Acceptance rate, probability of follow-up, and expulsion of postpartum intrauterine contraceptive device offered at two primary health centers, North India

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ABSTRACT

Introduction: Acceptance rate of postpartum intrauterine contraceptive device (PPIUCD) offered through a public health approach is unknown. Our aim was to describe the acceptance rate, expulsion, and follow-up and factors associated with it when PPIUCD was offered to women delivering at two primary health centers (PHCs). **Methods:** We analyzed routine health data of deliveries at two PHCs in district Faridabad, India between May and December 2014, having sociodemographic variables, obstetric history, and during the follow-up check-up at 6-weeks postpartum for *in situ* status of intrauterine contraceptive device, side effects, and complications. **Results:** The overall acceptance rate among those eligible for PPIUCD was 39% (95% confidence interval [CI]: 35.1–42.9). Independent predictor of acceptance was a monthly family income of <USD75$ (odds ratio [O.R.]: 2.29, 95% CI: 1.58–3.31). The expulsion rate, and removal rate at 6 weeks postpartum was 18.0% and 13.0%, respectively. Expulsion by 6 weeks was associated with, age >25 years (O.R.: 2.21, 95% CI: 1.03–4.73), gravida ≥4 (O.R.: 4.01, 95% CI: 1.28–12.56), and a living previous-child (O.R.: 1.51, 95% CI: 1.04–2.19). **Conclusion:** Acceptance rate of PPIUCD was higher than that reported in literature. Women from lower income family, having at least one living child, and having attended antenatal care clinic were more likely to accept PPIUCD.

Keywords: Acceptance, expulsion, India, postpartum intrauterine contraceptive device, primary care, rural

Introduction

Assisting couples to achieve their desired family size ought to be the prime purpose of any family planning program. One of the objectives of the family planning services is to control unregulated fertility. Fertility control is facilitated when long-acting contraceptives are promoted and made available to all eligible women looking for long-term spacing. Approximately 20% of currently married women between the ages of 15 and 49 in India have an unmet need for contraception, of whom 7.2% have an unmet need for spacing methods.[1]

Intrauterine contraceptive device (IUCD) is very effective (99%) and an inexpensive family planning method which is reversible, requires little effort on the part of the user once inserted, and offers 5–10 years of protection against pregnancy.[2] Wider use of IUCD would reduce the overall number of unintended pregnancies more than any other method. However, its acceptance rate is low. Globally, about one of the five women in reproductive age group use IUCD, while in India, the corresponding figure is about 3/100 women.[3]

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The Government of India launched Postpartum IUCD (PPIUCD) services in the year 2000 in selected states, which were universalized in all the states by the year 2010. Under the program, the device is inserted immediately after delivery. Postpartum period is generally considered to be an ideal time to introduce contraception since women are strongly motivated at this time. Even though expulsion rate for PPIUCD is higher, benefits of providing highly effective contraception immediately after delivery outweigh this disadvantage.[4] The Government of India provided IUCD free of cost, nonetheless, it still was largely underutilized. Hence, there is a need to identify factors that affect the acceptance of PPIUCD provided through a public health approach. Our aim was to measure the acceptance rate of PPIUCD, when offered at the primary health center (PHC) level, and factors associated with its acceptance.

Methods

Study setting

The study sites were two PHCs of rural Haryana, (District Faridabad). Total population served by these two PHCs was ~90,000, spread over 28 villages (in the year 2013–14), and comprised the field practice area of the Ballabgarh Health and Demographic Surveillance System (HDSS). Details about the HDSS can be found here.[5] This population was under continuous demographic and health surveillance. The village level multipurpose health workers (MPWs) made fortnightly domiciliary visit to each household for service delivery and data collection. Data were entered into computerized Health Management Information System.[5]

Delivery hut scheme

In the year 2005–06, Haryana government started establishing delivery huts by upgrading existing subcenters and PHCs. The objective was to promote institutional delivery and thereby reduce maternal and infant mortality. Services that were provided included antenatal, postnatal checkups, 24 × 7 obstetric care, immunization, family planning, and referral services. In both the study PHCs, delivery huts were established in the year 2009. We have discussed in detail, the profile of the pregnant women who deliver at these delivery huts where the PPIUCD was offered.[6]

Provision of postpartum intrauterine contraceptive device services at the study site

The antenatal care (ANC) in the study area was comprehensive in nature. MPWs were trained by lady medical officer in counseling technique. They counseled the women and their family members regarding the availability of PPIUCD. PPIUCD service was started in both the PHCs in May 2014. Service providers were staff nurses who were trained at District Training Centre, Faridabad. Lady Medical Officers, who were also trained in PPIUCD insertion, provided supportive supervision and training to the service providers. Pregnant women were provided counseling regarding benefits and availability of PPIUCD services during antenatal period by MPWs. Women coming for delivery

at these two PHCs were again motivated and counseled during the perinatal period. An Informed written consent for insertion of PPIUCD was obtained. Either CuT 375 or CuT 380A was used for PPIUCD insertion. PPIUCD was inserted either just after delivery of placenta or before discharge of mother or baby, usually within 48 h of delivery. Women experiencing postpartum hemorrhage, premature rupture of membrane for more than 48 h before delivery, prolonged labor, and birth asphyxia in newborn were not offered PPIUCD. Recommended standard method was used for PPIUCD insertion.[7] After insertion, PPIUCD acceptors were given a follow-up card, which had information about follow-up visits and warning symptoms. The routine follow-up visit was scheduled 6 weeks postdelivery date. Those who missed the scheduled follow-up were telephonically followed up. Details of the follow-up were documented in the PPIUCD register.

Study variables

Sociodemographic factors, such as caste, religion, family income, occupation and education of couple, obstetric history such as number of living children, gravida, number of antenatal visits, and sex of the newborn, were routinely captured at the time of delivery. Variables such as type of follow-up (clinic visit or telephonic), *in situ* status of IUCD, side effects, and complications were captured during the follow-up visit at 6 weeks postpartum.

Data entry and statistical analysis

Data were entered in Microsoft Office Excel worksheet. The analysis was done in Stata version 12 (StataCorp. 2011. Stata Statistical Software: Release 12. College Station, TX: StataCorp. LP, USA). For bivariate analysis, variables were categorized into 2–3 groups for comparison. Results are expressed in proportions, and Chi-square test was used wherever applicable. Ethical approval was not required as this was an analysis of service data. Personal identifiers were delinked from the final database before commencing analysis.

Results

A total of 799 pregnant women reported at delivery hut of two PHCs between May and December 2014. Of them, 151 were referred to a higher center per indications, and 648 delivered at the PHC delivery hut. Among them, 611 were eligible for PPIUCD insertion. The reasons of noneligibility are listed in Figure 1. Among those eligible, 238 women consented for insertion. The acceptance rate of PPIUCD was thus 38.9% (95% confidence interval [CI]: 35.1–42.9). Out of 238, follow-up information could be gathered for 128 through either at clinic visits or through telephone.

Table 1 shows the acceptance rates by sociodemographic characteristics. It was found that low monthly family income was significantly associated with higher acceptance. PPIUCD acceptance rate was lowest (33.2%) when the women did not have any previous living child. The acceptance rate gradually

improved as the number of previous living children increased. It was 38.2% and 45.2% when number of the previous living children was 1 and ≥2, respectively.
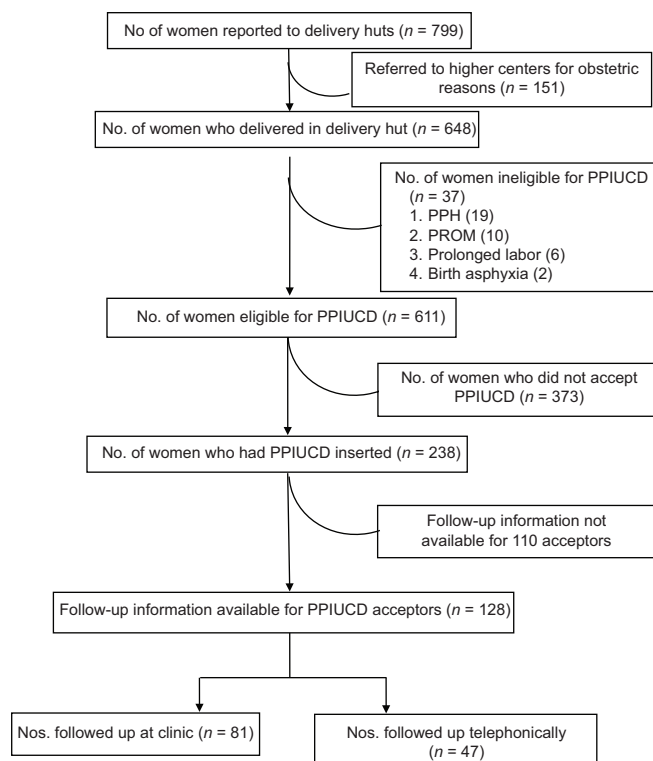

Figure 1: Flowchart showing the postpartum intrauterine contraceptive device insertions and follow-up of pregnant women

Using multivariate binary logistic regression [Table 2], the independent predictors of accepting PPIUCD were, having a monthly family income of <USD75 (odds ratio [O.R.]: 2.29, 95% CI: 1.58–3.31), and belonging to the Muslim religion (O.R.: 3.24, 95% CI: 1.07–9.98).

Out of 238 acceptors, follow-up information was available for 128 women (53.8%). Out of the 128, nearly two-thirds (63.3%) had visited the PHC for follow-up, whereas the rest (36.7%) were followed-up over telephone [Figure 1].

On multivariate binary logistic regression [Table 3], the independent predictors of being followed-up after the insertion of PPIUCD (either at health center or by telephone) were, being literate (O.R.: 2.34, 95% CI: 1.19–4.60), monthly family income of <USD75$ (O.R.: 2.34, 95% CI: 1.31–4.16), having at least one ANC visit (O.R.: 1.24, 95% CI: 1.10–1.41), and belonging to the General (nonbackward) caste (O.R.: 0.56, 95% CI: 0.32–0.98).

More than two-thirds of the women (68%) had the device *in situ* with no complaints [Table 4]. The expulsion rate and removal rate by the time of follow-up visit were 18.0% and 13.0%, respectively. Abdominal pain (16.4%), leukorrhea, and bleeding-per-vaginum (5.5%) were the most common reported symptoms at the time of follow-up [Table 4].

On univariate analysis, probability of expulsion (spontaneous or removed) by 6 weeks was associated with, age more than 25 years (O.R.: 2.21, 95% CI: 1.03–4.73), gravida ≥4 (O.R.: 4.01, 95% CI: 1.28–12.56), and a living previous child (O.R.: 1.51, 95% CI: 1.04–2.19) [Table 5].

Table 1: Profile of women who had accepted the postpartum intrauterine contraceptive device					
Variable	Category	Total no	PPIUCD acceptors	Acceptance rate	*P*
Total eligible for PPIUCD insertion		611	238	38.9	-
Age (years)	18-24	403	152	37.7	0.383
	≥25	208	86	41.4	
Literacy status of women	Illiterate	149	57	38.3	0.841
	Literate	462	181	39.2	
Literacy status of husband	Illiterate	51	23	45.1	0.347
	Literate	560	215	38.4	
Caste	General	344	126	36.6	0.181
	Others	267	112	42.0	
Religion	Hindu	582	221	38.0	0.024
	Muslim	17	12	70.6	
	Sikh	12	5	41.7	
Monthly family income	Income up to 5000	350	170	48.6	<0.001
	>5000	261	68	26.1	
Number of antenatal visits	Up to 3 visits	310	109	35.2	0.051
	>3 visits	301	129	42.9	
Gravida	Up to 2nd gravida	364	135	37.1	0.251
	≥3nd gravida	247	103	41.7	
Number of previous living children	No living child	187	62	33.2	0.050
	1 living child	225	86	38.2	
	≥2 living children	199	90	45.2	
Sex of the newborn	Male child	339	136	40.1	0.510
	Female child	272	102	37.5	

PPIUCD: Postpartum intrauterine contraceptive device

Table 2: Probability of acceptance of postpartum intrauterine contraceptive device by eligible women			
Univariate binary logistic regression			
Independent variable	OR	95% CI of OR	$P^{\#}$
Age (ref[†] <25 years)			
≥25 years	1.16	0.83-1.64	
Education (ref illiterate)			
Literate	1.04	0.71-1.52	
Education of husband (ref illiterate)			
Literate	0.76	0.43-1.35	
Monthly family income (ref ≥ INR 5000)			
INR <5000 (USD 75$)	2.89	2.06-4.04	<0.001
Caste (ref backward caste OBC, SC/ST)			
General caste	0.80	0.58-1.11	
Parity			
1	1.04	0.69-1.57	0.003
2	1.25	0.80-1.96	
3	1.17	0.63-2.20	
≥4	4.48	1.66-12.08	
Gravida			
2nd	0.93	0.61-1.42	
3rd	0.91	0.57-1.45	
≥4th	1.57	0.96-2.56	
Number of ANC visits (ref number ANC visit)			
≥1 visit	1.12	1.03-1.21	0.005
Living status of the previous child (ref dead)			
Living	1.25	1.07-1.46	0.01
Sex of the present child (ref female)			
Male	1.12	0.80-1.55	
Religion (ref Hindu)			
Muslim	3.92	1.36-11.28	0.01
Sikh	1.17	0.37-3.72	
Multivariate binary logistic regression*,^			
Monthly family income (ref ≥INR 5000)			
INR <5000 (USD 75$)	2.29	1.58-3.31	<0.001
Parity			
1	0.91	0.54-1.55	
2	0.98	0.44-2.14	
3	0.70	0.21-2.22	
≥4	2.45	0.51-12.57	
Number of ANC visits (ref number ANC visit)			
≥1 visit	1.08	0.99-1.18	
Living status of the previous child (ref dead)			
Living	1.18	0.83-1.69	
Religion (ref Hindu)			
Muslim	3.24	1.07-9.98	0.04
Sikh	1.13	0.33-3.92	

*For multivariate binary logistic regression, only those independent variables were included in the model that were significant in univariate analysis, ^Final multivariate binary logistic regression model has the followings: n=611; LR χ^2 (9)=60.31; P> χ^2<0.001; Pseudo R^2=0.0738; Log likelihood=−378.32, #P value of <0.05 has been considered statistically significant; nonsignificant P values are not shown, †Ref is for reference. INR: Indian rupees; OR: Odds ratio; CI: Confidence interval; LR: Likelihood ratio; ANC: Antenatal care visit

Table 3: Probability of receiving a follow-up after insertion of postpartum intrauterine contraceptive device (either at health center or by telephone)			
Univariate binary logistic regression			
Independent variable	OR	95% CI of OR	$P^{\#}$
Age (ref[†] <25 years)			
≥25 years	1.22	0.71-2.08	
Education (ref illiterate)			
Literate	2.48	1.34-4.58	0.004
Education of husband (ref illiterate)			
Literate	1.92	0.80-4.65	
Monthly family income (ref ≥INR 5,000)			
INR <5000 (USD 75$)	2.37	1.40-4.01	0.001
Caste (ref backward caste OBC, SC/ST)			
General caste	0.55	0.33-0.92	0.023
Parity			
1	0.83	0.43-1.59	
2	1.08	0.53-2.20	
3	0.84	0.31-2.24	
≥4	0.38	0.12-1.24	
Gravida			
2nd	0.99	0.51-1.97	
3rd	1.55	0.72-3.35	
≥4th	0.57	0.27-1.18	
Number of ANC visits (ref number ANC visit)			
≥1 visit (s)	1.29	1.14-1.45	0.001
Living status of the previous child (ref dead)			
Living	1.07	0.85-1.35	
Sex of the present child (ref female)			
Male	1.22	0.72-2.03	
Religion (ref Hindu)			
Muslim	0.81	0.25-2.60	
Sikh	-		
Multivariate binary logistic regression*,^			
Education (ref illiterate)			
Literate	2.34	1.19-4.60	0.014
Monthly family income (ref≥INR 5000)			
INR <5000 (USD 75$)	2.34	1.31-4.16	0.004
Caste (ref backward caste OBC, SC/ST)			
General caste	0.56	0.32-0.98	0.043
Number of ANC visits (ref number ANC visit)			
≥1 visit (s)	1.24	1.10-1.41	0.001

*For multivariate binary logistic regression, only those independent variables were included in the model that were significant in univariate analysis, ^Final multivariate binary logistic regression model has the followings: n=238; LR χ^2 (4)= 38.97; P> χ^2<0.001; Pseudo R^2=0.1186; Log likelihood=−144.80, ^A P<0.05 has been considered significant; nonsignificant P values are not shown, †Ref is for reference. INR: Indian rupees; OR: Odds ratio; CI: Confidence interval; ANC: Antenatal care visit; LR: Likelihood ratio

Discussion

We measured the acceptance rate of PPIUCD when offered at the PHC level since no information is available from the primary care. We also described the probability of being followed-up, of having an expulsion of the device, and their independent predictors. These elements of analysis have so far been missing in existing literature, especially from a primary care setting from India.

A study conducted in the District Head Quarters Hospital of Bolangir, Odisha reported an overall acceptance rate of 17.5%.[8] While the acceptance rate of PPIUCD among women delivering in a tertiary care teaching hospital in Western Uttar Pradesh, India, was reported as 14.4%.[9] The acceptance rate of PPIUCD insertions among eligible women, in our study, was 39%.

Table 4: Complications among acceptors of postpartum intrauterine contraceptive device (n=130) at the time of follow-up visit (6 weeks postpartum)

Complication	Frequency	Percentage
Outcome at follow-up		
In situ	87	68.0
Expulsion before follow-up visit	23	17.7
Removed before follow-up visit	3	2.3
Removed at the time of follow-up due to complications	15	11.7
Complications		
Abdominal pain	21	16.4
Leukorrhea	9	7.0
Bleeding per vaginum	7	5.5
Missing thread	3	2.3
Bleeding and abdominal pain	5	3.9
No complication	21	16.1

The percentages in the table may be rounded off to nearest first place after decimal

Table 5: Probability of expulsion of postpartum intrauterine contraceptive device (either spontaneous or removed) by 6 weeks

Univariate binary logistic regression			
Independent variable	OR	95% CI of OR	$P^{\#}$
Age (ref[†] <25 years)			
≥25 years	2.21	1.03-4.73	0.04
Parity			
1	1.07	0.38-3.02	
2	1.99	0.72-5.52	
3	3.87	0.95-15.72	
≥4	4.83	0.69-33.61	
Gravida			
2nd	0.59	0.19-1.80	0.02
3rd	1.67	0.59-4.74	
≥4th	4.01	1.28-12.56	
Number of ANC visits (ref number ANC visit)			
≥1 visit	1.08	0.93-1.25	
Living status of previous child (ref dead)			
Living	1.51	1.04-2.19	0.03
Sex of present child (ref female)			
Male	1.28	0.60-2.75	
Multivariate binary logistic regression*,^			
Age (ref <25 years)			
≥25 years	1.26	0.48-3.29	
Gravida			
2nd	0.53	0.15-1.85	
3rd	1.40	0.35-5.58	
≥4th	2.98	0.48-18.36	
Living status of previous child (ref dead)			
Living	1.05	0.58-1.91	

$^{\#}$A $P<0.05$ has been considered statistically significant; nonsignificant P values are not shown, *For multivariate binary logistic regression, only those independent variables were included in the model that were significant in univariate analysis, ^Final multivariate binary logistic regression model has the followings: $n=128$; LR χ^2 (5)= 12.33; $P>\chi^2=0.0306$; Pseudo $R^2=0.0768$; Log likelihood=−74.10, *None of the independent variables were significant in the final multivariate binary logistic regression model, †Ref is for reference. LR: Likelihood ratio, OR: Odds ratio; CI: Confidence interval; ANC: Antenatal care visit

We found a relatively higher rate of acceptance rate for PPIUCD when compared with other published literature from India. Lack of accurate and up to date information about PPIUCD among health service providers and potential clients has been cited as one of the reasons for low acceptance rate of PPIUCD.[10] We had trained the health-care workers in counseling skills, which was utilized by them during ANC provisions. This could be one of the reasons of higher acceptance rate of PPIUCD in our study as compared to the previous published literature.[8,11-13]

We found that the acceptance rate of PPIUCD was almost twice as high (48.6%) among those belonging to poorer family as compared to those from richer families (26.1%). One of the reasons could be that women belonging to richer families had better knowledge and access to wider choice of alternative methods such as injectable hormonal contraceptives. Hence, these women might have preferred contraceptive methods other than PPIUCD.

Among the women practicing Hindu religion, the PPIUCD acceptance rate was 38% whereas it was almost twice as high (70.6%) among women belonging to Muslim religion. It is possible that due to small absolute numbers of Muslim women ($n = 17$), the percentage figure was misleading. However, on the whole, the figures are in direct contrast to often held popular belief that due to religious injunction Muslim women are often unwilling to accept contraceptive methods, especially IUCD.[14] The study findings suggest that given privacy, anonymity, and proper counseling, Muslim women too are as likely to accept PPIUCD as their Hindu counterparts.

Often, women hear about PPIUCD only when they are in labor, a time when it is difficult to make informed decision. In a study, 94.2% women had not even heard of PPIUCD.[13] We found that women who received ANC visits were more likely to accept PPIUCD after the delivery. It seems that such visits provided an opportunity for interaction with the health-care provider, repeated counseling, and clarification of doubts that women might have had. This in turn might have resulted in higher acceptance of PPIUCD among them.

We found that PPIUCD acceptance rate increased with increasing number of living children. Other Indian studies have also reported that the acceptance rate of PPIUCD was high when there was at least one living child.[4,13] It is likely that couples already having living children may preferentially opt for one of the contraceptive methods. In a society that values highly a male child, it probably was reassuring to the woman that by having a male child a significant milestone has been achieved. Therefore, they were more inclined to accept PPIUCD.

Contrary to popular belief, we found that sex of the newborn did not have any effect on decision to accept PPIUCD. Rather it was whether the woman already had one or more living children which was more important. It is possible that the desire to have more time to decide about third or higher order pregnancy

inclined women to accept PPIUCD irrespective of the sex of the newborn. The study by Bhalerao and Purandare reported that the acceptance of PPIUCD was high among women who had at least one male child.[15] We did not have information about the sex of the previous children. Hence, we were unable to assess the impact of sex of the previous children on decision to accept PPIUCD.

In our study, 128 women (53.8%) could be followed-up. In their multicentric study in India of 2,733 women, Kumar *et al.*[4] reported a follow-up rate of 63.3% though they did not mentioned the type of health-care facilities included in their study. In the study done in district hospital of Bolangir, Odisha, Mishra[8] reported 23% women being lost to follow-up. Similarly, a lost to follow-up of 21.4% was reported by Shukla *et al.*[16] in their study done in a medical college in Uttar Pradesh. Thus, our follow-up rate, although lower, reflected the possibility in a real-life situation at a primary care level.

We found an expulsion rate of 18% which was higher than the expulsion rate of 10.7% at 6 months reported by Shukla *et al.*[16] in their study done among 1317 women in a medical college in north India by 6 months. One recent study from Turkey[17] on PPIUCD among women after C-section reported an expulsion rate of nearly 18%. Another Indian study conducted on 168 women reported 16.4% as IUD expulsion rate in women undergoing postpuerperal IUD insertion.[15]

Pain abdomen and bleeding per vaginum were the most common side effects reported. The expulsion rate observed in our study was 17.7%. The previous studies have reported expulsion rates varying from 3.6% to 16%.[4,9,13,18,19] The expulsion rate of PPIUCD is generally higher than the interval IUCD, (O.R.: 6.77; 95% CI 1.43–32.14).[20] Early expulsion is more likely if the IUCD is not placed high up in uterine fundus. Our data pertained to the period when PPIUCD insertion had been recently introduced at the PHC level. It is likely that the inadequate skill of the health-care providers could have been a factor for relatively higher expulsion rate. Upgrading skill by robust training and better supportive supervision can help in reducing the expulsion of PPIUCD.

Since this was a secondary data analysis, we were not able to study other variables which might have affected PPIUCD acceptance, for example, fear of side effects, quality of counseling, category of health-care worker who did the counseling, etc., The reported complications rates of PPIUCD need to be interpreted cautiously since the follow-up information were unavailable for two-fifths of the acceptors. It is possible that only those women who had complications of PPIUCD reported to PHC for remedial follow-up. In that case, the observed rates would be an overestimate. However, it is also likely that those women who had complications of PPIUCD had lost faith in PHC and had therefore availed services elsewhere. If this were true, then the observed rate of complications would be an underestimate. We cannot speculate as to which of these two scenarios is likely

to be true. Hence, we recommend that a prospectively collected follow-up data would be able to find out the true picture.

Conclusion

The acceptance rate of PPIUCD was 39% and was higher than what has been reported in the literature. Women from low-income family, having at least one living child, and having attended ANC clinic were more likely to accept PPIUCD.

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Conflicts of interest

There are no conflicts of interest.

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