Original Report

Will it Hurt? The Intrauterine Device Insertion Experience and Long-Term Acceptability Among Adolescents and Young Women

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A B S T R A C T

Study Objective: To examine how the intrauterine device (IUD) insertion experience affects long-term IUD acceptability among adolescents.
Design: Text to Web survey study.
Setting: Boston Children's Hospital and Cambridge Health Alliance in Massachusetts.
Participants, Interventions, and Main Outcome Measures: Nulliparous adolescents aged 13-21 years who received an IUD or etonogestrel implant between January 2012 and May 2018.
Results: We received survey responses from 95 adolescents (n = 46 IUD; n = 49 implant; response rate = 95/1098 (9%)). Mean current age (20.8 years) and time since device insertion (2.4 years) were similar between groups. Although a large proportion of both groups (64%) experienced moderate to severe preprocedural anxiety, IUD users expected more insertional pain compared with implant users (55.6 vs 39.6; $P = .01$). Compared with implant users, more IUD users experienced moderate to severe insertional pain (80% vs 18%; $P < .0001$), recalled that the procedure hurt more than expected (52% vs 4%; $P < .0001$), and endorsed lower rates of pain management satisfaction (72.4 vs 85.6; $P = .04$). Most respondents would recommend their method to a friend (75%) or consider getting the same device in the future (63%). When explicitly asked, more IUD users reported that dislike of the insertion procedure might or would probably prevent them from getting the same device in the future (41% vs 14%; $P = .005$).
Conclusion: Compared with implant users, IUD users reported more negative insertion experiences, although preprocedural anxiety was prevalent in both groups. Dislike of the insertion experience might negatively affect adolescents' willingness to continue using an IUD in the future. Findings should encourage multimodal interventions to holistically improve the IUD insertion experience.
Key Words: Intrauterine devices, Long-acting reversible contraception, Adolescent medicine, Pain

Introduction

Unintended adolescent pregnancy rates in the United States remain high compared with other high-income countries, and disparities persist according to race, income, and geography.[1–3] Long-acting reversible contraception (LARC), including intrauterine devices (IUDs) and the etonogestrel implant, should be considered first-line contraceptive options for adolescents because of their efficacy, safety, and convenience.[4] IUDs meet the family planning desires of many adolescents and offer important noncontraceptive medical benefits.[5,6] Unfortunately, IUD use remains low in the US adolescent population, despite recent increases in IUD use in other age groups.[7,8]

Adolescents and young women consistently identify fear of a painful insertion procedure (hereafter, "insertional pain") as a deterrent to choosing the IUD,[9–12] and adolescents who undergo IUD insertions report high rates of insertional pain. Although some interventions might provide modest reductions in insertion-related pain (eg, lidocaine-prilocaine cream and decreased pain at tenaculum placement), highly effective methods for reducing insertional pain have not been established.[13–16] The cited IUD insertion literature primarily examines: (1) insertional pain as a barrier to IUD initiation among adolescents who have never used LARC; and (2) pharmacological strategies to reduce insertional pain. One IUD initiation study reported that insertional pain severity might not affect short-term IUD acceptability; three-quarters of participants were willing to recommend the IUD at 6 months, despite reporting high levels of insertional pain.[17] However, no studies have specifically examined how the entire insertion experience affects long-term (>1 year) acceptability,[18] a time point at which adolescents can weigh their personal experience of living with an IUD (eg, bleeding profile and convenience) against the discomfort of the insertion procedure.

Our study expands on the existing body of work by: (1) assessing how global dislike of the insertion experience (ie, insertional pain, anxiety, experience-expectation

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discrepancies, and procedural dissatisfaction) affects long-term LARC acceptability; (2) surveying nulliparous adolescents and young women (younger than 21 years old at time of insertion) who are under-represented in LARC-related research[14]; (3) using an implant comparison group to identify barriers to IUD use specific to the insertion procedure; and (4) using a text to Web survey to contact individuals multiple years after their device insertion. We sought to describe how adolescents recall the overall IUD insertion experience and assess how dislike of the insertion procedure affects long-term IUD acceptability. We expected that IUD users would recall higher rates of insertional pain and preprocedural anxiety and lower pain management satisfaction, compared with implant users. We also hypothesized that individuals who experienced more insertional pain would be less willing to have another IUD placed in the future and less willing to recommend an IUD to peers.

Materials and Methods

Study Design and Sample

This text to Web survey study was conducted in winter 2019 at Boston Children's Hospital and Cambridge Health Alliance in Massachusetts. All English-speaking, nulliparous female patients who received an IUD or implant at 1 of the 2 study sites between January 2012 and May 2018, who were between the ages of 13 and 21 years at the time of the procedure, and who provided an active mobile phone number were eligible (n = 493 IUD; n = 605 implant). IUD recipients were offered institution-based preprocedural standard of care for analgesia, including 400- to 600-mg ibuprofen or 1000 mg acetaminophen orally at least 20 minutes before insertion to reduce postprocedure pain.[15] We did not perform chart review to confirm premedication with nonsteroidal anti-inflammatory drugs because they have not been shown to reduce acute insertional pain levels.[13–15] Other pain medications, anxiolytics, and sedating medications were not provided. Implant recipients received preprocedure standard of care, including subcutaneous 1% lidocaine for local anesthesia.

The IUD and implant are the 2 most common LARC methods used by adolescents. Implant users were chosen as a comparison group for several reasons. Like IUD users, implant users selected a LARC method that required a potentially painful procedure for method initiation. However, subcutaneous lidocaine offers local anesthesia for implant insertion, whereas optimal insertional pain management for IUDs has not been achieved.[13–16] Therefore, implant users were selected as a comparison group to better identify factors specific to the IUD insertion procedure that might affect long-term device acceptability, as opposed to identifying factors that contribute to disinterest in LARC methods altogether.

Participants were texted an invitation to participate in a short survey to help improve patient care. The recruitment text included a link to a Web-based survey, assurance that participation was voluntary, and an immediate opt-out option via SMS. Participants who clicked on the link were brought to a survey welcome page that included a general overview about the study's focus on improving adolescent health; information on the chance to receive a $25 e-gift card in appreciation of participation; assurance of the voluntary nature of participation and maintenance of confidentiality; and electronic consent to participate. Individuals who did not complete the survey after 3 reminder texts were considered to have implicitly opted out of the study.[19] The survey was anonymous and was administered via Medumo (https://www.medumo.com), a Health Insurance Portability and Accountability Act-compliant survey software platform. We limited our sample to the 95 individuals who opted in to the survey (response rate, 9%). This study was approved by the Boston Children's Hospital institutional review board and received a waiver of parental consent.

Measures

Demographic data collected via chart review included age, race/ethnicity as available, and insurance payor. Procedural details obtained from chart review included age at insertion, confirmation of nulliparity at time of insertion, and device type. Survey questions were designed on the basis of a comprehensive review of the literature assessing long-term contraception device acceptability,[18] validated pain intensity measures,[20,21] validated anxiety intensity measures,[22] and pain and satisfaction measures widely used in IUD pain management research.[23,24] The survey contained 12 items addressing: pain and anxiety related to the insertion procedure, satisfaction with insertional pain management, long-term device acceptability, and factors affecting device acceptability.

A 100-mm visual analogue scale (VAS) was used for each of the following measures: expected insertional pain and experienced insertional pain (0 mm indicating no pain, 100 mm the worst pain); satisfaction with pain management (0 mm not at all satisfied, 100 mm very satisfied); and pain-related anxiety before the procedure (0 mm not at all anxious, 100 mm the most anxious). Pain and anxiety ratings were also described using severity categories derived from the VAS (0-4 mm none, 5-44 mm mild, 45-74 mm moderate, 75-100 mm severe).[25,26] Participants were asked how the insertional pain they experienced compared with the insertional pain they expected (procedure hurt more than/the same as/less than expected). Next, participants were asked if they would be willing to get another IUD in the future (yes/no) and if they would recommend an IUD to a friend (yes/no). Participants were asked to identify reasons they might not get another IUD in the future or recommend an IUD to a friend. These reasons were selected from a list of factors that commonly affect IUD acceptability (eg, bleeding, pain during insertion, pain after insertion, other side effects, no longer need/want contraception, other). Finally, participants were asked whether overall dislike of the insertion procedure would prevent them from getting another IUD in the future (not applicable, no, maybe, yes).

The comparison group of implant users was asked the same series of questions in reference to the implant procedure. Implant users were additionally asked to identify factors that dissuaded them from choosing an IUD. Responses included a diverse set of reasons and participants

Table 1
Response Rate Analysis

Response Rate	IUD (n = 493)	Implant (n = 605)	P
Overall survey response data			.52
Responded	9	8	
Did not respond	50	77	
Opted out	40	15	

Response Rate according to Site and Device Type	BCH (n = 618)		CHA (n = 480)	
	IUD (n = 330)	Implant (n = 288)	IUD (n = 163)	Implant (n = 317)
Respondents, n	36	31	10	18
Response rate, %	10.9	10.8	6.1	5.7

BCH, Boston Children's Hospital; CHA, Cambridge Health Alliance; IUD, intrauterine device.
Frequencies (n) of individuals receiving the survey invitation are presented according to site and contraceptive device type. Response rates are presented as proportions (%). Response rates were calculated after excluding individuals with invalid phone numbers. *P* values are derived from comparisons of the IUD and implant groups using Fisher exact test (responded vs did not respond/opted out).

could select more than one (eg, concerns about painful insertion, painful removal, undesired bleeding, side effects, other). Implant users were also asked to report their willingness to receive an IUD in the future (yes/no). An option for free text response was provided at the end of each survey.

Statistical Analyses

Survey responses were imported into SAS statistical software (version 9.4, SAS Institute Inc, Carey, NC) for analysis. Demographic data and distributions of responses were assessed using standard descriptive statistics. Demographic and survey response data were compared between the IUD and implant groups using a Fisher exact test for categorical data and 2-tailed Student *t* test for continuous data. $P < .05$ was considered statistically significant for all comparisons. Free text responses were qualitatively analyzed to identify common themes.

Table 2
Characteristics of Survey Respondents

Characteristic	IUD (n = 46)	Implant (n = 49)	P
	Percent	Percent	
Clinic site			.12
Boston Children's Hospital	78	63	
Cambridge Health Alliance	22	37	
Ethnicity			.27
Hispanic/Latino	0	8	
Not Hispanic/Latino	22	29	
Not reported	78	63	
Race			1.00
Black	4	8	
White	11	16	
Asian	7	2	
Other	0	10	
Not reported	78	63	
Insurance Status			
Self pay or public insurance	30	43	.29
Device type			N/A
Mirena (Bayer HealthCare Pharmaceuticals)	87	–	
Skyla (Bayer HealthCare Pharmaceuticals)	2	–	
Paragard (The Cooper Companies)	7	–	
Nexplanon (Merck & Co, Inc)	–	96	
Implanon (Merck & Co, Inc)	–	4	
Not reported	4	0	
	Mean	SD	Mean
Current age, years	21.0	2.1	20.6
Age at procedure, years	18.8	1.7	18.0
Time since procedure, months	26.9	15.1	30.9

IUD, intrauterine device.
Demographic data were obtained from chart review. Categorical data are presented as proportions (%) of respondents. Continuous data are presented as mean with SD. For race and ethnicity, we excluded individuals for whom these data were not reported and made the following comparisons: Hispanic/Latino vs not Hispanic/Latino and white vs black/Asian/other. *P* values are derived from comparisons of the IUD and implant groups using 2-tailed independent samples *t* test for continuous data and Fisher exact test for categorical data.

Results

Sample Characteristics

We received survey responses from 95 adolescents (n = 46 IUD users; n = 49 implant users). Overall response rates were similar for IUD users (9%) and implant users (8%), although response rates were higher at Boston Children's Hospital compared with Cambridge Health Alliance (Table 1). Characteristics of the respondents are presented in Table 2. Characteristics of nonrespondents are available for review in Supplemental Table 1. IUD users were older at the time of insertion procedure compared with implant users (18.8 vs 18.0 years; $P = .04$). Among respondents for whom race and ethnicity data were available, a large proportion (57%) were white. A large proportion (37%) of respondents were underinsured (self-pay or public insurance). Nearly all IUD respondents used Mirena (40/46 respondents; Bayer HealthCare Pharmaceuticals) and nearly all implant respondents used Nexplanon (47/49 respondents; Merck & Co, Inc).

LARC Insertion Experience: IUD vs Implant

Respondents used a 100-mm VAS to report insertional pain (expected and experienced), preprocedural anxiety, and pain management satisfaction (0 = no pain/no anxiety/not at all satisfied; 100 = the worst pain/the most anxious/the most satisfied). Although a large percentage of both groups (65%) experienced moderate to severe preprocedural anxiety (Fig. 1), IUD users expected to experience more insertional pain compared with implant users (55.6 vs 39.6; $P = .01$). IUD users also experienced higher levels of insertional pain (62.0 vs 17.9; $P < .0001$) and lower satisfaction with insertional pain management (72.4 vs 85.6; $P = .04$) compared with the implant group. Compared with the implant group, more IUD users reported moderate to severe insertional pain (80% vs 18%; $P < .0001$) and recalled that the procedure hurt more than expected (52% vs 4%;

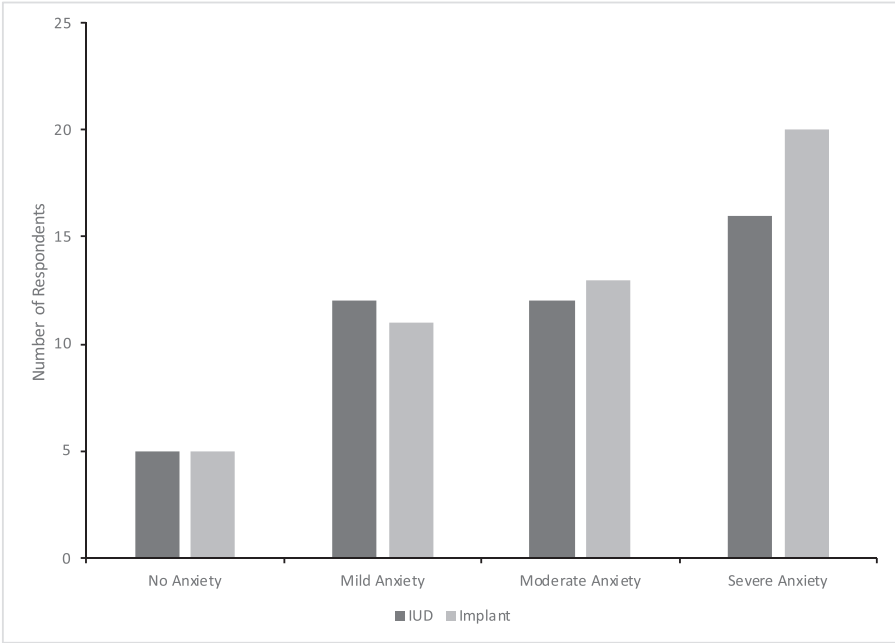

Fig. 1. Prevalence and severity of pain-related anxiety before the LARC insertion among nulliparous adolescents. Categorical data are presented as frequencies (n) of respondents. Anxiety response categories were derived from the visual analogue scale rating (none, 0-4 mm; mild, 5-44 mm; moderate, 45-74 mm; severe, 75-100 mm). Reports of none/mild vs moderate/severe anxiety were compared between the IUD and implant groups using Fisher exact test and did not reach statistical significance ($P = .67$). IUD, intrauterine device; LARC, long-acting reversible contraception.

$P < .0001$). Most implant users (86%) reported that the procedure hurt less than expected.

Long-Term LARC Acceptability

Future LARC Decision-Making

Similar proportions of both groups reported willingness to get the same device in the future (70% IUD vs 57% implant; $P = .29$). Most implant users (78%) reported they would not get an IUD in the future. When explicitly asked whether dislike of the insertion procedure would prevent them from getting the same device in the future (with qualifying language in response options: yes/maybe/no), more IUD users than implant users reported that dislike of the insertion procedure might or would probably prevent them from getting the same device in the future (41% vs

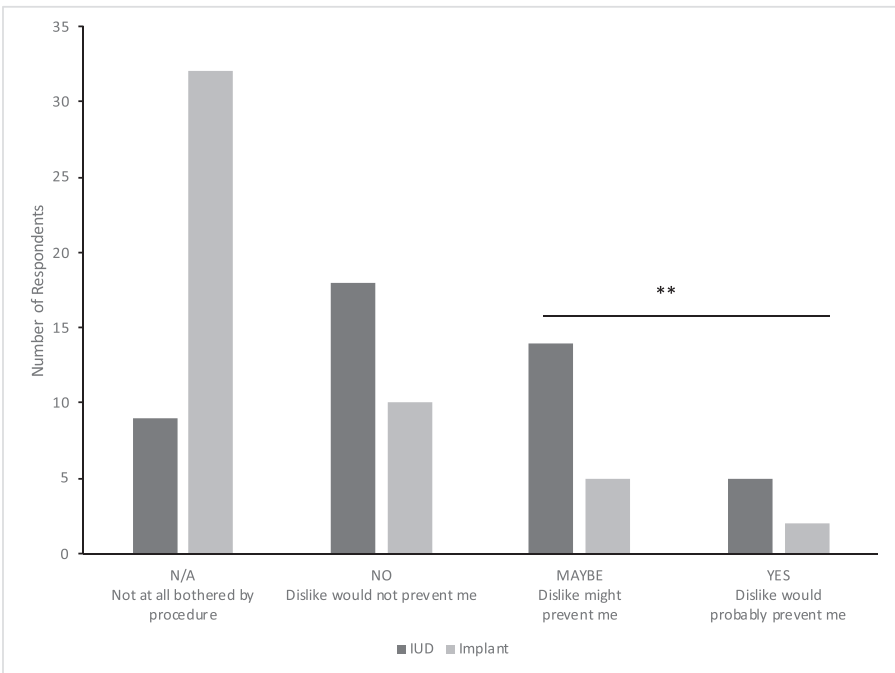

Fig. 2. Long-term acceptability of the LARC insertion procedure among nulliparous adolescents and young women. Data are presented as frequencies (n) of respondents endorsing each statement. Reports of N/A/no vs maybe/yes were compared between the IUD and implant groups using Fisher exact test. $^{**}P < .01$. IUD, intrauterine device; LARC, long-acting reversible contraception; N/A, not applicable.

Table 3
Factors Affecting Long-Term LARC Acceptability Among Nulliparous Adolescents and Young Women

Factor	IUD, %	Implant, %
If You Might Not Get the Same Device in the Future, Why Not?		
I didn't like other side effects with the implant/IUD	17	27
I had too much pain during the procedure	15	0
I had too much pain after getting the implant/IUD	15	4
I didn't like bleeding/spotting/periods with the implant/IUD	13	29
I won't need birth control in the future	9	2
Other reason	9	16
I won't want birth control in the future	7	12
If you might not recommend to a friend, why not?		
I had too much pain during the procedure	17	0
I didn't like bleeding/spotting/periods with the implant/IUD	11	29
I had too much pain after getting the implant/IUD	7	4
I didn't like other side effects with the implant/IUD	7	29
Other reason	7	8
		Implant, %
Why did you decide not to get an IUD? (implant group only)		
I was worried it might hurt to get the IUD inserted		31
I was worried the IUD could be harmful to me		31
I had friends/family who had bad experiences with the IUD		29
I was worried the IUD could fall out		24
Other reason		22
I didn't like the idea of having something inside my body		18
I was worried about side effects from the IUD		16
I was worried it might hurt to get the IUD removed		14
I was worried about how the IUD might affect my periods		10
I was worried the IUD might be painful for a long time		10

IUD, intrauterine device; LARC, long-acting reversible contraception.
Respondents could endorse specific reasons that they might not recommend their device to a friend, get the same device in the future, or get an IUD (implant group only). Data are presented as proportions (%) of respondents (n = 46 IUD; n = 49 implant). Proportions might not add up to 100% because respondents were able to select as many reasons as they wished.

14%; P = .005; Fig. 2). Among IUD users who endorsed reasons they might not get another IUD in the future, dislike of side effects, pain during the procedure, and pain after getting the IUD were the most commonly cited reasons (Table 3). Among implant users who endorsed reasons they might not get another implant in the future, dislike of bleeding/spotting and dislike of other side effects were the most commonly cited reasons (Table 3). Among all implant users, the most commonly cited reasons for choosing an implant over an IUD were worry about IUD insertional pain (31%), worry the IUD could be harmful (31%), and having friends or family who had negative experiences with the IUD (29%; Table 3).

Peer Endorsement of LARC Method

Similar proportions of both groups reported they would recommend their contraceptive device to a friend (80% IUD vs 69% implant; P = .25). Among IUD users who endorsed reasons they might not recommend the IUD to a friend, too much pain during the procedure was the most commonly cited reason (Table 3). Among implant users who endorsed reasons they might not recommend the implant to a friend, dislike of bleeding and dislike of other side effects were the most commonly cited reasons (Table 3).

Reflections on the IUD Insertion Experience

In the optional free text responses, some individuals (n = 6) described the personal significance of severe insertional pain, including fear of a painful IUD removal. One sexual assault survivor described feelings of retraumatization after a painful insertion procedure. Multiple respondents (n = 6) enthusiastically expressed satisfaction with the IUD, often explicitly weighing benefits of the IUD against dislike of the insertion procedure. For instance, some respondents (n = 4) expressed that the convenience and efficacy of IUD was "worth" the pain of the insertion procedure. Other respondents (n = 7) offered suggestions for facilitating a positive insertion experience, including pharmacological strategies (eg, sedation) and support from health care providers (eg, counseling about what to expect during the insertion procedure).

Discussion

Among this sample of nulliparous LARC users, young women reported overwhelmingly negative recollections of the IUD insertion experience. In contrast to our hypothesis and despite negative insertion experiences, a large proportion of IUD users reported they would recommend the IUD to a friend or get another IUD in the future. These high levels of device acceptability align with previous research showing high LARC continuation rates among adolescents after 1 year of use.[4,18,27] Because of the small number of respondents who reported they would not recommend the IUD or would not get another IUD in the future, statistical comparison of the groups (would vs would not recommend; would vs would not get another IUD) was not possible. However, when qualifying language was used in response options (ie, yes/maybe/no instead of yes/no) to explicitly ask participants how overall dislike of the insertion procedure would inform their future contraceptive decision-making, nearly half of IUD users reported that dislike of the insertion procedure might or would probably

prevent them from getting another IUD in the future. This finding suggests that insertional pain might act as a deterrent to continued IUD use (eg, routine exchange upon device expiration), providing a reproductive health imperative for improving the insertion experience.

The severity of IUD insertional pain reported herein is consistent with previous research showing that moderate to severe IUD insertional pain is common among nulliparous young women.[13–16] Our observation that LARC users anticipated mild to moderate pain agrees with LARC initiation research,[17] although we observed that IUD users expected more insertional pain than did implant users. Others have recently claimed that the similar pain levels anticipated by IUD and implant users show that insertional pain is not a barrier to IUD use.[17] On the contrary, we found that the willingness of some individuals to undergo a painful procedure is not evidence that pain does not deter others from undergoing the same procedure. In fact, 78% of implant users remained unwilling to get an IUD, and concern about insertional pain was their most commonly cited reason for disinterest in the IUD. Anxiety about LARC procedures and expected insertional pain severity levels are likely as high, if not higher, among the adolescent population who do not choose LARC. Although we limited our sample to LARC users, our data support the hypothesis that better management of anxiety and pain might lead to higher rates of LARC use. This conclusion is supported by a wealth of previous data in which non-LARC users consistently identify fear of insertional pain as a barrier to IUD initiation.[9–12]

Rather than serving as evidence that insertional pain is not a barrier to IUD use, our observation that most IUD users would choose the IUD again offers a powerful reminder that many young women are electing to undergo a painful procedure to access their preferred contraceptive method. This finding is supported by participants' free text responses, in which multiple young women commented that the benefits of the IUD were "worth" the pain of the IUD insertion. As the number of young women choosing IUDs rises despite the lack of adequate insertional anesthesia, our data should galvanize efforts to improve the IUD insertion experience so that an increasingly common procedure does not cause undue distress to a vulnerable population.

To our knowledge, our study is the first to describe the prevalence and severity of preprocedural anxiety among nulliparous adolescents and young women receiving an IUD. The high rates of severe anxiety reported herein suggest that local anesthetics alone (eg, topical lidocaine, paracervical blocks) are not likely to comprehensively improve adolescents' experience of receiving an IUD.[13–16] This observation is further supported by the high prevalence of anticipatory anxiety in our implant group, despite the relative painlessness of the implant procedure. Our data show that interventions directly targeting anxiety are urgently needed. Proactively offering a suite of options to reduce preprocedural anxiety, ranging from nonpharmacological support (eg, counseling, distraction) to anxiolytics and sedation, will be essential for providing youth-friendly LARC insertions.[28–30] Preprocedural counseling might be particularly important; pain expectation-reality discrepancies were extremely common in our study, consistent with other data suggesting that health care providers might not be appropriately counseling youth about the range of pain experienced during LARC insertions.[17,31,32]

From a research perspective, the high prevalence of preprocedural anxiety supports reframing outpatient IUD analgesia research, which has historically focused on absolute pain reduction without much success.[13–16] A few studies suggest that greater expected pain and higher anxiety levels preceding IUD insertion might be associated with greater insertional pain, although adolescents are under-represented in these studies.[33–35] However, IUD insertion studies rarely assess for anxiety reduction, focusing only on pain reduction and associated satisfaction metrics.[13–16,23] Because greater anticipatory anxiety might be associated with increased pain perception, interventions that reduce anxiety could yield improved pain and satisfaction outcomes.[36,37] Future IUD insertion studies should be designed with anxiety reduction and improved satisfaction included as primary outcomes, in addition to pain reduction, to identify interventions that holistically improve the insertion experience.

Our study has multiple limitations. First, the retrospective survey design is subject to recall bias. However, we were reassured by that literature that showed that retrospective pain reports are generally reliable and that memory of pain (regardless of its accuracy) drives future behavior.[9,21] Second, although we expected a low response rate (10%-12% on the basis of SMS to Web consumer survey data),[38] our survey had a response rate of 9% and Cambridge Health Alliance respondents were under-represented, concerning for selection bias. However, our pain rating and LARC acceptability data align closely with previous research, supporting the generalizability of our findings.[13,17,39] Because of the low response rate, our study was underpowered to detect statistically significant differences between groups for some outcome measures. Third, we did not assess how procedural details (eg, difficulty of insertion) and patient factors (eg, device indication, sexual activity, previous pelvic exams) affect long-term LARC acceptability; we were unable to obtain these data because of the retrospective design. Additional research will be needed to understand these factors, because our study focused more specifically on the implications of insertional pain, regardless of the many factors that might have influenced pain perception at the time of procedure. Of note, we limited our sample to nulliparous young women and collected data on anticipated pain levels, 2 patient factors consistently shown to influence insertional pain.[34] Fourth, although our sample was socioeconomically diverse, most participants were white, and all were English-speaking, limiting generalizability. Finally, we did not collect data on device discontinuation rates within our sample, because we were interested specifically in acceptability of the insertion procedure rather than acceptability of the device itself. However, we did collect data on factors that have consistently been shown to influence premature device discontinuation,[18] such as bleeding, persistent pain, and contraceptive needs (Table 3).

Our findings provide powerful justification that improving the IUD insertion experience is essential for providing dignified, compassionate, gynecological care to adolescents and young women. As adolescents consider their contraceptive options, fear of LARC procedures should not play a role. Our data clarify that preprocedural anxiety is a major component of the LARC insertion experience and support a movement away from interventions focused solely on insertional pain reduction. Future studies should assess multimodal approaches for improving the IUD insertion experience for adolescents, with an emphasis on strategies that minimize anxiety and pain (eg, concurrent use of topical lidocaine/prilocaine and minimally sedating anesthetic or anxiolytic agents). Until highly effective methods for insertional analgesia have been established, we hope our findings will encourage providers to follow published best practices for providing youth-centered IUD insertions.[40] Ultimately, we hope that such efforts will improve the acceptability of the IUD and expand access to the full suite of contraception options for adolescents and young women.

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Supplementary Data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jpag.2019.08.004.

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