Satisfaction, Early Removal, and Side Effects Associated With Long-Acting Reversible Contraception

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BACKGROUND AND OBJECTIVES: Although intrauterine devices (IUDs) and subdermal implants (SDI) are recommended as first-line contraception for the majority of women by the American College of Obstetrics and Gynecology, these methods of long-acting reversible contraception (LARC) are underutilized. Some concerns regarding their use include cost of placement, side effects, and perception of frequent early removal. This study evaluated satisfaction with LARC, frequency, and reasons behind early removal in a family medicine setting.

METHODS: Women > 18 years seen for placement of removal of an IUD or SDI were identified from billing data and surveyed via telephone to determine satisfaction and side effects with LARC. Additional demographic information was extracted from the electronic health record.

RESULTS: Of the 132 respondents (response rate 61.4%), 58.3% had IUDs and 41.7% had SDIs placed. Early removal occurred in 24.2% of women, and 72.7% were satisfied with their contraceptive choice. Younger and nulliparous women were more likely to have an SDI placed, whereas older and multiparous women chose the IUD. Younger nulliparous women were less likely to have LARC removed early. Pain (more commonly reported with the IUD) and increased frequency in bleeding (more commonly reported with the SDI) were associated with early removal rates.

CONCLUSIONS: Most women who received LARC were satisfied with their contraceptive choice, and only one in four had the LARC removed early. This is significantly better than continuation rates with other contraceptive methods. Younger, nulliparous women were good candidates for LARC, continuing their use more than older, multiparous women. Improved counseling regarding pain and changes in menstrual bleeding patterns may impact early removal of IUDs and SDIs, respectively.

(Fam Med 2013;45(10):701-7.)

In 2006, the United States unintended pregnancy rate was 51 per 1,000 women ages 15–44 years, and more than half of those pregnancies happened to women who were currently using contraception.[1] Nine out of 10 pregnancies that occurred while using contraception were due to user failure (incorrect or inconsistent use of contraception), and one third of women using contraception admit to periods of non-use up to 6 months in length.[2,3] These gaps in usage, switching between methods of contraception, and contraception discontinuation puts women at an increased risk for unintentional pregnancies. To reduce the risk of unintended pregnancy, increased access to and consistent use of effective contraceptive methods is needed.

One method of increasing compliance and decreasing gaps in use would be through the use of long-acting reversible contraception (LARC), which include intrauterine devices (IUDs) and subdermal implants (SDIs). LARC has a typical use failure rate of <1%, making IUDs and SDIs the most effective available method of reversible contraception.[3] These methods are not dependent on patient compliance,

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do not require repeat clinical visits for continuation of use, and do not have continued cost after placement.[4] While the initial cost for LARC is high, there are no additional costs until removal.[5] When compared to other forms of reversible contraception, LARC has reduced the risk of repeat pregnancies and abortions when placed postpartum or postabortion.[5]

Because there are so few contraindications, the American College of Obstetricians and Gynecologists (ACOG) stress that LARC is appropriate in almost all demographics of women, even groups with increased risk of complications with other forms of contraception.[8] Because LARC methods do not contain estrogen, they can be utilized earlier in the postpartum period than short-acting contraceptives, and they can be used in women with contraindications to estrogen-containing contraceptives (ie, thromboembolic disease, breast cancer, migraines, etc).[9] However, less than 5% of women in the United States reported having ever used a LARC, perhaps due to lack of awareness, lack of access, or high up front costs.[4,6] Lack of clinician knowledge about appropriate use of LARC or lack of training in insertion and removal may also play a role in underuse.[7] Historical risks of IUDs (sexually transmitted infections [STI], infertility), although unrelated to currently available IUDs, may affect physician recommendations. Despite perception that side effects lead to frequent early removal of LARC, thereby reducing cost-effectiveness, little data exist to support this theory. Piepert and colleagues reported a 12-month continuation rate of 88% for the levonorgestrel IUD and 83% for the SDI.[10] Harvey and colleagues reported 50% continuation rates with SDIs in Australia.[11] All of these are greater than continuation rates reported by Raine for short-acting methods (10.9% patch, 12.1% depo-medroxyprogesterone acetate, 29.4% ring, and 32.7% pill).[12]

Given the safety, efficacy, and ease of use of LARC, increased awareness and utilization of these methods may be an effective strategy to decrease the number of unintended pregnancies. However, LARC should be kept in place for their recommended duration of use to maximize cost-effectiveness. Pre-placement counseling about anticipated side effects and tolerability issues might improve duration of use of LARC. Therefore, this study sought to evaluate women who had an IUD or SDI placed to identify factors affecting satisfaction and early removal of LARC.

Methods

Women (>18 years) seen at Medical University of South Carolina (MUSC) family medicine resident and faculty clinics from January 2009 to April 2012 for placement or removal of an IUD or SDI were identified through billing data. A 17-item telephone-based survey was created and pilot tested to ensure clarity and reproducibility of the questions. The survey included demographic information, LARC type, satisfaction and side effects with LARC, as well as duration of use, and if applicable, timing of removal and reasons for removal. Additional demographic and clinical data were extracted via electronic health records (EHR) review. All data were recorded in a de-identified manner in a password-protected spreadsheet on a password-protected computer. This project was approved as expedited research by the MUSC Institutional Review Board.

Outcome measures included method, satisfaction and continuation rates, reported side effects, continuation rates by gravida and age, and most common reasons for early removal of LARC. Age of LARC placement was categorized as less than 21 years, 21–30 years, and 31 years and older. Insurance status (self pay, public or private insurance) was obtained from billing data. Body mass index (BMI) was calculated and categorized into three groups (< 25 as normal weight, 25–29 as overweight, and > 29 as obese).[11] Subjects who reported smoking at any time during the study period were categorized as smokers. Relationship status was categorized as married or living with a partner versus single or not living with partner.

The number of pregnancies, births, and spontaneous or elective abortions were obtained. Timing of the last pregnancy was evaluated to categorize participants as postpartum (placement less than 3 months after giving birth). Previous contraceptive use was categorized as condoms, pills, patches, rings, injections, IUDs, or SDIs. Subjects not using previous contraception or who were pregnant prior to LARC placement were excluded from analysis of previous contraceptive use. History of sexually transmitted infections (STIs) was defined as having a positive culture (chlamydia trachomatis, gonorrhea, human herpes virus, herpes simplex virus, trichomonas, and syphilis) in the EHR.

Other comorbidities associated with increased risk of side effects from estrogen use were identified and included metabolic (hypertension, diabetes, hypothyroidism, hyperthyroidism, polycystic ovary syndrome, hyperlipidemia, hypercholesterolemia), other (menorrhagia, anemia, metorrhagia, cervical dysplasia, deep venous thrombosis, pulmonary embolism, breast mass, breast cancer, migraines), or both.[9]

Side effects evaluated were pain since placement, increased heaviness/frequency of bleeding, irregular bleeding, amenorrhea, depression, weight gain, hair loss, headaches, and any other abnormal effect that the subject felt was attributable to the LARC.[10]

Satisfaction with the LARC method was recorded during telephone interviews using a Likert scale (very satisfied, rather satisfied, rather dissatisfied, very dissatisfied). Date of placement was used to calculate whether the LARC was removed early. For the IUD, early removal was considered to be less than 58 months after insertion, and for the SDIs, early removal was considered to be less than 34 months after placement. Women who kept LARC in place for

Table 1: Demographic Variables and Type of Long-Acting Reversible Contraceptive (LARC) Used

	Total (%)	IUD % (n=77)	SDI % (n=55)	*P* Value
Total respondents	132	58.3	41.7	
LARC removed early*	32 (24.2%)	28.6	18.2	.17
Satisfied with LARC	96 (72.7%)	74.0	70.9	.69
Age at LARC placement				
< 21 years old	26 (19.7%)	22.1	40.0	.04
21–30 years old	74 (56.1%)	48.1	43.6	
>30 years old	32 (24.2%)	29.9	16.4	
Race				
Black	88 (66.7%)	63.6	72.7	.30
White	43 (32.6%)	36.4	27.3	
Method of payment				
Self pay	23 (17.4%)	20.8	12.7	.23
Public or private insurance	109 (82.6%)	79.2	87.3	
Relationship status				
Married/living with partner	34 (25.8%)	29.9	20.0	.20
Single	98 (74.2%)	70.1	80.0	
Gravida				
0	26 (19.7%)	11.7	34.6	.03
1	35 (26.5%)	41.6	30.9	
2	35 (26.5%)	26.0	20.0	
≥ 3	36 (27.3%)	20.8	14.6	
Placed < 3 months postpartum	52 (50.0%)	45.6	58.3	.01
History of abortion	32 (24.2%)	28.6	20.0	.05
Previous use of contraception**	84 (63.6%)	63.2	78.9	.06
Body mass index***				
< 25	30 (22.7%)	22.1	30.6	.56
25–29.9	27 (20.5%)	25.0	20.4	
≥ 30	60 (45.5%)	52.9	49.0	
Current smoker	33 (25.0%)	26.0	23.6	.76
History of sexually transmitted infection	41 (31.1%)	26.0	38.2	.14
Comorbidities present	42 (31.8%)	36.4	25.5	.18
Metabolic comorbidities present	26 (19.7%)	23.4	14.6	.24

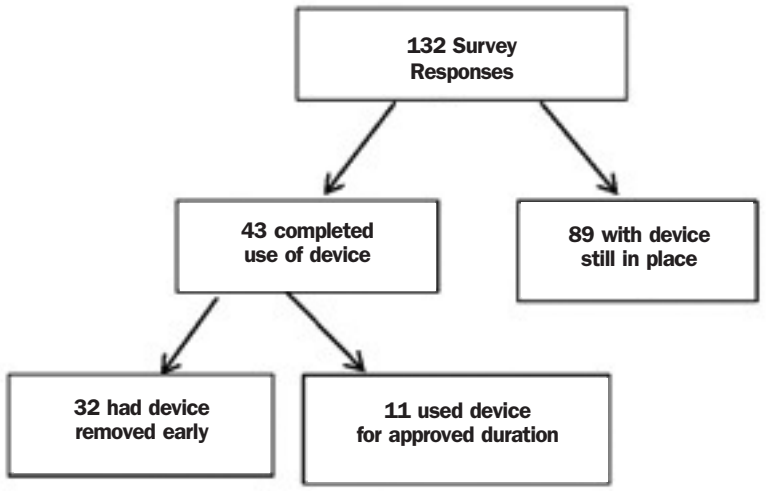
IUD—intrauterine devices
SDI—subdermal implant

* Early removal defined as less than 58 months post-placement for IUD and less than 34 months post-placement for SDI. Excludes devices that were removed early due to planned pregnancy (n=4).
** Excludes respondents who were pregnant directly before insertion of device.
*** Excludes respondents who did not have an accurate body mass index on record.

more than the above time periods were considered to have completed use of the device.

All analyses were determined *a priori* and performed using SAS version 9.2 (Cary, NC). *P* values less than .05 were considered statistically significant. In addition to descriptive statistics, removal timing and presence of side effects were compared by variables listed above using chi square analysis. Multivariate regressions were calculated predicting early removal, pain, and increased frequency of bleeding. These regressions included age, race, type of device, BMI, postpartum placement, and pregnancy history.

Figure 1: Description of State of Use of Device



Results

Of the 211 women identified as having had LARC placed or removed, 129 women (61.1%) were reached and surveyed. Three women were surveyed twice (had both an IUD and SDI placed during the study period), and one woman declined to answer the survey. The remainder were not contacted either due to non-working telephone numbers or not responding to three contact attempts. Therefore, a total of 132 surveys were completed.

Of the 132 responses, 58.3% had an IUD placed (75 levonorgestrel and two copper IUDs) and 41.7% received the etonorgestrel SDI (Table 1). The mean duration of use for the levonorgestrel IUD was 19.20 +/- 17.94 months, and for the SDI was 13.91 +/- 10.5 months. Thirty-two women had LARC removed early, and 11 women used LARC for the approved duration of use of the device (IUD for > 58 months and SDI for > 36 months) (Figure 1). There were no differences between this group and the remaining 89 women with respect to age of placement (P=.08), race (P=.98), or type of LARC used (P=.10).

Overall, there were no differences in rates of satisfaction (overall 72.7% satisfied) or early removal (24.2% overall) with either method of LARC (Table 1). Younger and nulliparous women were more likely to have an SDI placed (P=.04 and P=.03, respectively). Postpartum women were more likely to have chosen an SDI (P=.01). No differences in choice of LARC based on race, insurance status, relationship status, previous contraceptive use, BMI, smoking status, history of STI, or comorbidities were noted.

On further examination of early removal, 28.6% of IUDs and 18.2% of SDIs were removed before 58 months and 34 months post-placement, respectively (P=0.17 (Table 2). Younger women, those with placement of LARC in the early postpartum period, and women reporting satisfaction with LARC were less likely to have LARC removed early (P<.01). Nulliparous women were less likely to have an IUD or SDI removed early (P<.01 and .02 respectively). There were no differences in early removal based on race, method of payment, relationship status, history of abortion, previous contraception use, and history of STIs.

Differences were found in reported side effects by type of LARC used (Table 3). Levonorgestrel IUDs were more frequently associated with pain (48.0%) whereas women using SDIs reported increased frequency of bleeding (58.2%) and weight gain (30.9%). Copper IUDs were excluded from the side effect analysis. Weight gain with LARC was more commonly reported in women who were overweight (22.2%) and obese (21.7%) when compared with women of normal weight (13.3%) (P=.03). There were no differences in side effects when controlled by age. White women more often reported "other" side effects (32.6% versus 15.9%, P=.03), and women reporting depression were more likely to have their device removed early (19.9% versus 5.0%, P=.01). Multivariate regressions did not reveal any associations with early removal, pain, or increased frequency of bleeding.

Discussion

Unintended pregnancy continues to be an important public health concern in the United States. Due to low failure rates, increased use of LARC may decrease unintended pregnancies. Concerns regarding early removal of IUDs and SDIs may limit their use, as early removal significantly impacts their cost-effectiveness. This study found that most women (72.7%) who received LARC were somewhat or very satisfied with their contraceptive choice. These women had a low early discontinuation rate (24.2%), that is, more than 75% of women did not have LARC removed early.

This continuation rate is similar to reported 1-year LARC continuation rates of 86% in a cohort developed to promote the use of LARC in the St. Louis region.[10] In a retrospective analysis of 976 Australian women who had SDI placed, only 50% continued 2 years after insertion.[11] Data from Planned Parenthood clinics in California found very low 1-year continuation rates for short-acting reversible contraceptives, ranging from 10.9% for the hormonal patch up to only 32.7% with oral contraceptive pills.[12] Therefore, perceptions about early removal of IUDs and SDIs may be incorrect and, in reality, continued use is much better than other forms of contraception.

Table 2: Characteristics of Women With Early Removal* of Long-Acting Reversible Contraceptives (LARC)

	Total (n=32)		IUD (n=22)		SDI (n=10)	
	%	*P* Value	%	*P* Value	%	*P* Value
Dissatisfied with LARC	62.5	<.01	54.6	<.01	80.0	<.01
Age at LARC placement						
< 21 years old	6.3	.10	4.5	.25	10.0	.40
21–30 years old	59.4		54.6		70.0	
> 30 years old	34.3		40.9		20.0	
Race						
Black	68.8	.85	59.1	.60	90.0	.25
White	31.2		40.9		10.0	
Method of payment						
Self pay	21.9	.45	22.7	.79	20.0	.60
Public or private insurance	78.1		71.4		80.0	
Relationship status						
Married/living with partner	81.2	.30	22.7	.39	10.0	.67
Single	18.8		77.3		90.0	
Gravida						
0	15.6	.70	13.6	.41	20.0	.55
1	34.4		27.3		50.0	
2	28.1		31.8		20.0	
> 3	21.9		27.3		10.0	
Placed < 3 months postpartum	18.8	<.01	18.2	.01	20.0	.05
History of abortion	34.4	.16	40.9	.13	20.0	1.0
Previously used contraception**	72.4	.74	68.4	.58	80.0	1.0
Body mass index***						
< 25	32.2	.59	31.8	.40	33.3	.80
25–29.9	19.4		22.7		11.1	
> 30	48.4		45.5		55.6	
Current smoker	34.4	.16	27.3	.87	50.0	.03
History of sexually transmitted infection	31.3	.98	22.7	.68	50.0	.40
Comorbidities present	46.9	.04	40.9	.6	60.0	.01
Metabolic Comorbidities Present	28.1	.17	27.3	.61	30.0	.15

IUD—intrauterine devices
SDI—subdermal implant

* Early removal defined as less than 58 months post placement for intrauterine devices (IUD) and less than 34 months post placement for subdermal implants (SDI).
** Excludes devices that were removed early due to planned pregnancy.
*** Excludes respondents who were pregnant directly before insertion of device.
**** Excludes respondents who did not have an accurate body mass index on record.

Table 3: Side Effects Associated With Type of Long-Acting Reversible Contraception*

Side Effect	IUD %	SDI %	*P* Value
Pain	48.0	23.6	.005
Increased frequency of menstrual bleeding	38.7	58.2	.03
Irregular menstrual bleeding	45.3	47.3	.83
Amenorrhea	40.0	45.5	.53
Depression	9.3	7.3	.76
Weight gain	12.0	30.9	.008
Hair loss	4.0	9.1	.28
Headaches	0.0	5.5	.07
Other	26.7	16.4	.16
None	17.3	5.5	.06

* n=75
IUD—Levonorgestrel intrauterine devices
SDI—subdermal implant

Table 4: Side Effects Associated With Type of Long-Acting Reversible Contraception in Early Removal*

Side Effect	IUD%	SDI%	P value
Pain	68.2	20.0	0.02
Increased Frequency of Menstrual Bleeding	40.9	100.0	0.002
Irregular Menstrual Bleeding	63.6	50.0	0.47
Amenorrhea	40.9	30.0	0.70
Depression	22.7	10.0	0.64
Weight Gain	18.2	20.0	1.00
Hair Loss	9.1	10.0	1.00
Headaches	0.0	10.0	0.31
Other	40.9	20.0	0.43
None	13.6	0.0	0.53

* n=32
IUD—Levonorgestrel intrauterine devices
SDI—subdermal implant.

Despite recommendations from the ACOG for use of LARC in most women,[4] clinicians continue to have misconceptions about the use of IUDs in younger, nulliparous women. For example, in survey-based scenarios, only 27% of family physicians in South Carolina recommended an IUD for a sexually active adolescent.[7] Consistent with these misconceptions, this study found that IUDs were more commonly used in older multiparous women. However, older multiparous women were also more likely to have the IUD removed early. Perhaps increased awareness of ACOG guidelines is needed, and IUDs should be encouraged in younger, nulliparous women who may have fewer cases of early removal. Side effects were as expected for LARC; pain with the IUD and increased frequency of menstrual bleeding with the SDI. Pre-placement counseling regarding significant side effects may have an impact on early removal rates but requires specific evaluation.

Limitations of this survey include the self-reported nature of the survey data, as well as accuracy of data housed within and collected from the electronic health record. This study did not evaluate the time period for early discontinuation (ie, removal greater than or less than 1 year early), which would be an area for future study and contribute to the body of literature. Other factors that were not recorded may have impacted satisfaction, early removal, and side effects associated with LARC. Although this study included all patients who had ever had an IUD or SDI inserted, the total number of respondents and narrow geographic region from which the subjects were drawn limit generalizability of these results.

ACKNOWLEDGMENTS: Drs Goddard and Carr participated in the work during their second and third year of training in the Trident/MUSC Family Medicine Residency Program. Ms Jordon and Ms Davis were medical students participating in the FamTrack Summer Research Program in the Department of Family Medicine.

"Satisfaction, Early Removal, and Side Effects Associated With Long-Acting Reversible Contraception" was presented at the South Carolina Area Health Education Consortium Family Medicine Residency Programs Scholarship Symposium, June 2012, Litchfield Beach, SC.

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