Contraception and Reproductive Medicine

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Early contraceptive implant removal and associated factors among women attending public family planning clinics, Mbarara City, Southwestern Uganda: a cross-sectional study

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Abstract

Background Early implant removal not only results in method wastage and strains healthcare resources but also exposes women to the risk of unplanned pregnancies and associated complications if an alternative contraceptive is not promptly adopted. Studies have demonstrated that prevalence and factors associated with contraceptive use vary across different cultures and regions even within Uganda. We determined the prevalence and associated factors of early implant removal, among women attending public family planning clinics in Mbarara City, southwestern Uganda.

Methods We conducted a cross-sectional study from April to July 2023 at four public family planning clinics in Mbarara City. We consecutively enrolled women and administered a questionnaire to obtain data on demographic, and medical characteristics. We defined early removal as implant discontinuation within a period < 2 years. We excluded women who did not have a written record of the date of insertion of the contraceptive implants. We used modified Poisson regression analysis to determine factors associated with early implant removal.

Results We enrolled 406 women, with a mean age of 29 ± 6 years. The prevalence of early contraceptive implant removal was 53% (*n* = 210; 95%, CI: 48-58%). Factors associated with early implant removal were experiencing side effects (adjusted prevalence ratio [aPR] = 1.63, 95% CI: 1.20–2.21), inserting an implant to achieve career goals (aPR = 1.88, 95% CI: 1.26–2.81) and intending to use the implant for < 24 months (aPR = 1.36, 95% CI: 1.11–1.66).

Conclusion Approximately half of the surveyed women removed their contraceptive implant early. Women who experienced side effects, chose an implant due to career obligations and those whose intended implant use was

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< 2 years were more likely to have an early contraceptive implant removal compared to their counterparts. We recommend strengthening of pre- and post- insertion counselling to address concerns among those who may experience side-effects. Women who intend to use implants for < 2 years and those who have career obligations should be encouraged to use short-acting methods as an option.

Keywords Contraception, Contraceptive implants, Contraceptive removal, Family planning, Southwestern Uganda

Introduction

Although East Africa and Uganda have witnessed a rise in the adoption of contraceptives, with implants emerging as a popular choice, the overall total fertility rate remains elevated at 5.4 children per woman of childbearing age; notably, one in every three women experiences a short inter-birth interval despite the increasing prevalence of contraceptive usage [1–3]. A survey in 21 middle and low income countries found that 59% of women on implants discontinued them while still requiring contraception [4].

In Uganda, the contraceptive prevalence rate has remarkably increased from 18% in 2006 to 38% in 2021; implants are among the most preferred methods with approximately 9% of the sexually-active unmarried women and 12% of the married women [5]. Despite this, studies have revealed proportions of women removing contraceptive implants early to be as high as 42% [6]. The high rates of early implant removal counteract the anticipated gains from increased uptake and sustained use of this contraceptive method [7]. The process of contraceptive implant insertion entails substantial expenses, encompassing the costs associated with training healthcare providers, as well as expenses for equipment and supplies required to provide the service [8]. Early removal of these implants not only results in method wastage and strains hospital resources but also exposes women to the risk of unplanned pregnancies and associated complications if they do not choose an alternative contraceptive. Various factors have been associated with early removal of contraceptive implants, the commonest factor being occurrence of side effects like altered menstrual bleeding patterns [4]. Other factors which have been identified, including quality of pre-insertion counseling, age, parity, residence, marital status, and joint decision-making regarding family planning, level of education, desire for pregnancy [9].

Early implant removal puts women at risk of unplanned pregnancies associated with either use of a less effective method or no method at all and yet desiring not to have any children at the time [10, 11]. Such a situation potentially increases likelihood of unsafe abortions, school drop-out and maternal mortality with their associated social, economic, and physical health implications [12]. Although a study was done in Central Uganda (Kampala) in 2021 regarding the prevalence and factors associated with early implant removal [6], the former study defined implant removal as implant discontinuation 18 months or less after implant insertion. In our study, we defined early implant removal before completion of 24 months based on the WHO recommended interpregnancy interval [13]. Furthermore, while variations in both prevalence and factors associated with continuous implant use have been documented across different regions in Uganda [1, 14], a research gap exists as no study has investigated this phenomenon in the Southwestern Region of Uganda. In this study, we determined the prevalence and associated factors of early implant removal among women attending public family planning clinics in Mbarara City Southwestern Uganda.

Materials and methods

Study setting, study design and study population

This cross-sectional study was conducted among women attending the family planning clinics at four public health facilities in Mbarara City: Mbarara Regional Referral Hospital (MRRH) Family Planning Clinic, Mbarara City Council Health Centre IV, Kakoba Health Centre III and Nyamityobora Health Centre II. Data was collected over a four-month period from April 2023 to July 2023. Mbarara city is located in the south western region of Uganda about 270 km from Kampala city, Uganda and has a population of 195,013 [1]. The family planning clinics at the health facilities in Mbarara City receive clients from within and around Mbarara City but also serve clients from several districts, including Isingiro, Bushenyi, Buhweju, Ibanda, Kazo, Kiruhura, Mitooma, Ntungamo, Rwamapara, Sheema, and Rubirizi. The estimated catchment population is 10,577,9900 [15].

Family planning services in these clinics include both long acting and short acting contraceptive methods. The methods are predominantly offered by midwives. The family planning clinics operate using guidelines provided by the Ministry of Health and offer these services free of charge. The patients who routinely seek family planning services in these health facilities within the city do not follow the referral system. These clients predominantly either go to the nearest family planning clinic or the family planning clinic of their choice.

We excluded women who did not have a written record of the date of insertion of the contraceptive implants.

Sample size and sampling

The sample size was calculated by using the Kish formula, $n = Z^2P\ (1\text{-}P)/\ d^2$, where Z is Z- score, P is percentage, and

d is the margin of error. Considering the proportion of early implant removal as 42% in Uganda according to a study done in National Referral Hospital- Kawempe [6]. We assumed a design effect of 1.5, a margin of error of 0.05, and a 95% confidence interval. With the addition of 5% to account for non-response, a total sample size of 394 was calculated and these were consecutively enrolled among the eligible women.

Study variables

The outcome variable was the duration between the date of insertion and the date of removal. It was dichotomously categorized as early contraceptive implant removal (yes, if≤24 months) or not (no, if>24 months) [16].

The study encompassed various independent variables categorized into socio-demographic, obstetric, and contraceptive-related factors. Regarding socio-demographic variables, participant characteristics such as age, level of education, marital status, residence, religion, and occupation were considered. The occupation variable was dichotomized as "employed" for participants with formal employment or a business, while the rest were classified as unemployed. Additionally, decision-making on family planning matters was recorded and categorized as self, husband alone, or combined decision.

In terms of obstetric variables, data included the outcome of antecedent pregnancies (classified as term, preterm, or abortion), mode of previous delivery (categorized as vaginal or caesarean section), the number of living children, and the desired sex on antecedent delivery.

Contraceptive-related variables encompassed a range of factors, including pre-insertion counseling, which was dichotomized as "Yes" if participants were informed about managing side effects and "No" if not. The experience of side effects was dichotomized as Yes or No based-on participant reports. Other variables included management of side effects of contraceptive methods, previous contraceptive use, duration of use, reason for implant insertion (categorized as stop pregnancy, space pregnancies, forced by career - for students, or any other), and the intended duration of implant use, categorized as ≤24 months or >24 months.

Data collection procedure

The data were collected Monday to Friday from 8:00 AM to 5:00 PM by research assistants and the principal investigator through exit interviews at the four family planning clinics. All eligible participants were invited for interviews. On a daily basis, the research team worked closely with the clinical care team at all research sites to identify women that had the contraceptive implants removed. These women were approached and informed consent was obtained. All women who did not have a written record of the date of insertion of the contraceptive implant were excluded from the study. The eligible participants responded to an interviewer-administered questionnaire. All the interviews were conducted in either English or Runyankole-Rukiga (local language) depending on the participant's preference and fluency in language.

Data management and analysis

Data were entered in RED-CAP software and exported to STATA version 17 (StataCorp, College Texas, USA) for cleaning and analysis.

The prevalence of early implant removal was determined by calculating the proportion of participants with early implant removal as a percentage of the total study participants.

We performed both bivariate and multivariate analyses, using a modified Poisson regression model with a log link and robust standard errors, which is part of the generalized linear model regression of the Poisson family. This approach was chosen over logistic regression due to the high prevalence of the outcome of interest among the study participants [17, 18]. In the multivariate analysis, we included variables with a p-value of ≤0.2 at the bivariate analysis stage. Measures of association were expressed as prevalence ratios, accompanied by their respective 95% confidence intervals, all reported at a significance level of 0.05.

Results

During the study period, 427 women had their implants removed, 21 women were excluded from the study because they did not have their record of date of insertion (Fig. 1). We enrolled 406 into our study: 137 from Mbarara Regional Referral Hospital, 111 from Mbarara City Council Health Centre IV, 94 from Kakoba Health Centre III and 64 removed from Nyamityobora Health Centre II.

Socio-demographic characteristics

Most participants (78.33%) were aged 21–35, and the majority (83%) were married or cohabiting. Urban residence was more common (85.7%) than rural (14.3%). Employed participants constituted 57.64%, and most identified as Catholic (38.9%) or Anglican (37.9%). Regarding education, 39.2% had completed secondary education, and 32.3% had primary education (Table 1). The distribution of age was significantly different between the two groups ($p=0.005$).

Obstetric and contraceptive method characteristics

Most of participants who removed implants early had experienced a term pregnancy (84.69%), had 1–2 living children (66.05%), encountered side effects (86.51%),

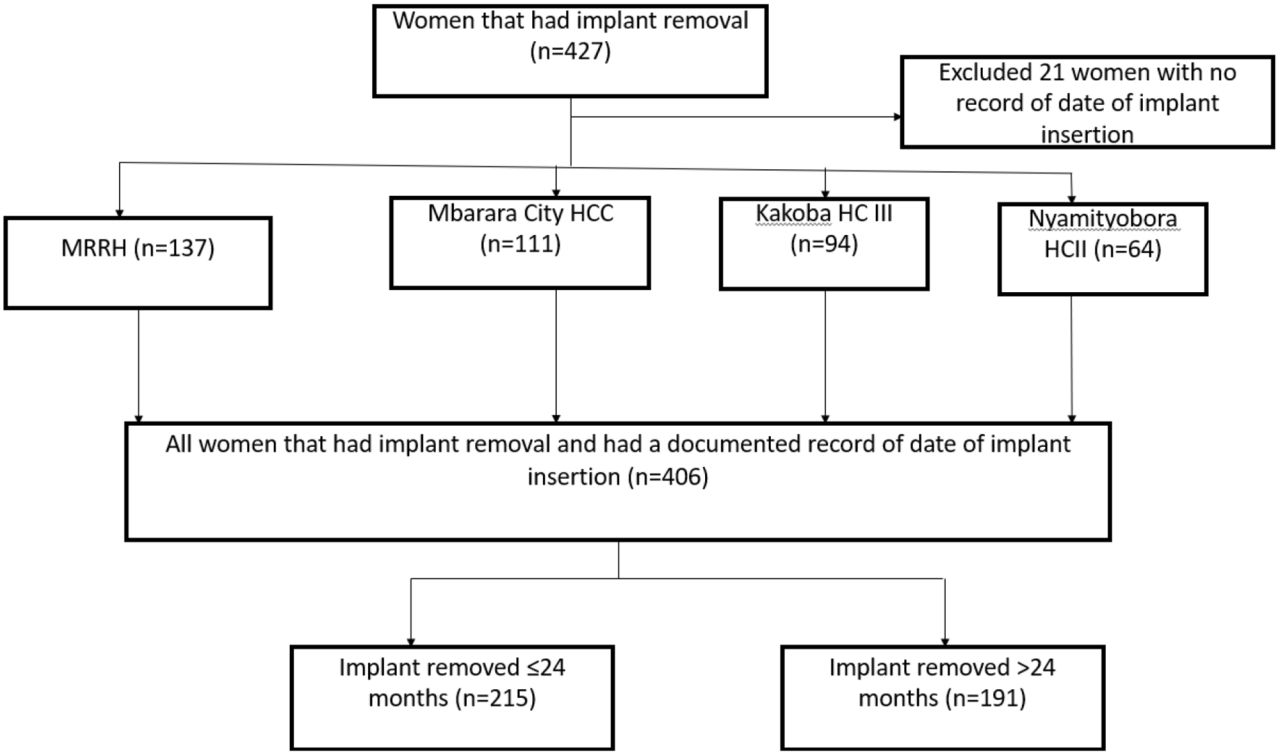

Fig. 1 Study flow chart for enrollment of participants at public family planning clinics Mbarara City, Southwestern Uganda, from April –July 2023; HC: Health center; HCC: Health center clinic; MRRH: Mbarara Regional Referral Hospital

received guidance on managing side effects (82.33%), used a modern contraceptive before implant insertion (72.09%), did not desire immediate conception (76.28%), and opted for a contraceptive implant with the intention of spacing pregnancies (76.74%). Among the 324 participants who experienced side effects, changes in bleeding patterns were the most common. However, those who removed implants early reported significantly higher rates of low abdominal pain (24.65% vs. 13.61%; $p=0.005$), persistent headache (29.77% vs. 11.52%; $p<0.001$), and dizziness (33.95% vs. 19.90%; $p=0.002$) compared to those who did not remove the implants early.

A larger proportion of women with term pregnancies removed their implants later (92.51%) compared to those who opted for early removal (84.69%) ($p=0.002$). Additionally, women who experienced side effects had a significantly higher likelihood of early removal (86.51%) compared to those who did not (13.49%) ($p<0.001$). Among women who used a modern family planning method before implant insertion, a greater proportion removed implants later (>24 months) (76.28%) compared to those who did not use any modern family planning method (23.72%) ($p=0.044$). Furthermore, participants who chose the implant for spacing pregnancies had a higher proportion of early removal (76.74%) compared to those who removed implants later (74.35%) ($p<0.001$) (Table 2).

Prevalence of early implant removal

Among the 406 participants in our study, 215 had early implant removal, giving a prevalence of 53% (95% CI: 48–58%) for early implant removal among study participants. Among the 215 participants who had early implant removal, 81 (37.7%) wanted to conceive; the remaining 134 (62.3%) did not want to conceive.

Factors associated with early contraceptive implant removal

The factors significantly associated with early contraceptive implant removal at multivariate analysis were experiencing side effects, selecting an implant for career-related reasons, and intending to use the implant for 24 months or less from the date of insertion. Women who reported experiencing side effects were 1.65 times more likely to undergo early implant removal (aPR=1.65, 95% CI: 1.20–2.26, $p=0.002$) compared to those without reported side effects. Participants who chose the implant to fulfill career obligations had a 1.94 times higher likelihood of removing the implant within 24 months (aPR=1.94, 95% CI: 1.30–2.92, $p=0.001$) compared to those whose intention was to prevent pregnancies. Additionally, women who intended to use the implant for up to 2 years were 1.37 times more likely to remove it early (aPR=1.37,

Table 1 Socio-demographic characteristics of participants

Variable	Total *N* = 406	Early removal		*P* value
		Yes *N* = 215	No *N* = 191	
	n/N (%)	*n/N* (%)	*n/N* (%)	
Age (years)				0.005
≤ 20	13 (3.20)	11 (5.12)	2 (1.05)	
21–35	318 (78.33)	174 (80.93)	144 (75.39)	
> 35	75 (18.5)	30 (13.95)	45 (23.56)	
Marital status				0.148
Single	69 [17]	42(19.53)	27(14.14)	
Married/ cohabiting	337(83)	173(80.47)	164(85.86)	
Body mass index (kg/m2)				0.162
≤ 25	202 (49.75)	114(53.02)	88(46.07)	
> 25	204 (50.25)	101(46.98)	103(53.93)	
Residence				0.104
Rural	58 (14.3)	25(11.63)	33(17.28)	
Urban	348 (85.7)	190(88.37)	158(82.72)	
Occupation				0.675
Employed	234(57.64)	126(58.60)	108(56.54)	
Unemployed	172(42.36)	89(41.40)	83(43.46)	
Religion				0.217
Catholic	158 (38.9)	81(37.67)	77(40.31)	
Anglican	154 (37.9)	92(42.79)	62(32.46)	
Seventh Day Adventist	49 (12.1)	21(9.77)	28(14.66)	
Moslem	41 (10.1)	19(8.84)	22(11.52)	
Other	4 (1.0)	2(0.93)	2(1.05)	
Education level				0.216
No formal education	25(6.2)	12(5.58)	13(6.81)	
Primary	131(32.3)	66(30.70)	65(34.03)	
Secondary	159(39.2)	80(37.21)	79(41.36)	
Tertiary	91(22.4)	57(26.51)	34(17.80)	

95% CI: 1.11–1.68, $p=0.003$) compared to those with an intended duration of > 2 years (Table 3).

Discussion

In this study, approximately half (53%) of the surveyed women attending public family planning clinics in Mbarara City, Southwestern Uganda opted for early removal of their contraceptive implants. The identified factors associated with early contraceptive implant removal were; experiencing side effects, selecting an implant for career-related reasons, and intended duration of implant use less than two years.

The prevalence of early implant removal in our study was high at 53%. Comparable findings were observed in a study in Kembata, Ethiopia, where early implant removal stood at 56.4%. Both studies, conducted in low to middle-income countries, were multicenter and featured a majority of participants aged 21–35 years—a demographic linked to high fertility rates [19]. In Uganda, this age group is known to have a peak in the general fertility rate (260 births per 1,000 women) [1].

The prevalence in our study is higher than have been found in related studies within Uganda Kawempe National Referral Hospital reported a 42% early implant discontinuation, possibly influenced by the definition of early removal at 18 months; additionally, a health facility-based study in Wakiso district, Uganda, revealed a 31% prevalence, potentially attributed to associated removal costs [6, 20]. Our study's prevalence also exceeded that of a tertiary center in Ilorin, Nigeria (26.1%) [21], with the difference potentially explained by the higher education levels in the Ilorin study (65.9% tertiary education) compared to our study (22.4% tertiary education). Higher education equips women to comprehend contraceptive implications, fostering continued usage despite potential challenges, as educated women have access to diverse information sources beyond healthcare workers [21, 22].

The prevalence in our study is lower than the one found in a study at four public health facilities in Debre Tabor, Ethiopia where the prevalence of early implant discontinuation was 65%; this could be because the cut-off for early implant removal was set at 2.5 years [9]. The study in Ethiopia also included participants 15–49 years some of whom we missed in our study when we include those aged 18–49 years. The difference can as well be due to the socio-cultural differences among the participants in the different study settings. Women in the bracket of 15–19 years in sub-Saharan Africa have been associated with a high likelihood of contraceptive discontinuation due to desire for pregnancy [23].

In our study, women who at the time of implant insertion had intended to have them for < 2 years were more likely to remove them early compared to those whose intended duration was ≥ 2 years. This finding is consistent with the finding in the study conducted in public health facilities in Ethiopia where women were more likely to have early implant removal if they desired to conceive in the near future (< 2 years) as compared to one who desired to conceive later. [24] This might be due to women who, at the time of implant insertion, may have experienced a pregnancy loss, or were anticipating completing their career obligations soon but still desired to have children in the near future [24, 25]. While no studies directly link career obligations to early implant removal, women may choose implants either to limit family size after reaching their desired number of children or to space pregnancies. Some women opt for implants due to career responsibilities, wanting to fulfill work or study commitments before committing to conceiving children. We hypothesize that women choosing implants for career-related reasons may be more prone to early removal. Initially focused on avoiding pregnancy to fulfill work or study commitments, their priorities may shift

Table 2 Obstetric and contraceptive method characteristics among the participants

Variable	Total *N* = 406	Early removal		*P* value
		Yes *N* = 215	No *N* = 191	
	n/*N* (%)	*n*/*N* (%)	*n*/*N* (%)	
Decision making on family planning				0.163
Self	158(38.92)	93(43.26)	65(34.03)	
Spouse	28(6.90)	14(6.51)	14(7.33)	
Both	220(54.19)	108(50.23)	112(58.64)	
Pregnancy outcome before insertion				0.002
Term	350(88.38)	177(84.69)	173(92.51)	
Abortion	35(8.84)	28(13.40)	7(3.74)	
Preterm	11(2.78)	4(1.91)	7(3.74)	
Number of living children				0.001
0	22(5.42)	16(7.44)	6(3.14)	
1–2	244(60.10)	142(66.05)	102(53.40)	
>3	140(34.48)	57(26.51)	83(43.46)	
Number of pregnancies before				0.003
0–1	120(29.56)	78(36.28)	42(21.99)	
2–4	238(58.62)	118(54.88)	120(62.83)	
≥5	48(11.82)	19(8.84)	29(15.18)	
Place of implant insertion				0.641
Health center	250(61.58)	137(63.58)	113(59.16)	
Hospital	148(36.45)	74(34.42)	74(38.74)	
Other (outreach)	8(1.97)	4(1.86)	4(2.09)	
Experienced side effects				< 0.001
No	82(20.20)	29(13.49)	53(27.75)	
Yes	324(79.8)	186(86.51)	138(72.25)	
Side effect experienced*				
Change in the bleeding patterns	265(65.27)	148(68.84)	117(61.26)	0.109
Low abdominal pain	79(19.46)	53(24.65)	26(13.61)	0.005
Weight gain	49(12.07)	30(13.95)	19(9.95)	0.216
Persistent headache	86(21.18)	64(29.77)	22(11.52)	< 0.001
Dizziness	111(27.34)	73(33.95)	38(19.90)	0.002
Acne	19(4.68)	12(5.58)	7(3.66)	0.361
Arm pain	17(4.19)	10(4.65)	7(3.66)	0.620
Pre-insertion counselling				0.113
No	61(15.02)	38(17.67)	23(12.04)	
Yes	345(84.98)	177(82.33)	168(87.96)	
Used family planning before insertion				0.044
No	97(23.89)	60(27.91)	37(19.37)	
Yes	309(76.11)	155(72.09)	154(80.63)	
Intended duration of implant use				< 0.001
>24 months	336(82.76)	164(76.28)	172(90.05)	
≤ 24 months	70(17.24)	51(23.72)	19(9.95)	
Purpose of implant use				< 0.001
Stop pregnancies	67(16.60)	24(11.16)	43(22.51)	
Space pregnancies	307(75.62)	165(76.74)	142(74.35)	
To attend to career	32(7.88)	26(12.09)	6(3.14)	

*Assessed among those who experienced side effects (n = 324)

Table 3 Factors associated with early implant removal among women attending public family planning clinics, Mbarara City, Southwestern Uganda

Characteristic	cPR (95% CI)	*p*-value	aPR (95% CI)	*p*-value
Age (years)				
≤ 20	1.55 (1.20–1.99)	0.001	1.31(0.91–1.88)	0.146
21–35	Ref		Ref	
> 35	0.73 (0.54–0.98)	0.037	0.93(0.66–1.30)	0.654
Marital status				
Single	Ref		Ref	
Married/ cohabiting	0.84(0.68–1.05)	0.122	0.87(0.68–1.21)	0.290
Body mass index (kg/m2)				
≤ 25	Ref		Ref	
> 25	0.88(0.73–1.05)	0.164	1.00 (0.82–1.21)	0.990
Residence				
Rural	Ref		Ref	
Urban	1.27(0.93–1.73)	0.137	1.09 (0.81–1.47)	0.553
Pregnancy outcome before insertion				
Term	Ref		Ref	
Abortion	1.58(1.30–1.92)	< 0.001	1.22 (0.90–1.67)	0.193
Preterm	0.72(0.33–1.58)	0.413	0.73 (0.33–1.60)	0.428
Number of living children				
> 3	Ref		Ref	
1–2	1.43(1.14–1.79)	0.002	1.21(0.92–1.59)	0.181
0	1.79(1.29–2.47)	< 0.001	1.16(0.74–1.82)	0.524
Experienced side effects				
No	Ref		Ref	
Yes	1.62 (1.19–2.21)	0.002	1.65 (1.20–2.26)	0.002
Pre-insertion counselling				
No	Ref		Ref	
Yes	0.64 (0.66–1.03)	0.085	0.86 (0.68–1.08)	0.188
Prior use of family planning				
No	Ref		Ref	
Yes	0.81 (0.66–0.98)	0.028	0.98 (0.78 - -1.23)	0.869
Purpose of implant use				
Stop pregnancies	Ref		Ref	
Space pregnancies	1.50 (1.07–2.10)	0.018	1.31 (0.87–1.95)	0.193
Career obligations	2.27 (1.58–3.26)	< 0.001	1.94 (1.30–2.92)	0.001
Intended duration				
> 24 months	Ref		Ref	
≤ 24 months	1.49 (1.25–1.79)	< 0.001	1.37 (1.11–1.68)	0.003

cPR: *Crude prevalence ratio*; ***aPR***: *Adjusted prevalence ratio*; **CI**: Confidence interval

once these obligations are met. This shift, coupled with concerns about childlessness or aging, may contribute to the observed pattern of early implant removal. Further scientific inquiry into the interplay between career aspirations, contraceptive choices, and family planning outcomes could provide valuable insights into these complex dynamics.

Participants who experienced side effects had a higher likelihood of opting for early implant removal, aligning with similar observations in a study conducted at a national referral hospital in Central Uganda and a multicenter investigation spanning four public facilities in Ethiopia [6, 9]. This may be because some of the side effects may interfere with the socio-cultural values of women which may be unacceptable in some settings. Also, women may fail to tolerate some of the side effects or fear anticipated (even when unjustified) complications related to these side effects or myths [26].

Our study findings have implications for public health and point towards opportunities for optimizing contraceptive counseling strategies. Enhancing pre- and post-insertion counseling could alleviate concerns, particularly among women susceptible to side effects. Additionally, a tailored approach is warranted, encouraging women with plans for implant use less than two years or those motivated by career obligations to explore short-acting

contraceptive methods as more suitable alternatives. These measures collectively contribute to minimizing the public health consequences of a high contraceptive discontinuation which include career drop-outs, unsafe abortions, undesired large family sizes and increased family expenditure.

Our study was subject to several limitations that are worth mentioning. First, considering the fact that we relied on self-report for some of the exposure factors, there is a potential for social desirability bias, wherein participants may have provided responses they deemed socially desirable, leading to the underreporting of sensitive issues or the overreporting of socially-accepted behaviors, such as career ambitions. Secondly, the study's scope was confined to women attending public family planning clinics in Mbarara City. As a result, the generalizability of our findings may be limited to those settings and may not accurately represent the picture that applies to women attending private facilities.

To further enrich the understanding of the factors influencing early implant removal, we recommend the implementation of qualitative studies specifically designed to explore patient and healthcare providers' experiences and perspectives among women that seek early contraceptive implant removal. Additionally, conducting more extensive scientific inquiry into the cultural factors influencing women's attitudes towards implant discontinuation would contribute to a more comprehensive understanding, thus better informing family planning programs in the region.

The strengths of this study include the recruitment of participants from multiple family planning clinics within Mbarara City, which enhances the internal validity and generalizability of our findings to better inform local family planning interventions in the city. Additionally, by basing the duration of implant use on documented dates of insertion and removal, we effectively eliminated recall bias, enhancing the accuracy and reliability of our data.

Conclusion

Nearly half of the surveyed women attending public family planning clinics in Mbarara City, Southwestern Uganda opted for early removal of their contraceptive implants. Notably, factors such as experiencing side effects, selecting implants due to career obligations, and intending to use the implant for less than two years were associated with a higher likelihood of early removal. Strengthening of pre- and post-insertion counseling, particularly addressing concerns related to side effects could enhance the effectiveness of family planning interventions in the region. Furthermore, women with either, intention of short-term implant use or those driven by career commitments should be encouraged to consider short-acting contraceptive methods as viable alternatives.

Abbreviations

BMI	Body Mass Index
FP	Family Planning
HC	Health Centre
MLICs	Middle and Low-income countries
MRRH	Mbarara Regional Referral Hospital
MUST	Mbarara University of Science and Technology
REC	Research Ethics Committee
UBOS	Uganda Bureau of Statistics
UNCST	Uganda National Council for Science and Technology
WHO	World Health Organization.

Acknowledgements

The research assistants Amanya Shine, Sophia Bashir and Honest Twinomujuni for their diligent effort and patience during the data collection process. The Institute of Maternal and Child Health, Mbarara University of Science and Technology for the financial support (partial funding) offered to enable be collect data.

Author contributions

JR conceived and designed the study with contributions from HK, OB, LA, GRM, PKK, LT, ST, ADC, and JM. JR and FM contributed to the study implementation and data acquisition. RM and ST performed the formal data analysis. JR, HK, GM, ADC, GRM, YTF, WGMS and MK interpreted the data and contributed in the drafting of the first version of the manuscript. RM, LT, RK, HK and JN provided additional inputs and proof read the manuscript for key content. RJ prepared the final manuscript. All authors read and approved the final manuscript for publication.

Funding

The study received partial funding from the Institute of Maternal and Child Health to enable data collection. The funder did not influence the research process.

Data availability

The datasets will be made available to appropriate academic parties on request from the corresponding author.

Declarations

Ethics approval and consent to participate

The study was approved by both the Mbarara University of Science and Technology Research Ethics Committee (**MUST-2022-717)** and the Uganda National Council for Science and Technology **(HS3057ES)**. All participants provided consent before participating in the study. All the participants' information was anonymously presented in this study. We followed the ethical principles outlined in the Helsinki Declaration and CIOMS-2002 guidelines for human research, aiming to prevent any form of physical or moral harm.

Consent to publication

Not applicable.

Competing interests

The authors declare no competing interests.

Conflict of interest

No conflicts of interests among authors.

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Received: 27 April 2024 / Accepted: 20 July 2024
Published online: 30 July 2024

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