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Expulsion rates and risk factors for intrauterine device expulsion following medical management of first-trimester incomplete abortions: A prospective cohort study in central Uganda

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► Additional supplemental material is published online only. To view, please visit the journal online (https://doi.org/10.1136/bmjsrh-2025-203045).

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Received 5 September 2025
Accepted 26 November 2025

Check for updates

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To cite: Kayiga H, Looft-Trägårdh E, Cleeve A, *et al*. *BMJ Sex Reprod Health* Published Online First: [please include Day Month Year]. doi:10.1136/bmjsrh-2025-203045

ABSTRACT

Objective Intrauterine device (IUD) user rates remain below 5% in low-income countries yet fertility after first-trimester abortions returns within 2 weeks. IUDs provide effective contraception. This study set out to explore the risk factors for IUD expulsion after medical management of first-trimester incomplete abortions.

Design Prospective cohort study

Setting Multicentre study at five public health facilities in central Uganda.

Participants 1050 women with first-trimester incomplete abortion managed with misoprostol, recruited on giving informed consent.

Intervention After selecting either copper or levonorgestrel (LNG) IUDs, participants were randomised to early (within 1 week) or standard (at 2–4 weeks) insertion and assessed on IUD expulsion 6 months later.

Main outcome measures Primary outcome was IUD expulsion rates at 6 months. Secondary outcomes were risk factors for IUD expulsions.

Results Between 8 July 2023 and 31 May 2024, 532 (50.7%) participants chose LNG IUDs, 488 (46.5%) chose copper IUDs, while 30 (2.9%) participants chose not to use IUDs. The IUD expulsion rate was 4.6% (95% CI 3.48 to 6.07). IUD expulsion was significantly associated with low overall satisfaction with IUD insertion procedure and use (adjusted odds ratio (aOR)=7.99, 95% CI 4.83 to 13.22, p<0.001), anxiety during the IUD insertion (aOR=4.28, 95% CI 1.09 to 16.85, p=0.038), use of ultrasound at follow-up (aOR=8.41, 95% CI 4.56 to 15.5, p<0.001) and breastfeeding at the time of IUD insertion (aOR=1.48, 95% CI 0.26 to 4.98, p=0.042).

Conclusion Offering IUD insertion immediately after medical management of first-trimester incomplete abortion is associated with low expulsion rates and should be offered as a safe choice.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Post-abortion intrauterine device (IUD) expulsion contributes significantly to the risk of unintended subsequent pregnancies. With more than 50% of all women generally resuming sexual intercourse within 2 weeks after first-trimester abortions, the risk of early repeat pregnancies is high. There was a need to determine the risk factors for IUD expulsion to prevent subsequent unintended pregnancies as a sequela of IUD expulsion.

WHAT THIS STUDY ADDS

⇒ Our study demonstrates that immediate post-abortion IUDs have low expulsion rates yet with high patient satisfaction. Women can safely utilise insertion of IUDs after medical management of their abortions to prevent unintended pregnancies. Although the effect of breastfeeding on IUD expulsions may not be sufficiently large in the current study to guarantee clinical significance, there is a need for further research to evaluate the impact of breastfeeding on IUD expulsion after first-trimester abortions.

INTRODUCTION

In the face of restrictive abortion laws in most low- and middle-income countries, unintended pregnancies continue to be a

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HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ With return to fertility as early as within 2 weeks after treatment of first-trimester incomplete abortion, women should be encouraged to utilise early IUD insertion to prevent subsequent unintended pregnancies. The role of ultrasound and breastfeeding as risk factors for post-abortion IUD expulsion should be explored further to guide on context evidence-based clinical guideline formulation.

major contributor to abortion-related morbidities and mortalities.[1] The high burden of unintended pregnancies is reported to follow failure to use reliable and effective contraception.[2] Intrauterine devices (IUDs) are safe and effective in minimising unintended pregnancies.[3]

IUD expulsion, which occurs when an IUD is spontaneously expelled from the uterus, or when a portion of it is visible in the cervix, is one of the parameters used to determine the safety of post-abortion IUDs.[4] IUD expulsion increases the risk of unintended pregnancies.[5] As the uterus involutes after first-trimester abortion, the uterine cavity shrinks, which may cause displacement of the IUD, especially when inserted immediately post-abortion.[6] Post-abortion IUD expulsion rates occur in between 2.8% and 15.4% of cases, with the rates increasing with gestational age after 9 weeks.[7] One systematic review showed higher expulsion rates with early IUD insertion after medical abortion.[8] Evidence has shown no difference in the expulsion rates or perforations, based on the timing of IUD insertion.[9] With the notion that delayed insertion of post-abortion IUDs assures that the uterus returns to its pre-pregnant state, clinicians have opted to delay IUD insertions for 2–6 weeks after abortion management.

This study set out to determine the expulsion rates and risk factors for post-abortion IUD expulsion in central Uganda at 6 months so as to guide the formulation of evidence-based practice regarding placement of IUDs after medical management of first-trimester incomplete abortion.

METHODS

Study design

This prospective cohort study was conducted between 8 July 2023 and 31 May 2024 among participants who were enrolled in the primary study, which was a non-inferiority, open-label, randomised controlled trial (RCT) that compared the expulsion and continuation rates following early insertion (within 1 week) versus standard insertion (2–4 weeks) after medical management of first-trimester incomplete abortion.[10]

Study setting

Five public health facilities in central Uganda were selected. The Central Region was selected due to the high abortion rate there compared with the national average (62 vs 39 per 1000 live births).[10] The selected sites were, at the time of the study, the largest family planning service providers in central Uganda (see online supplemental appendix 1).

Patient and public involvement

From the study's outset, patients were involved in discussions on post-abortion contraception and misoprostol use for managing incomplete abortions. As research partners, patients were also involved in designing the relevant research questions, the appropriate study design and study execution. The study was presented to the relevant institutional review boards. Written informed consent was obtained from all study participants prior to data collection. Potential participants were invited to study workshops prior to commencing the study. We plan to present the study findings at international conferences for the benefit of the global community.

Participants

Inclusion criteria

Women aged 15 years or above, treated with misoprostol for first-trimester incomplete abortion, living within 10 km of a health facility, opting for post-abortion IUDs, with no intention of conceiving within 6 months were included into the study.

Exclusion criteria

Women with contraindications for medical management of incomplete abortion, or surgically evacuated, a fever above 38.5°C, known allergies to the study medications, confirmed cervical cancer or known uterine anomalies were excluded.

Data collection procedure

Semi-structured interviewer-administered questionnaires were used to collect data from the participants, on their first contact and at the subsequent follow-up visits. The research assistants, being part of the care teams at the different health facilities, identified and approached potential participants willing to undertake medical management of first-trimester incomplete abortion from the emergency gynaecology units on their first clinic attendance for post-abortion care services. We used a consecutive sampling technique until the desired sample size was achieved. figure 1

Intervention

Participants chose between the copper IUD (Nova T; Bayer AG, Berlin, Germany) and the LNG-IUD (Mirena; Bayer AG). The diagnosis of first-trimester incomplete abortion was made based on clinical evaluation (par vaginal bleeding, lower abdominal pain,

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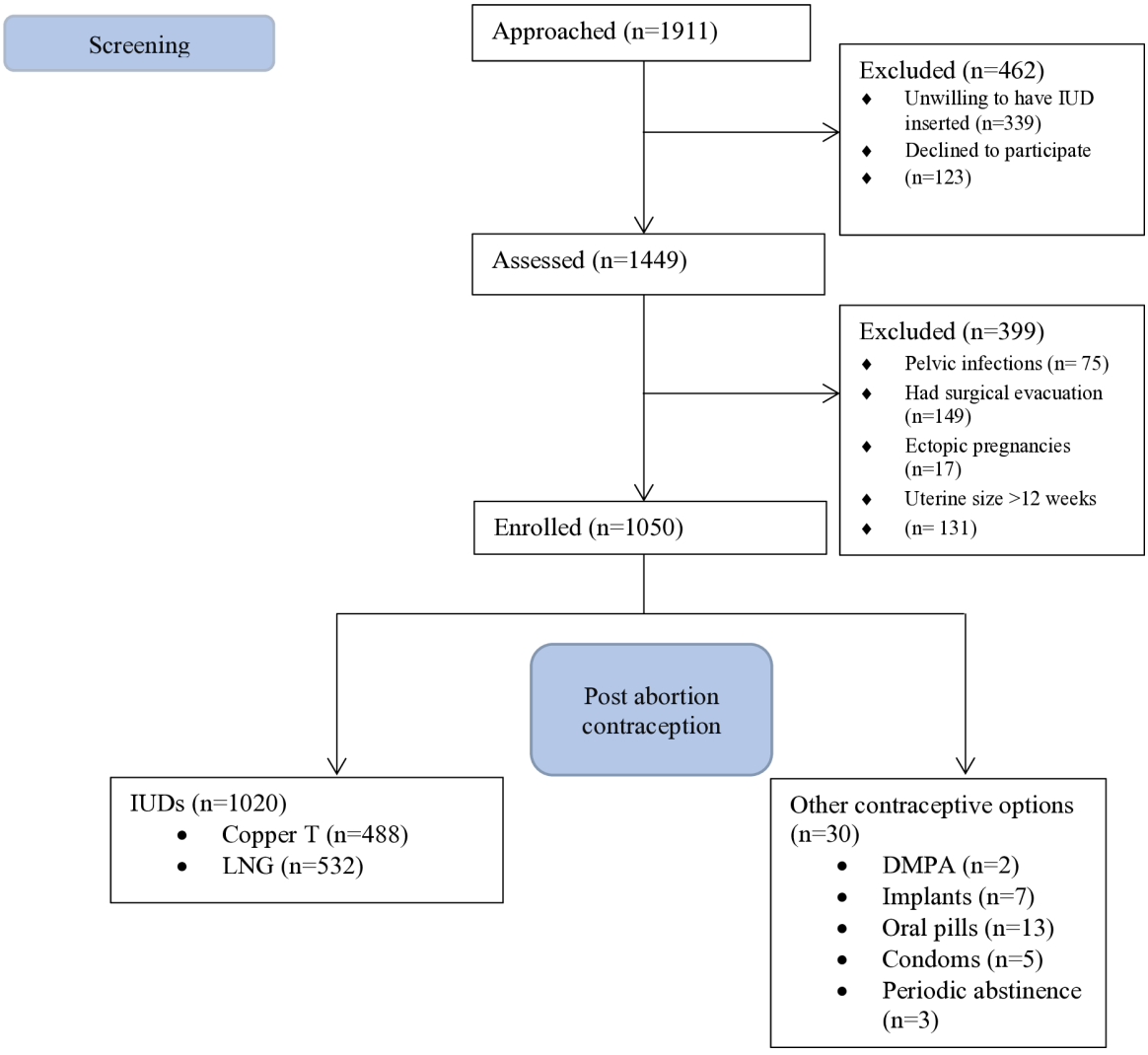

Figure 1 Modified PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) flow diagram of participants enrolled in the uptake of post-abortion intrauterine contraception after medical management of first-trimester incomplete abortion. DMPA, depot medroxyprogesterone acetate; IUD, intrauterine device; LNG, levonorgestrel.

visualisation of products of conception on pelvic examination). The abortion laws in Uganda are restrictive and it was against this background that patients who needed medical abortion were excluded.[11] Eligible participants were then given misoprostol 400 μg sublingually.[12] Oral analgesia such as ibuprofen or paracetamol was administered to all participants. To prevent post-abortion infections, oral metronidazole and doxycycline were administered to all participants.[13] After receiving misoprostol, the participants were discharged unless they had medical reasons for hospitalisation. Transport reimbursements were provided to encourage return for the scheduled visits. Pelvic ultrasonography was only used in cases where incomplete expulsion of products of conception after the first dose of misoprostol occurred or if IUD expulsion was suspected from the clinical evaluation after IUD insertion. Patients with incomplete expulsion of products of conception were thereafter given additional doses of misoprostol or surgically evacuated based on the judgement of the clinical team.

IUD insertion steps

The IUD insertion procedure was as follows: the woman was placed in a supine position with her legs in stirrups. Local anaesthesia was only administered when thought appropriate; otherwise, oral analgesia was administered for all participants prior to IUD insertion. A speculum was inserted after observing aseptic technique into the woman's vagina. The cervix and vagina were further cleaned with povidone iodine and a tenaculum placed at the 12 o'clock position on the cervix to straighten the uterus. A uterine sound was only inserted into the uterus to measure the length to the fundus when this was deemed appropriate. The IUD of choice was then placed at the fundus of the uterus. The IUD strings were cut at 3 cm length from the cervical os.

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Follow-up

All participants were followed up at 2 weeks, 3 months and 6 months after IUD insertion. At each scheduled visit, the participants undertook a standardised history and physical examination that included general, abdominal and pelvic examinations. If a participant missed a scheduled visit by 2 weeks, she was contacted by telephone, reminded of the missed visit, and had her appointment rescheduled within the study time frame. At every visit participants were assessed clinically for pelvic infections or any other complications. Participants with complications were seen at unscheduled visits. Satisfaction was measured with regard to what participants perceived of the overall IUD insertion procedure, and their experience while using their IUD.

Outcomes

The primary outcome was IUD expulsion rates at 6 months. The secondary outcomes comprised risk factors for IUD expulsion such as sociodemographic characteristics like age, parity, socioeconomic status, education background, type of IUD inserted, interval of IUD insertion and nature of abortion, whether spontaneous or induced.

Sample size

Sample size estimation for the risk factors for IUD expulsion was based on a secondary analysis of the contraceptive CHOICE Project by Madden *et al* that reported age of women to be associated with IUD expulsion[14]; using a power of 80%, two-sided 95% CI and $p<0.05$, the required sample size was 1000 women. Adjusting for a 5% non-response as reported by Iyengar *et al*,[15] our sample size was 1050 participants.[10]

Quality control

Staff training and recruitment

Thirty nurse-midwives familiar with the local hospital settings were selected and trained for 3 days. The training included how to identify potential participants, study procedures and participant recruitment.

A pilot study was carried out to pre-test and modify the data collection tools. Completed data collection tools were checked daily for completeness, edited, coded and entered by two data clerks on the same day of collection into the REDCap (Research Electronic Data Capture) database. Data were backed up on external hard drives, encrypted and retained in secure cloud storage.

Statistical analysis

Measures of central tendency were computed for numerical variables depending on whether or not they were normally distributed. For categorical variables, frequencies and percentages were computed to describe patient characteristics. In the primary, non-inferiority, open-label RCT, intention-to-treat protocol and per-protocol were used.

Bivariate analysis was done using logistic regression to select variables to include in the multivariable analysis. Variables with $p<0.2$ were included in the multivariable analysis.

Multivariable logistic regression was used to determine the factors associated with IUD expulsion rate. A likelihood ratio test was used to compare the reduced and full model and therefore assessed for interaction. Confounding was then assessed whereby a variable was considered a confounder if the change in the OR was greater than 10%. Data were analysed using STATA version 15.0 software (Stata Corporation, College Station, TX, USA).

RESULTS

Participants' characteristics

Between 8 July 2023 and 31 May 2024, 1191 women were screened for inclusion. A total of 1050 participants were enrolled. Of the 1050 participants enrolled, 1020 (97.1%) participants had IUDs inserted. The majority (n=532, 52.2%)of the participants chose LNG-IUDs, while 488 (47.8%) chose copper IUDs. Some 30 (2.9%) participants who had initially opted to use post-abortion IUDs changed their minds after recruitment and instead chose other contraceptive options. Of these 30 participants, 2 (6.7%) chose Depo-Provera injections, 7 (23.3%) chose implants, 13 (43.3%) chose oral contraceptive pills, 5 (16.7%) chose condoms and 3 participants (10.0%) chose periodic abstinence (figure 1).

The participants' median age was 27 (IQR 23–31) years. Nearly 75% of the participants were married, having between one and four children. Over 90% of the participants achieved a complete abortion with one dose of misoprostol and were satisfied with the medical care and post-abortion IUD they received (table 1).

Primary outcome

IUD expulsion was assessed by clinical evaluation or unscheduled visits and/or pelvic ultrasonography at the different follow-up visits. Of the 47 IUD expulsions by the end of 6 months, 30 (63.8%) were reported as partial expulsions while 17 (36.2%) were complete expulsions. The expulsion rate among the IUD users was 4.6% (95% CI 3.4 to 6.1) (table 2).

Timing of IUD insertion

Twenty-three (2.2%) participants in the early insertion group versus 24 (2.4%) participants in the standard insertion group had post-abortion IUD expulsion.[10] According to intention-to-treat, the IUD expulsion rate was 1.05 times higher in the standard versus the early IUD insertion group

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Table 1 Characteristics of the 1050 participants enrolled at the five health facilities by the 6-month follow-up visit in central Uganda

Characteristic	Overall (N=1050) n (%)	Expulsion (N=47) n (%)	No expulsion (N=1003) n (%)	Test statistic	P value
Insertion type				Fisher's exact	0.882
Early insertion (<1 week)	528 (50.3)	23 (48.9)	505 (50.3)		
Standard insertion (2–4 weeks)	522 (49.7)	24 (51.1)	498 (49.7)		
Age (years)				Fisher's exact	0.764
<20	96 (9.1)	4 (8.5)	92 (9.2)		
20–24	251 (23.9)	9 (19.1)	242 (24.1)		
25–29	346 (33.0)	14 (29.8)	332 (33.1)		
30–35	238 (22.7)	14 (29.8)	224 (22.3)		
>35	119 (11.3)	6 (12.8)	113 (11.3)		
Median (IQR)	27 (23, 31)				
Marital status				χ^2=5.659	**0.017**
Married	836 (79.6)	31 (70.0)	805 (80.3)		
Single	214 (20.4)	16 (34.0)	198 (19.7)		
Type of IUD inserted				Fisher's exact	0.883
Copper	488 (50.1)	24 (51.1)	464 (46.6)		
Levonorgestrel	532 (49.9)	23 (48.9)	509 (50.7)		
Education level				Fisher's exact	0.233
Never attended school	33 (3.1)	3 (6.4)	30 (3.0)		
Primary level	441 (42.0)	20 (42.6)	421 (42.0)		
Secondary level	488 (46.5)	18 (38.3)	470 (46.9)		
Tertiary	88 (8.4)	6 (12.8)	82 (8.18)		
Number of births (n)				Fisher's exact	0.453
Nulliparous	153 (14.6)	7 (15.0)	157 (15.7)		
1–4	765 (72.9)	31 (66.0)	718 (71.6)		
>5	132 (12.6)	9 (19.1)	128 (12.8)		
HIV status				Fisher's exact	0.239
Positive	48 (4.6)	3 (6.4)	45 (4.49)		
Negative	980 (93.3)	42 (89.4)	938 (93.6)		
Not known	22 (2.1)	2 (4.3)	20 (2.0)		
Pregnancy outcome				Fisher's exact	0.054
Spontaneous abortion	931 (88.7)	37 (78.7)	894 (89.1)		
Induced abortion	119 (11.3)	10 (21.3)	109 (10.9)		
Misoprostol dose added				Fisher's exact	0.711
Yes	80 (7.6)	8 (17.0)	72 (7.2)		
No	970 (92.4)	39 (83.0)	931 (92.8)		
Experienced continuous bleeding				Fisher's exact	0.705
Yes	1009 (96.1)	45 (95.7)	964 (96.1)		
No	41 (3.90)	2 (4.3)	39 (3.9)		
Level of pain at insertion				Fisher's exact	0.965
No pain	7 (0.7)	0 (0.0)	7 (0.7)		
Mild pain	701 (66.4)	31 (66.0)	670 (66.8)		
Moderate pain	315 (30.0)	15 (31.9)	300 (29.9)		
Severe pain	27 (2.6)	1 (2.1)	26 (2.59)		

Continued

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Table 1 Continued

Characteristic	Overall (N=1050) n (%)	Expulsion (N=47) n (%)	No expulsion (N=1003) n (%)	Test statistic	P value
Average monthly salary (USh)				Fisher's exact	0.424
<50 000	413 (39.3)	19 (40.4)	394 (39.3)		
50 000–499 999	536 (51.1)	24 (51.1)	512 (51.0)		
500 000–999 999	95 (9.1)	3 (6.4)	92 (9.2)		
>1 000 000	6 (0.5)	1 (2.1)	5 (0.50)		
Unscheduled visit				Fisher's exact	0.644
Yes	122 (11.6)	4 (8.5)	118 (11.8)		
No	928 (88.4)	43 (91.5)	885 (88.2)		
Level of satisfaction (IUD insertion procedure/IUD use)				Fisher's exact	**<0.001**
Satisfied	1009 (96.1)	39 (83.0)	970 (96.7)		
Unsatisfied	41 (3.9)	8 (17.0)	33 (3.3)		
Pain administration at insertion				Fisher's exact	**0.001**
Yes	535 (52.8)	35 (74.5)	500 (49.9)		
No	478 (47.2)	11 (23.4)	467 (46.6)		
Attempts at insertion				Fisher's exact	0.413
Once	854 (84.3)	37 (78.7)	817 (81.5)		
More than once	159 (15.7)	9 (19.1)	150 (15.0)		
Perception at insertion				Fisher's exact	0.100
Felt calm	1001 (98.8)	44 (93.6)	957 (95.4)		
Did not feel calm	12 (1.2)	2 (4.3)	10 (1.0)		**<0.001**
Use of ultrasound to confirm IUD position				Fisher's exact	
Yes	122 (12.0)	23 (48.9)	99 (9.9)		
No	893 (88.0)	24 (51.1)	869 (86.6)		
Breastfeeding				Fisher's exact	
Yes	105 (10.0)	8 (17.0)	97 (9.7)		
No	945 (90.0)	39 (83.0)	906 (90.3)		
Post IUD insertion					
Heavy menstruation				Fisher's exact	0.819
Yes	126 (12.0)	6 (12.8)	120 (12.0)		
No	924 (88.0)	41 (87.2)	883 (88.0)		
Painful menstruation				Fisher's exact	0.272
Yes	49 (4.7)	4 (8.5)	45 (4.5)		
No	1001 (95.3)	43 (91.5)	958 (95.5)		
Ease of insertion				Fisher's exact	0.085
Easy	1002 (98.2)	44 (93.6)	958 (95.5)		
Difficult	11 (1.1)	2 (4.3)	9 (0.9)		

Values in bold type denote statistical significance (ie, p<0.05).
IUD, intrauterine device; USh, Ugandan shilling.

(incidence rate ratio (IRR)=1.05; 95% CI 0.59 to 1.86, p=0.87).

Type of IUD inserted

Twenty-four (4.9%) of the 488 participants who chose copper IUDs experienced post-abortion IUD expulsion as compared with 23 (4.3%) expulsions among the 532 participants who chose LNG IUDs (adjusted OR (aOR)=1.14; 95% CI 0.63 to 2.04, p=0.67).

Factors associated with IUD expulsions

At multivariable analysis, low overall satisfaction with IUD insertion procedure and experience

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Table 2 Clinical characteristics of women in the early and standard groups in the three follow-up visits.

	2-week follow-up (n (%))x3		3-month follow-up (n (%))x3		6-month follow-up (n (%))x3	
Variables	**Early**	**Standard**	**Early**	**Standard**	**Early**	**Standard**
Expulsion rates						
Yes	9 (1.8)	10 (2.0)	8 (1.6)	8 (1.6)	6 (1.2)	6 (1.2)
No	502 (98.2)	499 (98.0)	494 (98.4)	491 (98.4)	488 (98.8)	485 (98.8)

while using the IUD of choice, participants' anxiety during the IUD insertion procedure, use of ultrasound at follow-up visits, and women who were breastfeeding at the time of IUD insertion were positively associated with IUD expulsion.

Overall satisfaction with the insertion procedure: participants who were unsatisfied with post-abortion care and IUD insertion were 7.99 (aOR=7.99; 95% CI 4.83 to 13.22, p<0.001) times more likely to experience IUD expulsion compared with those who were satisfied with the post-abortion care.

Participants' anxiety during the IUD insertion procedure: participants who were apprehensive and uncalm were 4.28 (aOR=4.28; 95% CI 1.09 to 16.85, p=0.038) times more likely to expel their IUDs compared with participants who were calm.

Use of ultrasound at follow-up visits: participants who had ultrasound scans at their post-IUD insertion visits were 8.41 (aOR=8.41; 95% CI 4.56 to 15.5, p<0.001) times more likely to expel their IUDs compared with those who did not have ultrasound scans.

Breastfeeding status: participants who were breastfeeding at the time of IUD insertion were 1.48 (aOR=1.48; 95% CI 0.26 to 4.98, p=0.042) times more likely to expel their IUDs compared with those who were not breastfeeding (table 3).

DISCUSSION

Post-abortion IUD expulsion rates at 6 months were 4.6%. The low overall satisfaction with IUD insertion procedure and experience while using the IUD of choice, participants' anxiety during the IUD insertion procedure, use of ultrasound at follow-up visits, and currently breastfeeding status were positively associated with IUD expulsion.

Despite our study's satisfaction rate at the 6-month follow-up of 98.8% higher than the 95.1% reported by Hogmark *et al*,[16] participants who were dissatisfied were found to have higher chances of IUD expulsion. Although we were unable in the current study to explore the reasons for participants' dissatisfaction, a previous study reported that dissatisfaction resulted from the menstrual bleeding patterns that followed IUD placement.[17] It is likely that those participants who could have experienced heavy menstrual bleeding or dysmenorrhoea could have had IUD expulsion.[18] Our study findings accentuate the impact of comprehensive and updated training on post-abortion contraceptive counselling on the uptake of IUDs to address patients' concerns prior to inserting IUDs.

Participants who were anxious or uncalm were reported to have had more post-abortion IUD expulsions. Misperceptions about IUDs could have driven the anxiety and made some of the participants become uncalm at the time of IUD insertion.[19] Prior evidence suggests that failure to address women's fears not only leads to IUD expulsions through an effect on the insertion process, but also impacts on early removals.[20] It is advisable that healthcare providers are more skilled, knowledgeable and prepared for difficult IUD insertions.

Prior literature[21] has indicated that use of ultrasound at post-insertion follow-up visits was associated with reduced IUD expulsion. In our study, participants who were evaluated for IUD expulsion using ultrasound had more post-abortion IUD expulsions than those who did not undergo ultrasound. Some researchers have urged that IUD malposition, especially LNG IUDs, is not important as long as the IUDs are in the uterus.[22] Others have urged that for copper IUDs, malposition is associated with menstrual irregularities, dysmenorrhoea and contraceptive failure.[23] More research is needed to formulate evidence-based policies in this regard.

Breastfeeding status was associated with post-abortion IUD expulsion. Breastfeeding has been associated with endocrine and physiological changes in the genitourinary system driven by the release of oxytocin.[24] Oxytocin has been noted to lead to uterine peristalsis.[25] A systematic review by Berry-Bibee et al,[26] however, reported that IUD expulsions were similar, or even lower, among breastfeeding women as compared with non-breastfeeding women, though with a higher risk of perforation among the breastfeeding women. Although the effect may not be sufficiently large in the current study to guarantee clinical significance, with most studies having been conducted in the postpartum period, further research to evaluate the impact of breastfeeding on IUD expulsion after first-trimester abortions is needed.

Strengths and limitations

Our study's strength lies in the fact that our sample size of 1050 participants was large and included women from rural and urban areas, thus enabling us to generalise our findings. In addition, the healthcare providers had extensive training in post-abortion family planning counselling and provision prior to the study.

We were unable to assess the factors that led to participants' dissatisfaction with IUDs in the current study.

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Table 3 Factors associated with expulsion rate among women managed for first-trimester incomplete abortions by the 6-month follow-up visit at five health facilities in central Uganda

Variable	Crude OR (95% CI)	P value	aOR (95% CI)	P value
Insertion type				
Standard insertion (2–4 weeks)	1			
Early insertion (1 week)	0.95 (0.68 to 0.1.30)	0.733		
Age (years)				
<20	1			
20–24	0.86 (0.18 to 4.00)	0.843		
25–29	0.97 (0.44 to 2.15)	0.940		
30–35	1.44 (0.32 to 6.54)	0.639		
>35	1.22 (0.38 to 3.94)	0.738		
Marital status				
Single	1			
Married	0.48 (0.21 to 1.08)	0.076		
Type of IUD inserted				
Copper	1			
Levonorgestrel	0.95 (0.57 to 1.60)	0.855		
Education level				
Never attended school	1			
Primary level	0.48 (0.24 to 0.95)	**0.034**		
Secondary level	0.38 (0.14 to 1.01)	0.053		
Tertiary	0.73 (0.27 to 1.96)	0.535		
Number of births (n)				
Nulliparous	1			
1–4	0.97 (0.42 to 2.21)	0.939		
>5	1.58 (0.46 to 5.38)	0.467		
Pregnancy outcome				
Spontaneous abortion	1			
Induced abortion	2.22 (0.79 to 6.17)	0.127		
Misoprostol dose added				
Yes	1			
No	1.90 (0.48 to 7.55)	0.363		
Unscheduled visit				
Yes	1			
No	1.43 (0.42 to 4.84)	0.562		
Overall satisfaction with the IUD insertion procedure				
Satisfied	1		1	
Unsatisfied	6.03 (3.60 to 10.1)	**<0.001**	7.99 (4.83 to 13.22)	**<0.001**
Heavy menstruation				
Yes	1			
No	0.93 (0.39 to 2.22)	0.868		
Painful menstruation				
Yes	1			
No	0.50 (0.16 to 1.62)	0.251		
Ease of insertion				
Easy	1		1	

Continued

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Table 3 Continued

Variable	Crude OR (95% CI)	P value	aOR (95% CI)	P value
Difficult	4.84 (1.33 to 17.60)	**0.017**	1.93 (0.21 to 18.0)	0.565
Pain administration at insertion				
Yes	1			
No	0.34 (0.06 to 1.80)	0.20		
Attempts at insertion				
Once	1			
More than once	1.32 (0.56 to 3.12)	0.520		
Participants' anxiety during the IUD insertion procedure				
Felt calm	1		1	
Did not feel calm	4.35 (1.81 to 10.4)	**0.001**	4.28 (1.09 to 16.85)	**0.038**
Use of ultrasound				
No	1		1	
Yes	8.41 (4.56 to 15.5)	**<0.001**	8.4 (4.55 to 15.6)	**<0.001**
Side effects				
Mild and tolerable	1			
Just tolerable	1.62 (0.77 to 3.39)	0.20		
Intolerable	8.22 (0.76 to 89.3)	0.083		
Breastfeeding				
No	1		1	
Yes	1.48 (0.26 to 4.97)	**0.022**	1.49 (0.26 to 4.98)	**0.042**

OR, aOR, Values in bold type denote statistical significance (ie, p<0.05)
aOR, adjusted odds ratio; IUD, intrauterine device.

Determining the participants' dissatisfaction with IUDs, would have been informative in making client-based recommendations on the utilisation of post-abortion IUDs. Our study demonstrates that there was a constant rate of IUD expulsion during the 6-month follow-up period. We do, however, acknowledge that we are unsure as to whether the expulsions continued at the same rate after the 6-month follow-up period ended.

CONCLUSIONS

Our study demonstrates an overall low expulsion rate of post-abortion IUDs irrespective of type and timing of IUD insertion. Therefore, offering IUDs shortly after medical management of incomplete abortions is recommended, given that this is likely to be less inconvenient for women. The role of breastfeeding in post-abortion IUD expulsion needs to be explored further in order to streamline patient care.

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Acknowledgements The lead author and co-authors extend their gratitude to the participants, doctoral committee and the research team that enabled this study to become a reality. This study was undertaken as part of the lead author's doctoral education funded by the collaboration between the Swedish Research Council, Makerere University and MakRif Project.

Contributors KG-D conceptualised the study, developed the protocol, received funding for the study, supervised the study conduct, data analysis and editing of the manuscript. HK and ELM contributed to the conceptualisation, data curation, data analysis, investigation, methodology and writing of the original report. OK, NMT, AC and JB also contributed to the conceptualisation, methodology, supervision, review and editing of the original draft. The corresponding author attests that all listed authors meet authorship criteria and that no others meeting these criteria have been omitted. HK is the guarantor.

Funding This project was supported by funds from the Swedish Research Council (Grant 2019-04256) in partnership with Makerere University and the MakRif Project. The content is solely the responsibility of the authors and does not necessarily represent the official views of the Swedish Research Council, Makerere University or the MakRif Project. The funders provided support in the form of research expenses, but did not have any additional role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript. Both of these institutions are research and education oriented and not commercial organisations. All authors had full access to the study data materials and took collective responsibility for the submitted manuscript. The corresponding author had the mandate to submit the manuscript for publication.

Competing interests All authors have completed the International Committee of Medical Journal Editors (ICMJE)

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uniform disclosure form (www.icmje.org/coi_disclosure.pdf) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous 3 years; and no other relationships or activities that could appear to have influenced the submitted work.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Consent obtained directly from patient(s).

Ethics approval This study involves human participants and ethical approval was obtained from the Makerere University School of Medicine Research and Ethics Committee (MakSOMREC-2021-131), Stockholm Regional Ethical Committee (2023-01263-01) and Uganda National Council for Science and Technology (HS2111ES). Administrative clearances were also obtained from the five implementing health facilities. Participants gave informed consent to participate in the study before taking part. Participants were reassured that participating in the study was voluntary and that they could opt out of the study without any interference with the relationship with the research team and service delivery. Participants were compensated for their time. Confidentiality and participants' rights were observed throughout the study.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The datasets used and/or analysed during the current study are accessible from the corresponding author (hkayiga@gmail.com, herbert.kayiga@mak.ac.ug) on reasonable request.

Author note The lead authors KDG and HK, affirm that the execution, and write up of this manuscript, is transparent, accurate and honest. There is no omission of important aspects of the study. Any study discrepancies whether planned, registered or relevant have been reported and explained in the manuscript.

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