

# Evaluation of Expulsion and Continuation Rate of Immediate Postpartum Intrauterine Contraceptive Devices: A Prospective Hospital-based Study

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## ABSTRACT

**Introduction:** Family planning can avert nearly one-third of maternal deaths and 10% of child mortality when couples space their pregnancies more than two years apart. With increased institutional deliveries, Postpartum Intrauterine Contraceptive Devices (PPIUCD) can play an important role in addressing the unmet needs of spacing methods in India. Moreover, in this digital age, generalised awareness of the female population about contraception has increased considerably, so the acceptance and continuation rate might be high.

**Aim:** To evaluate expulsion and continuation rate of immediate PPIUCDs at a tertiary care hospital in Haryana, India.

**Materials and Methods:** The prospective, hospital-based study was conducted from October 2020 to September 2021 in the Department of Obstetrics and Gynaecology at Kalpana Chawla Government Medical College, Karnal, Haryana, India. Ninety

women who underwent IUCD insertion within 10 minutes of delivery of the placenta were enrolled, irrespective of the mode of delivery. Patients were followed-up at six weeks, three months, and six months. The expulsion and continuation rate of immediate PPIUCD and reasons for removal were studied. Descriptive variables were expressed in percentages. The Chi-square test was used to determine the continuation rate and expulsion/removal rates in vaginal versus cesarean deliveries and a p-value less than 0.05 was taken as statistically significant.

**Results:** A continuation rate of 84.4% was observed at six months. A statistically significant difference was observed in the continuation rate of participants of vaginal delivery versus caesarean section (82.67% vs 93.33%, p-value <0.01). Overall, the expulsion rate was 6.66%.

**Conclusion:** Immediate PPIUCD insertion has high continuation rates and can play an important role in family planning.

**Keywords:** Caesarean section, Family planning, Intrauterine device, Postpartum contraception, Vaginal insertion

## INTRODUCTION

World Health Organisation (WHO) recommends spacing between pregnancies by atleast 24 months [1]. An estimated 61% of births in India occur at intervals that are shorter than the recommended birth interval [2]. Short birth intervals are associated with adverse pregnancy outcomes such as induced abortions, miscarriage, preterm births, neonatal and child mortalities, stillbirths, and maternal depletion syndrome [3]. A study shows that if couples space their pregnancies more than two years apart by contraception, more than 30% of maternal mortalities and 10% of child deaths can be averted [4].

The postpartum period provides the most convenient opportunity to explain women about family planning methods, as they are strongly motivated during this period [5]. Women stay in contact with healthcare providers for enough time to undergo counseling and this opportunity may be utilized to motivate her for opting one of the contraceptive methods. If this prospect is missed, women may never return to seek contraception advice [6].

Postpartum Intrauterine Contraceptive Devices (PPIUCD) is a non hormonal, long-acting, and highly effective contraception that does not affect fertility. It is suitable for women of all reproductive ages and represents the most cost-effective contraceptive method for preventing unwanted pregnancies [7]. Women who undergo tubal ligation at a relatively younger age may regret it later on, especially in view of high perinatal and infant mortality rates in developing countries like India [8]. Therefore, IUCD insertion at caesarean section offers an alternative to the common practice of tubal ligation.

The PPIUCD coverage rate varies widely among different states in India ranging from 1.2% to 40.2% with the national average

being 16.3% [9,10]. Given the high unmet need for birth spacing and the rise in institutional deliveries, the Government of India has been working to scale up the use of postpartum family planning, with a focused effort on expanding the capacity to provide PPIUD services [11,12]. Moreover, in this digital age, generalised awareness of the female population about contraception has increased considerably so, the acceptance and continuation rate might be high as compared to older studies [13,14]. Hence, newer studies on PPIUCD insertion are vital to understand the impact of Government's initiatives and changing scenarios on PPIUCD use. There are limited studies on PPIUCD insertions in North India [15-17] which encouraged us to conduct the present study. Findings from the current study will help planners in designing strategies so as to promote the use of postpartum IUCD by providing baseline information. The present study aims to evaluate the expulsion and continuation rate of immediate PPIUCDs and factors associated with its discontinuation at a tertiary care hospital in Haryana, India.

## MATERIALS AND METHODS

This was a prospective, hospital-based study conducted from October 2020 to September 2021 in the Department of Obstetrics and Gynaecology, Kalpana Chawla Government Medical College, Karnal, Haryana, India. Approval from Institutional Ethical Committee was obtained (KCGMC/SRC/2020/128-133). Written informed consent was obtained from all the participants.

All antenatal women, admitted to labour room of the Department of Obstetrics and Gynaecology, for their delivery were counseled for PPIUCD insertion as a part of the routine protocol.

**Inclusion and Exclusion criteria:** All women who delivered vaginally or by caesarean section and underwent PPIUCD insertion within 10 minutes of delivery of placenta were enrolled in the study. Women belonging to Medical Eligibility Category 3 and 4 for PPIUCD and IUCD by WHO [18], haemoglobin <8 gm%, diagnosed with obstructed labour, more than 18 hours from rupture of membranes to delivery of the baby, suffering from Acquired Immune Deficiency Syndrome (AIDS) and neither clinically well nor on antiretroviral therapy, unresolved postpartum haemorrhage, women who underwent PPIUCD insertion after 10 minutes of delivery of placenta and women who were lost to follow-up were excluded from the study.

**Sample size:** The study of Lall J et al., [19] observed a continuation rate of 84.5% for PPIUCD at three months of follow-up. Taking this value as a reference, the minimum required sample size with a 7.5% margin of error and a 5% level of significance was 90 patients.

### Study Procedure

For women who underwent vaginal delivery, Copper T380A (CuT380A) Intrauterine Device (IUD) was placed high up the fundus, immediately within 10 minutes of delivery of the placenta using long Kelley's forceps, in the lithotomy position, and the strings were cut [6]. For those undergoing caesarean section, CuT380A IUCD was placed high up at the fundus within 10 min of delivering the placenta, with the help of long ring forceps passed through the uterine incision. Strings were pointed toward the cervical canal but not pushed to the canal to avoid infection by vaginal flora, and displacement of the IUCD. Care was taken to avoid strings being included during suture. The uterus was repaired in two layers (Vicryl 1-0) as routine [6,20].

Each participant was provided with a discharge card at the time of discharge showing the type of IUCD and date of insertion. The participant was informed about the IUCD side effects and normal postpartum symptoms. Participants were asked to come for follow-up in the Outpatient Department (OPD) of Obstetrics and Gynaecology, at six weeks, three months, and six months or they could visit OPD any time if they had foul-smelling vaginal discharge, lower abdominal pain, especially accompanied by not feeling well, fever or chills, feeling of being pregnant, suspicious of IUCD expulsion. Patients who did not turn up for follow-up were contacted telephonically. The study was discontinued, once the patient number who completed follow-up, was equal to the sample size achieved.

Details regarding socio-demographic factors such as age, parity, socio-economic status [21], and residence were recorded from case sheets. At each follow-up visit, complaints regarding PPIUCD were recorded, and per abdomen, per speculum, and per vaginam examination of each participant was done. Details regarding in-situ presence of IUCD, missing threads, spontaneous expulsion/removal of IUCD, along with reasons for removal were recorded. Details regarding adverse effects of PPIUCD such as pelvic pain, abnormal vaginal discharge, and excessive/irregular menstrual bleeding were recorded. The continuation rate of PPIUCD was the primary outcome. For continuation rate, participants with IUCD in situ at six months, were counted. Factors leading to its discontinuation were also evaluated.

### STATISTICAL ANALYSIS

All the data was analysed using various tests on Statistical Package for Social Sciences (SPSS) software version 21.0. Descriptive variables were expressed in percentages. The Chi-square test was used for categorical values. For all statistical tests, a p-value <0.05 was taken as statistically significant.

### RESULTS

The first 90 women who completed six months of follow-up were included in the study. Seventy five (83.33%) participants got IUCD inserted following vaginal delivery and 15 (16.67%) had intra-caesarean insertion.

During the study period, 44 (48.9%) participants were between 18 to 24 years of age group, 37 (41.1%) participants were between 25 to 30 years of age group, 8 (8.9%) participants were between 31 to 35 years of age group and 1 (1.1%) participant was above 35 years. In present study, 44 (48.88 %) participants were parity-1, 24 (26.67 %) participants were parity-2, 12 (13.33 %) participants were parity-3 and 10 (11.11 %) participants were parity-4 and above parity [Table/Fig-1].

Variables	Frequency (N=90)	Percentage
<b>Age (years)</b>		
18-24	44	48.88%
25-30	37	41.11%
31-35	8	8.88%
>35	1	1.11%
<b>Parity</b>		
1	44	48.88%
2	24	26.67%
≥3	22	24.44%
<b>Socio-economic status*</b>		
I (Upper)	3	3.33%
II (Upper middle)	36	40%
III (Lower middle)	42	46.67%
IV (Upper lower)	9	10%
V (Lower)	0	0
<b>Residence</b>		
Urban†	31	34.44%
Rural‡	59	65.56%

[Table/Fig-1]: Demographic characteristics.

\*Socio-economic status as per modified Kuppuswamy scale [21]

†Urban Unit (or Town): All places with a municipality, corporation, cantonment board or notified town area committee, etc. (known as Statutory Town)

‡All other places which satisfied the following criteria (known as Census Town): A minimum population of 5,000, atleast 75 % of the male main workers engaged in non-agricultural pursuits, a density of population of atleast 400 per sq. km.

§Rural Areas : All areas which are not categorized as Urban area are considered as Rural Area (Source: Census of India 2011)

Four (4.44%) participants had spontaneous expulsion of the device within six weeks and 2 (2.22%) more cases of spontaneous expulsion were observed at three months of follow-up. No additional cases were recorded at six months. One (1.11%) participants requested for removal of IUCD at six weeks, 2 (2.22%) at three months, and 5 (5.55%) at six months. [Table/Fig-3] shows that 5 (5.55%) PPIUCD removals were done due to menstrual/bleeding problems, 1 (1.11%) within three months and an additional 4 (4.44%) at six months. One (1.11%) removal was done due to pelvic pain at three months.

Parameters	6 Weeks	3 Months	6 Months	Total
Expulsion	4 (4.44%)	2 (2.2%)	-	6 (6.66%)
Removal on request	1 (1.11%)	2 (2.2%)	5 (5.55%)	8 (8.88%)
Continuation rate	85 (94.44%)	81 (90%)	76 (84.4%)	76 (84.4%)

[Table/Fig-2]: Expulsion rate /removal and continuation rate of PPIUCD with time.

Complications	6 weeks	3 months	6 months	Total
Menstrual/Bleeding problem	-	1 (1.11%)	4 (4.44%)	5 (5.55%)
Pelvic Pain	-	1 (1.11%)	-	1 (1.11%)
Lost string	-	-	1 (1.11%)	1 (1.11%)
Family issues	1 (1.11%)	-	-	1 (1.11%)
Total	1 (1.11%)	2 (2.22%)	5 (5.55%)	8 (8.88%)

[Table/Fig-3]: Reasons for removal of PPIUCD with time.

Thirteen (17.33%) participants of the vaginal delivery group and 1 (6.66%) from the intra-caesarean group had IUCD expulsion/removal

of PPIUCD. Vaginal delivery and intracaesarean groups had a continuation rate of 82.67% (n=62) and 93.33% (n=14) respectively (p-value <0.001) [Table/Fig-4].

Expulsion/ Removal	Mode of Delivery n (%)		p-value
	Vaginal delivery	Caesarean section	
Expelled/Removed (n=14)	13 (17.33%)	1 (6.66%)	<0.001
Continuation (n=76)	62 (82.67%)	14 (93.33%)	
Total	75 (100%)	15 (100%)	-

**[Table/Fig-4]:** Expulsion/Removal rate of PPIUCD between different modes of delivery at six weeks follow-up.  
Chi-square test was used

## DISCUSSION

A total of 90 women who completed follow-up were enrolled in the study, out of which 83.33% of women underwent post placental IUCD insertion within 10 minutes of placental delivery following vaginal birth, whereas 16.67% of women had device insertion during caesarean section. Present study showed that women following vaginal delivery were more inclined for PPIUCD insertion. This could be due to the fact that pain of normal labour inclines a woman more toward birth spacing. Moreover, women may be afraid of complications of an operative procedure and therefore do not choose any further procedure along with caesarean section. Garg N et al., also observed that women following vaginal delivery were more inclined to PPIUCD insertion [22].

In the present study, acceptance of PPIUCD was more among parity 1 (48.88%) and parity 2 (26.67%). Mothers having more than two living children had lower acceptance as they prefer permanent sterilisation. The same observation was seen in the study by Halder A et al., primipara mothers accepted PPIUCD more than the others (44 and 52 % in vaginal and intracaesarean group, respectively) [6]. Sharma A et al., and Kanhere AV et al., also found the highest acceptance in the parity 1 group (44.24% and 48% respectively) [8,13].

The present study showed that maternal age is an important factor in accepting contraceptives. Results showed that the majority (48.9%) of acceptors belonged to the 18-24 years of age group. It could be due to the fact that women in the high age group belong to higher parity also, and therefore are more inclined towards permanent sterilisation. Halder A et al., found the highest acceptors in the age group 21-25 years (40% and 44% in vaginal and intracaesarean group) [6]. Sharma A et al., [8], Garg N et al., [22] and Shanavas A et al., [23] also observed almost similar age group in their study (45%, 61.8% and 50% in age-group 20-25 years respectively). The middle socio-economic group constituted the majority in this study (86.67%). Shanavas A et al., found the middle socioeconomic group as a major constituent of their study, which was almost 70.7% [23]. Whereas, Goswamy G et al., in their study found 62% of acceptors from the lower socioeconomic group [14].

In the present study 59 (65.56%) participants were from rural areas and 31 (34.44%) participants were from urban areas. This shows the role of antenatal contraceptive counseling done by ASHA workers and ANM in rural areas because the frequency of contact of pregnant women with ANM or ASHA worker and their influence in the rural area is more as compared to urban areas. Garg N et al., also observed that 71.13% of participants were from a rural background in their study [22]. In the present study, 6 (6.66%) cases had spontaneous expulsion of the device, 4 (4.44%) at six weeks, and the remaining 2 (2.22%) at three months. The expulsion rate of the device might be reduced by improving the skills in PPIUCD insertion by conducting more training for healthcare workers. Moreover, confirmation of the position of the IUCD postinsertion with ultrasonography might also lead to better results [12].

Variations in rates of IUD expulsions, mainly depend upon the timing of placement and mode of delivery [24]. A statistically significant difference was observed in the continuation rate of participants of vaginal delivery versus caesarean section (82.66% vs. 93.33%, p-value <0.01). Intracaesarean PPIUCD insertion is attempted through the uterine incision and is under direct vision. It leads to better placement of IUCD and hence, lesser expulsions and an improved continuation rate. Sharma A et al., observed an expulsion rate of 5.20%, and IUCD removal was done in 13.54% of women [8]. The continuation rate at six months was 81.25% which is comparable to the present study.

Bayaumi YA et al., observed a total expulsions rate of 13.9% in the postplacental group at six months and the continuation rate of IUCD use was 87.0% at 6 months [25]. In a similar study by Agarwal M et al., the expulsion rate was high in vaginal delivery than intracaesarean group [26]. The overall expulsion rate was 6% and the continuation rate was 78% after three months. This may be due to better visualisation, fundal placement and expertise of the provider in case of caesarean section. Hooda R et al., found that the expulsions were significantly higher in postplacental IUCD insertions after vaginal deliveries as compared to caesarean insertions (p-value=0.042) [27].

PPIUCD insertion is a single-time decision as compared to the barrier and hormonal contraceptives. Moreover, it is available free of cost in government health facilities and is long-acting and reversible. Further, healthcare providers can also be easily trained for PPIUCD insertion as the technique is quite simple. Trained providers and proper technique of PPIUCD insertion result in a lesser expulsion rate as seen in the present study. For women undergoing multiple caesarean sections, it is an alternative to tubal ligation. With the rapidly growing population and high unmet needs for family planning especially during the first two-three years following delivery, immediate PPIUCD can play a significant role.

## Limitation(s)

The short duration of follow-up and the study was conducted in a single-centre, hence, the findings cannot be generalised.

## CONCLUSION(S)

With the rise in institutional births in our country, opportunities to provide postpartum contraception have further increased. Immediate PPIUCD insertion has high continuation rates and can play an important role in family planning. Although there is a relatively higher incidence of expulsions after vaginal PPIUCD insertions, they should be encouraged considering the advantages that come along. Improvement in follow-up services can further enhance continuation rates.

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