21 ± 2.2	
Nulliparous; n (%)	282 (85.7)	770 (66.6)	1,052 (70.6)	<.001
Race/ethnicity; n (%)				.004
White	142 (42.3)	602 (51.7)	744 (49.6)	
Hispanic	119 (35.4)	289 (24.8)	408 (27.2)	
Black	48 (14.3)	174 (14.9)	222 (14.8)	
Other	27 (8)	99 (8.5)	126 (8.4)	
Married	7 (2.1)	83 (7.2)	90 (6.1)	.003
Health insurance type; n (%)				<.001
Private	88 (26.5)	359 (31.0)	447 (30.0)	
Medicaid/state	108 (32.5)	301 (26.0)	409 (27.4)	
No insurance	107 (32.2)	463 (40.0)	570 (38.3)	
Don't know	29 (8.7)	35 (3.0)	64 (4.3)	
Would be unhappy if pregnant; n (%)	270 (81.8)	921 (79.8)	1,191 (80.3)	.20
Used LARC in past 3 months; n (%)	8 (2.4)	55 (4.8)	63 (4.2)	.05
Multiple partners in past 3 months; n (%)	65 (19.5)	240 (20.8)	305 (20.5)	.58
Clinic site characteristics				
Study group; n (%)				.33
Intervention	191 (56.8)	611 (52.5)	802 (53.5)	
Control	145 (43.2)	553 (47.5)	698 (46.5)	
Practice setting; n (%)				.21
Family planning	205 (61)	647 (55.6)	852 (56.8)	
Abortion	131 (39)	517 (44.4)	648 (43.2)	
Family planning Medicaid expansion; n (%)	187 (55.6)	712 (61.2)	899 (59.9)	.19

SD = standard deviation.

Table 2

LARC counseling, selection, and initiation by age group, parity, and study arm

	Counseled on LARC (n = 1,490); n (%)		Selected LARC (n = 1,500); n (%)		Initiated LARC (n = 1,478); n (rate per 100 PY)	
	Control	Intervention	Control	Intervention	Control	Intervention
Age group						
Adolescent (18–19 years)	48 (33.3)	124 (66.0)	17 (11.7)	51 (26.7)	19 (14.0)	40 (23.1)
Young adult (20–25 years)	223 (40.6)	441 (72.4)	100 (18.1)	173 (28.3)	92 (19.1)	122 (20.6)
Parity						
Nulliparous	156 (33.6)	403 (69.2)	56 (12.0)	127 (21.7)	53 (12.9)	102 (18.6)
Parous	114 (51.1)	160 (75.8)	60 (26.7)	97 (45.8)	57 (29.0)	60 (32.0)

PY = person-years.

Table 3

Main effects and interactions of study arm, age group (adolescent 18–19 years vs. young adults 20–25 years), and parity (nulliparous vs. parous) on LARC counseling and selection

	Counseled on LARC (n = 1,500)			Selected LARC (n = 1,500)		
	Model 1: main effects	Model 2: interaction (intervention by adolescent)	Model 3: interaction (intervention by nulliparous)	Model 1: main effects	Model 2: interaction (intervention by adolescent)	Model 3: interaction (intervention by nulliparous)
	aOR	95% CI	aOR	95% CI	aOR	95% CI
Intervention	3.99	[2.86–5.57]***	4.03	[1.80–5.82]***	3.21	[2.14–4.81]***
Adolescent (18–19 years)	.85	[-.63–1.15]	.87	[-.58–1.32]	.85	[-.63–1.14]
Intervention by adolescent interaction	—	—	.95	[-.55–1.64]	—	—
Nulliparous	.57	[-.42–.79]**	.57	[-.42–.79]**	.50	[-.33–.75]**
Intervention by nulliparous interaction	—	—	—	—	1.35	[-.79–2.29]
					2.30	[1.71–3.10]***
					.86	[-.64–1.17]
					1.24	[-.67–2.31]
					.52	[-.37–.75]***
					—	—
					2.21	[1.58–3.08]***
					.75	[-.46–1.22]
					—	—
					.57	[-.39–.85]**
					.87	[-.49–1.53]

*** *p* .01;

*** *p* .001.

Models also include race/ethnicity, multiple sexual partners, insurance status, pregnancy intentions, LARC use prior to study enrollment, practice setting, and family planning Medicaid expansion.

aOR = adjusted odds ratio; CI = confidence interval.

Table 4
Main effects and interactions of study arm, age group (adolescent 18–19 years vs. young adults 20–25 years), and parity (nulliparous vs. parous) on LARC initiation

Initiated LARC (n = 1,478)						
	Model 1: main effects		Model 2: interaction (intervention by adolescent)		Model 3: interaction (intervention by nulliparous)	
	aHR	95% CI	aHR	95% CI	aHR	95% CI
Intervention	1.45	[1.03–2.03]*	1.44	[1.00–2.08]*	1.29	[.83–2.01]
Age group						
Adolescent (18–19 years)	.94	[.69–1.27]	.93	[.56–1.54]	.94	[.69–1.27]
Intervention by adolescent interaction	—	—	1.01	[.54–1.89]	—	—
Parity						
Nulliparous	.65	[.48–.90]**	.65	[.48–.90]**	.58	[.38–.90]*
Intervention by nulliparous interaction	—	—	—	—	1.22	[.73–2.03]

* *p* .05;

** *p* .01.

Models also include race/ethnicity, multiple sexual partners, insurance status, pregnancy intentions, LARC use prior to study enrollment, practice setting, and family planning Medicaid expansion.

CI = confidence interval.