

Availability of and Interest in Long-Acting Reversible Contraception (LARC) and their Effect on LARC Utilization among Latina Adolescents

Brittany Badal^{1*}, Loris Y Hwang², Lance Pollack³, Felicia Rodriguez⁴, Rosario Rico⁵, Sang Leng Trieu⁵ and Kathleen P Tebb⁶

¹University of California, California, United States

²Department of Pediatrics, Division of Adolescent & Young Adult Medicine, University of California Los Angeles, California, United States

³Center for AIDS Prevention Studies (CAPS), University of California San Francisco, California, United States

⁴Development Cooperation Directorate, Organisation for Economic Cooperation and Development, France

⁵The Los Angeles Trust for Children's Health, California, United States

⁶Department of Pediatrics, Division of Adolescent and Young Adult Medicine, University of California San Francisco, California, United States

Abstract

Background: To examine the impact of on-site availability of long-acting reversible contraceptive methods (LARC) at school-based health centers (SBHCs) on interest and use of LARCs.

Aim: This study examined the association between LARC availability at nine SBHCs and LARC interest and uptake among sexually active Latinas aged 14-18 years.

Methods: Participants completed four surveys: baseline (at the recruitment visit) and at 48-hours, 3-months and 6-months post-recruitment visit. Multivariate logistic regression models analyzed the effect of on-site LARC availability and adolescents' interest in using a LARC and on subsequent LARC utilization.

Results: Of the 334 participants, 28% reported interest in using LARC; 45% had on-site access to LARCs at their SBHC. Utilization of LARC was 6.0% at the 48-hour follow-up, 8.3% at 3-months and 7.2% at the 6-month follow-up. Initial interest in LARC use was significantly associated with subsequent LARC utilization at all follow-ups. However, on-site clinic availability to LARCs significantly increased LARC use only at the 6-month follow-up.

Conclusion: Latina adolescents' interest in LARC use far exceeded their actual utilization. Efforts to increase LARC access are warranted to assure that all adolescents are able to get their preferred contraceptive method. SBHCs can serve a critical role in supporting adolescents' access to contraceptive care.

***Correspondence to:** Brittany Badal, University of California, California, United States; Tel: (904) 881-9811; Fax: (415) 476-6106; E-mail: Brittany.badal@ucsf.edu

Citation: Badal B, Hwang LY, Pollack L (2021) Availability of and Interest in Long-Acting Reversible Contraception (LARC) and their Effect on LARC Utilization among Latina Adolescents. *J Womens Health Care Manage*, Volume 2:3. 123. DOI: <https://doi.org/10.47275/2692-0948-123>

Received: May 10, 2021; **Accepted:** May 24, 2021; **Published:** May 29, 2021

Introduction

Long-acting reversible contraception (LARC) devices, including etonogestrel implants and levonorgestrel intrauterine devices (IUDs), are highly effective contraception options for all women including adolescent and young adult nulliparous women. The American Academy of Pediatrics recommends that providers begin contraception counseling with a discussion of LARCs since they have the highest effectiveness rates of all contraceptive methods [1,2]. Professional guidelines by the Society of Adolescent Health and Medicine and the American College of Obstetricians and Gynecologists both recommend patient-centered contraceptive counseling and providing full access to a range of options including LARCs methods [3,4]. Despite these recommendations, only two-thirds of publicly funded US health centers have providers trained to place and remove both implant and IUD devices, while one fifth of health centers did not offer any LARC methods on-site [5]. In addition, in a national survey of 561 practicing pediatricians, while more than 70% prescribe short-acting hormonal

contraceptives for their adolescent patients, less than 5% insert LARC devices [6]. The need for a referral to a LARC provider creates additional barriers for adolescents who may not have access to or the skills to navigate the health system or may feel hesitant to see a non-pediatric provider. In a study of a large urban health system, adolescent patients who were referred from a general pediatrics clinic for contraception waited an average of 45 days to see the consulting provider, approximately 42% of patients failed to keep referral appointments and 15% cancelled or rescheduled their referral appointment [7], thereby increasing their risk of unintended pregnancy. Convenience of method access has been found to be a significant motivator for patients to choose non-LARC methods when LARC placement was not available on-site [8]. Hence, it would follow that on-site availability of LARC placement may promote the selection of LARCs by adolescents, but evidence is lacking. Sexually active females are more likely to have used hormonal contraceptives if their school has a school-based health center (SBHC) [9]; however, research examining the effect of on-site LARC availability on LARC utilization at SBHCs is also lacking. Further, the impact of



immediate access to LARCs on adolescent contraceptive decision making is particularly salient among Latina adolescents, since this group experiences disparities in reproductive health outcomes such as higher rates of unintended pregnancies [10]. The provision of patient-centered contraceptive care is essential as is equitable access to the full range of contraceptive options. Understanding the role of LARC access in patient decision-making would inform public health efforts to improve utilization of highly effective LARCs for adolescents who are interested in using this method of contraception.

This study aims to examine the associations between adolescents' interest in LARCs along with LARC access on-site at SBHCs and utilization of LARCs among previously non-LARC-using sexually active Latinas aged 14-18 years. Specifically, we hypothesized that both self-reported interest in LARCs and on-site access to LARCs would be associated with greater utilization of LARC methods. Additionally, we hypothesized that LARC interest may moderate the effect of access, whereby on-site access would have an effect on utilization in the presence of personal interest but not in the absence of personal interest in a LARC method.

Methods

Participants

This study is part of a larger randomized controlled trial to evaluate the impact of *Health-E You/Salud iTu*, a computer-based application (app), on its ability to support contraception decision-making among sexually active Latina adolescents, not currently using a LARC, and not currently pregnant [11]. To assess the impact on the availability of LARCs at SBHCs, our current sample included 334 participants who were given the *Health-E You* app upon recruitment immediately prior to a clinic visit at one of the nine SBHCs, reported that they wanted to avoid pregnancy and completed at least one of the three on-line follow-up surveys (48-hours, 3-months, and 6-months post-recruitment visit). A total of 264 participants completed the 48-hr follow-up survey (in which they reported the results of their clinic visit), 236 completed the 3-month follow-up survey, and 240 completed the 6-month follow up survey.

Instrumentation and Procedure

All adolescent girls at the nine SBHCs were offered the *Health-E You* app on an iPad which assessed study eligibility, obtained voluntary informed consent, and gathered baseline information including contraceptive use and desire to avoid pregnancy. As described elsewhere [12], the app administered a series of questions to participants about their medical history, sexual activity, attitudes towards pregnancy and contraception, contraceptive history, contraceptive method satisfaction, and attitudes about factors that may be important when considering a contraceptive method. Using an interactive format and based on the adolescent's responses, the app presented contraceptive recommendations for the patient and basic information about the recommended choices. However, participants were encouraged to learn more about any contraceptive method. Upon completing the app, participants were asked to select the method(s) they were most interested in and then provide the best contact information (e-mail and/or cell phone) to receive the weblinks for the follow-up surveys. Participants received a gift card for completing each survey and a bonus for completing all surveys, for a \$70 maximum. This study received Institutional Review Board approval (UCSF IRB # 10-02730) and is registered with ClinicalTrials.gov as *Health-E You: Reducing Unintended Pregnancies Among Hispanic Adolescents*, #NCT02847858.

Measures

On-site access: To LARC devices varied across the nine SBHCs: six provided on-site access while three did not provide on-site access.

Interest in LARC: Was assessed upon completion of the *Health-E You* app. Participants were presented with the following message and task: "The app has shown you which methods might be best for you. You and your health care provider will be able to decide which one is really best. Touch the methods you are most interested in." The list of options presented to participants were intra-uterine device (IUD), implant, the contraceptive injection medroxyprogesterone acetate, commonly known as the "depo-provera", vaginal ring, patch, and birth control pills. If a participant selecting either the IUD or implant, they were classified as being interested in using a LARC.

LARC utilization: The primary outcome variable, was assessed slightly differently at each follow-up survey. At the 48-hour participants who reported either receiving an IUD or implant at their visit, or receiving a follow-up appointment or referral for a LARC placement, were considered to be LARC utilizers. In the 3-month survey, LARC utilization included participants who reported using an IUD or implant in the prior 3 months. In the 6-month survey, this definition was further refined to include participants who reported using an IUD or implant in the prior 3 months and were still using the method.

Covariates: Five covariates were considered for inclusion in the analytic models:

1. Age at baseline,
2. Sexual intercourse in the prior 3 months (yes/no),
3. How upset the participant would feel if they became pregnant in the next 3 months (a 4-point Likert-scale item that was then dichotomized as very upset vs. not very upset),
4. Language preference at home (only/mostly Spanish vs. both Spanish and English equally vs. only/mostly English), and
5. A contraception uses self-efficacy scale score (which was the sum of scores on 3 items with a response set ranging from 0=not at all confident to 10=completely confident; Cronbach's alpha ranged from 0.74 to 0.80).

An additional seven covariates, assessed only at the 48-hour follow-up survey, were considered for inclusion in that analytic model:

1. How upset their mother (or female mother figure) would feel if the participant became pregnant before age 20 years (very upset vs. not very upset),
2. How upset their father (or male father figure) would feel if the participant became pregnant before age 20 years (very upset vs. not very upset),
3. How upset their closest friend may feel if the participant became pregnant before age 20 years (very upset vs. a little upset vs. pleased/would not care),
4. How the participant viewed others knowing they are on contraception (Likert-scale response to the statement "I do not want others (such as my partner or family members) to be able to know that I am using birth control"),
5. If they had experienced a friend getting pregnant before age 20 years (yes/no),



6. If they had experienced a sibling getting pregnant before age 20 years (yes/no), and
7. A contraception knowledge score (range 0-7 correct).

Data Analysis

Given the varying operational definitions of LARC utilization, a separate multivariate logistic regression model was developed for the outcome at each of these three timepoints. We employed a two-step model building strategy. First, all potential contemporaneous covariates plus age at baseline were evaluated for inclusion in the multivariate model. Any covariate achieving $p < 0.25$ in a univariate logistic regression analysis qualified for inclusion, as suggested by Hosmer DW, et al. [13], an initial multivariate logistic regression model containing on-site access to LARCs, interest in LARC use and qualifying covariates assessed the two-way interaction of access and interest. The interaction term was not statistically significant ($p > 0.05$) in any of the three models. Consequently, we report results from multivariate models that do not include the interaction term.

For each regression model, multiple imputation of missing data was employed to minimize bias due to assessment-specific nonresponse, generating 50 imputed data sets. Each imputation model included all variables in the regression analysis model, auxiliary baseline variables associated with nonresponse, and recruitment site (SBHC). In addition, p-values were computed using robust standard error estimation to account for the potential lack of independence between observations due to clustering by recruitment site. All analyses were performed using Stata Release 15 statistical software.

Results

Participants' mean age at the time of SBHC recruitment visit was 16.5 years, 45% had on-site availability to a LARC method at SBHCs. Upon completion of the app, 28% of participants expressed interest in using a LARC method. At the 48-hour follow-up survey 6.0% reported either receiving a LARC or were given an appointment or referral for a LARC. At the 3-month follow-up 8.3% reported utilizing a LARC device in the prior 3 months, and 7.2% reported currently utilizing

a LARC at the 6-month follow-up. LARC utilization was markedly higher among those who expressed interest in LARC use and those with on-site LARC availability at SBHCs at each follow-up (Table 1).

When both variables (on-site availability and interest in a LARC) were included in multivariate models, participant interest in a LARC method was significantly associated with utilization of a LARC method at each follow-up (Table 2). In addition, participants with on-site LARC availability were significantly more likely to be using a LARC at the 6-month follow-up than those without on-site availability; this association approached but did not reach statistical significance at the 3-month follow-up (Table 2).

Discussion

Patients with interest and availability to LARCs demonstrated increased LARC utilization rates over time. Availability to LARC devices on-site at the SBHC appears to play a more important role in utilization over time. A lack of significant association at the 48-hour follow-up is not surprising given that even with on-site availability, it is not often possible for adolescents to receive a LARC that same day and thus it may have been too soon for on-site availability to have a measurable effect. At the 3-month follow-up, the association approached statistical significance but the association between on-site availability and LARC use was strongest at 6-month follow-up. It is possible that participants who selected a LARC method sooner may have felt comfortable with either an on-site procedure or pursuing their referral to another clinic, such that on-site access was not a strong factor in their decision. In contrast, perhaps those who needed more time for contemplation before choosing a LARC later during follow-up also may have been encouraged by the availability of LARC procedures on-site. While it may not always be feasible to provide youth with same-day LARC access, other system factors need to be explored in greater detail to understand and address barriers to adolescents obtaining the contraceptive method they desire in a timely fashion.

This study also found that although more than a quarter of our Latina adolescent participants expressed interest in utilizing a LARC method after using the *Health-E You* app, a much smaller proportion

Table 1: Percent of participants self-reporting LARC utilization after use of the Health-E You/Salud iTu contraception app.

	Category	LARC Utilization at 48 Hours	LARC Utilization at 3 Months	LARC Utilization at 6 Months
Interest in LARC use (upon completion of the App)	Yes	18.3	25.0	21.3
	No	1.1	2.1	1.8
On-site access to LARCs	Yes	10.2	16.1	12.6
	No	2.3	1.8	3.0
Overall utilization		6.0	8.3	7.2

Table 2: Odds of LARC utilization at 48 hours, 3 months, and 6 months after the baseline clinic visit by access to and interest in LARCs (N=334).

Timepoint	On-site Access to LARCs			Interest in LARCs		
	OR ^a	95%CI	p-value	OR ^a	95%CI	p-value
48 hours^b	2.22	0.58-8.55	.244	7.39	2.31-23.65	.001
3 months^c	3.57	0.95-13.35	.059	4.71	1.52-14.53	.007
6 months^d	2.92	1.11-7.71	.031	5.59	1.84-16.93	.003

Where: ^aUse of a LARC vs. Reference Group: No on-site LARC access/No interest in using a LARC.

^bLARC utilization defined as receiving, making an appointment to receive, or receiving a referral for IUD or implant; results adjusted for whether had sibling get pregnant before age 20.

^cLARC utilization defined as any use of IUD or implant in prior 3 months; results adjusted for language spoken at home and contraception use self-efficacy.

^dLARC utilization defined as current use of IUD or implant; results adjusted for contraception use self-efficacy.

Note: No covariate achieved statistical significance ($p < 0.05$) in any model.

For the outcome at each of the three time points, no more than two potential covariates (including whether participant had a sibling get pregnant before age 20 years, language spoken at home, and contraception use self-efficacy) met the criterion for inclusion, and none of those covariates achieved statistical significance in the multivariate models.



of this group obtained a LARC method over the 6-months of follow-up. It is important to note that the gap between the proportion of adolescents who expressed an interest in a LARC method and the proportion who subsequently acquired a LARC method persisted even out to 6-month follow-up. This finding suggests that while on-site access is an important factor to LARC utilization, more research is needed to understand how to provide patient-centered contraceptive counseling, especially for adolescents, while also ensuring they have accurate information about their options and equal access to all FDA approved contraceptive methods.

There are some noteworthy limitations to this study. Adolescents attending our SBHCs may not be representative of the larger population of Latina adolescents, which limits the generalizability of study findings. Further, this study was performed in California where, by state law, adolescents may receive birth control without parental consent, which allows adolescents access to confidential contraceptive services. This study is also limited in that it did not assess the complete range of factors that adolescents weigh when making contraceptive choices, such as concerns regarding LARC placement side effects, longevity of use of LARC devices, and the concept of LARC as a foreign body [14]. In addition, LARC uptake at the 48-hour, 3-month, and 6-month follow-up surveys were each analyzed separately because of varying definitions of LARC utilization applied in the larger study, as well as a different subset of participants who responded at each of these survey timepoints. This statistical approach does not allow us to benefit from the greater statistical power normally inherent in longitudinal analyses of repeated measures. Restricting the analyses to participants who completed at least one follow-up survey further limits generalizability of study findings, although the use of multiple imputation minimized bias due to assessment-specific non-response.

Despite these limitations, this study makes a significant contribution showing that both access to and interest in LARC methods are important in utilization of LARCs over time. This study demonstrates the potential effect that on-site access to LARCs has on LARC uptake among Latina adolescents seeking care within SBHCs. It also highlights the importance of providing in-clinic access to LARC devices so that all teens, regardless of where they live or go to school, have the same access to the whole suite of contraceptive options, including LARCs. There are noteworthy barriers to providing on-site LARC access such as provider knowledge surrounding LARC use in adolescents, clinic system practices including time in providers schedule for insertion, and financial barriers to providing LARC devices [15,16]. However, it is important to learn from clinical sites, such as SBHCs, that have overcome these barriers and to ensure there are adequate policies and practice supports to promote equity in contraceptive access. For example, one mobile clinic in Florida developed a framework for providing LARC which included partnering with a primary care office to allow for autoclaving of IUD insertion equipment, increasing LARC trained providers, and partnering with a pharmaceutical company patient assistance program to ensure no cost levonorgestrel IUDs are available to uninsured patients [17]. Thus, it is important to promote access to LARCs where adolescents seek care within a broader public health effort to understand and address patient and provider barriers to LARCs. It is also important to recognize that a patient-centered approach to contraceptive counseling and service delivery to reflect patient choice is critical, since LARCs may not be the best option for all teens. However, the ability to exercise one's freedom of choice is contingent upon access to all options.

Acknowledgements

None.

Authorship

Each author listed above meets criteria for authorship and has been integral to this project.

Funding

Provided by the Patient Centered Outcomes Research Institute, Contract # AD-1502-27481.

Conflict of Interest

The Authors declare that there is no conflict of interest.

Consent for Publication

The authors grant permission for publication.

Ethical and Human Subjects Approval Statement

The *Health-E You/Salud iTu* study has approval from the Institutional Review Board for Protection of Human Subjects at University of California San Francisco (IRB Approval #10-02730).

References

1. Ott MA, Sucato GS (2014) Contraception for adolescents. *Pediatrics* 134: e1244-e1256. <https://doi.org/10.1542/peds.2014-2300>
2. Curtis KM, Tepper NK, Jatlaoui TC, Berry-Bibee E, Horton LG, et al. (2016) US medical eligibility criteria for contraceptive use, 2016. *MMWR Recomm Rep* 65: 1-3. <https://doi.org/10.15585/mmwr.rr6503a1>
3. Society for Adolescent Health and Medicine, Burke PJ, Coles MS, Di Meglio G, Gibson EJ, et al. (2014) Sexual and reproductive health care: a position paper of the Society for Adolescent Health and Medicine. *J Adolesc Health* 54: 491-496. <https://doi.org/10.1016/j.jadohealth.2014.01.010>
4. American College of Obstetricians and Gynecologists (2017) Committee Opinion No. 710, Counseling adolescents about contraception. *Obstet Gynecol* 130: e74-e80. <https://doi.org/10.1097/aog.0000000000002234>
5. Bornstein M, Carter M, Zapata L, Gavin L, Moskosky S (2018) Access to long-acting reversible contraception among US publicly funded health centers. *Contraception* 97: 405-410. <https://doi.org/10.1016/j.contraception.2017.12.010>
6. Fridy RL, Maslyanskaya S, Lim S, Coupey SM (2018) Pediatricians' knowledge and practices related to long-acting reversible contraceptives for adolescent girls. *J Pediatr Adolesc Gynecol* 31: 394-399. <https://doi.org/10.1016/j.jpjag.2018.01.004>
7. Stowers P, Teelin K (2018) Referrals outcomes among pediatric patients referred to adolescent and gynecology. *J Pediatr Adolesc Gynecol* 31: 197-198. <https://doi.org/10.1016/j.jpjag.2018.02.091>
8. McCaffrey KA, MacAfee LK, Howard A, Howe AK, Brown SA (2017) Patient-perceived barriers to accessing long-acting reversible contraception among college students. *Contraception* 96: 292. <https://doi.org/10.1016/j.contraception.2017.07.112>
9. Ethier KA, Dittus PJ, DeRosa CJ, Chung EQ, Martinez E, et al. (2011) School-based health center access, reproductive health care, and contraceptive use among sexually experienced high school students. *J Adolesc Health* 48: 562-565. <https://doi.org/10.1016/j.jadohealth.2011.01.018>
10. Ventura SJ, Hamilton BE, Mathews TJ (2013) Pregnancy and childbirth among females aged 10-19 year-United States, 2007-2010. *MMWR Suppl* 62: 71-76.
11. Tebb KP, Trieu SL, Rico R, Renteria R, Rodriguez F, et al. (2019) A mobile health contraception decision support intervention for Latina adolescents: implementation evaluation for use in school-based health centers. *JMIR mHealth uHealth* 7: e11163. <https://doi.org/10.2196/11163>
12. Tebb KP, Rodriguez F, Pollack LM, Trieu SL, Hwang L, et al. (2018) Assessing the effectiveness of a patient-centred computer-based clinic intervention, Health-E You/Salud iTu, to reduce health disparities in unintended pregnancies among Hispanic



- adolescents: study protocol for a cluster randomised control trial. *BMJ Open* 8: e018201. <http://dx.doi.org/10.1136/bmjopen-2017-018201>
13. Hosmer DW, Lemeshow S (1989) *Applied logistic regression*. John Wiley & Sons, New York, United States.
 14. Coates C, Gordon CM, Simpson T (2018) A qualitative study exploring contraceptive practices and barriers to long-acting reversible contraceptive use in a sample of adolescents living in the Southern United States. *J Pediatr Adolesc Gynecol* 31: 605-609. <https://doi.org/10.1016/j.jpag.2018.07.006>
 15. Russo JA, Miller E, Gold MA (2013) Myths and misconceptions about long-acting reversible contraception (LARC). *J Adolesc Health* 52: S14-S21. <https://doi.org/10.1016/j.jadohealth.2013.02.003>
 16. Kavanaugh ML, Frohwirth L, Jerman J, Popkin R, Ethier K (2013) Long-acting reversible contraception for adolescents and young adults: patient and provider perspectives. *J Pediatr Adolesc Gynecol* 26: 86-95. <https://doi.org/10.1016/j.jpag.2012.10.006>
 17. Nall M, O'Connor S, Hopper T, Peterson H, Mahajan B (2019) Community women and reproductive autonomy: building an infrastructure for long-acting reversible contraception (LARC) services in a mobile health clinic. *J Health Care Poor Underserved* 30: 47-58. <https://doi.org/10.1353/hpu.2019.0006>