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Hospital-based study of post-partum intrauterine contraceptive device (PPIUCD) acceptance, outcomes and complications

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Abstract:
Unmet postpartum contraception needs contribute to unintended pregnancies and PPIUCD. The overall PPIUCD acceptance rate in this observational study of 20,500 deliveries in a Central Indian tertiary hospital was 15.37%, with cesarean (18.00%) deliveries having a higher rate than vaginal (9.52%). The device had a 92.21% continuation rate and a 2.56% expulsion rate after six weeks. Thus, physical discomfort and family pressure caused early removals (7.79%), emphasizing the need for proactive family counseling during antenatal care to maximize retention.

Keywords: Post-partum intrauterine contraceptive device (PPIUCD), contraceptive continuation, post-partum family planning

Background:
Unplanned pregnancy is a global and South Asian public health issue. In 2015–2019, 121 million unintended pregnancies occurred globally, 64 per 1,000 women aged 15–49 and 61% ended in abortion **[1].** Even though the burden is decreasing, 44% of pregnancies worldwide were unintended in 2010–2014 **[2].** Unplanned pregnancy causes health, social and economic problems for women and families and in low- and middle-income countries, it drives unsafe abortion and maternal harm **[3, 4].** While India has the world's largest population, family planning progress is uneven across states and populations **[5].** The prevalence of unmet family planning need in India declined to 9.4% in 2021, but it still accounted for 24.2 million women, with the highest burden in Meghalaya, Mizoram, Bihar and Uttar Pradesh **[5, 6]**. Unplanned pregnancy in India has decreased from 22% in 2005–2006 to 8% in 2019–2020, with higher rates among poorer and less educated women **[7].** However, inequalities remain poverty, age, residence and contraceptive access continue to influence unintended pregnancy in South Asia **[4].** Postpartum is an important time to address unmet contraception needs because many women don't use family planning and underestimate the risk of rapid repeat pregnancy **[8].** Poor outcomes are consistently associated with short interpregnancy intervals. A 2023 population-based analysis of 46 nations found that perinatal death was 2.72-fold greater in intervals less than 6 months after a live birth, supporting WHO advice to wait at least 24 months before trying again **[9].** A 2023 systematic review and dose-response meta-analysis of 129 studies found that extreme short and long intervals increased the risk of preterm birth, low birthweight, fetal mortality and other negative outcomes, with 18–23 months being best for the general population **[10]**. Expanding postpartum family planning is a high-yield strategy for India. The postpartum intrauterine contraceptive device (PPIUCD) is long-acting, reversible, cost-effective and can be used immediately after delivery without interfering with breastfeeding **[11-13].** PSI and FOGSI in India launched the women's health program to promote IUCD use and postpartum insertion (post-placental and early postpartum < 48 hours) **[14]**. Despite free public-sector provision, IUCDs account for only 1.5% of contraceptive method use **[13]**. Recent Indian facility-based studies show that PPIUCD acceptance ranges from 18% in one Kerala tertiary center to 32.7% in West Bengal and 60%–63.1% in North and Central India **[15, 16].** Lack of accurate information among healthcare providers and potential users can downplay benefits, overstate complications and reinforce community misconceptions, leading to PPIUCD discontinuation **[17].** These knowledge gaps, poor counseling and inadequate follow-up may increase discontinuation by leaving women unprepared for expected side effects and less supported in managing them **[18, 19]**. Studies in India have linked PPIUCD refusal or removal to partial knowledge, fear of pain or bleeding, partner or family opposition and untreated or poorly explained symptoms **[19].** However, Indian research on women's safety, follow-up, decision-making, perception and satisfaction after PPIUCD adoption is scarce **[16]**. Therefore it of interest to examine the factors affecting PPIUCD acceptability and retention and risk factors for discontinuation at six weeks in women delivering at our facility.

Materials and Methods:
This retrospective, record-based study evaluated the utilization, acceptability, follow-up outcomes and complications of immediate postpartum intrauterine contraceptive device (PPIUCD) services at a tertiary-care hospital in East Nimar, Central India.

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Study design and setting:
This was a retrospective, hospital record-based observational study conducted at the Department of Obstetrics and Gynaecology of a tertiary-care centre in East Nimar, Central India. Records pertaining to deliveries and PPIUCD insertions performed between 1 November 2021 and 31 October 2023 were reviewed.

Study population:
The study population comprised all women who delivered at the study hospital during the two-year study period. Women who accepted and underwent immediate PPIUCD insertion following vaginal delivery or caesarean section were identified from the PPIUCD register, labour-room records, operation-theatre records and follow-up register.

Sample size:
A universal sampling method was used. All delivery records and all available PPIUCD insertion records from 1 November 2021 to 31 October 2023 were screened. Women with complete information in the PPIUCD register and/or follow-up records were included for evaluation of acceptance and short-term outcomes.

Inclusion criteria:
The following records were included:
[1] Records of women who delivered at the tertiary-care hospital during the study period
[2] Records of women who underwent immediate PPIUCD insertion after delivery
[3] Records with complete demographic, obstetric, insertion and follow-up details
[4] Women with documented follow-up information up to six weeks postpartum, wherever available

Exclusion criteria:
The following records were excluded:
[1] Records with incomplete or illegible essential information
[2] Women with PPIUCD insertion details unavailable in the hospital register
[3] Women whose follow-up details could not be traced for analysis of six-week complications and continuation outcomes
[4] Records of interval IUCD insertion not related to the immediate postpartum period

Study variables:
Data were extracted using a structured proforma. The demographic and obstetric variables included maternal age, parity, mode of delivery and timing/type of PPIUCD insertion where documented. The primary outcome was PPIUCD acceptance, calculated as the proportion of women accepting PPIUCD insertion among the total number of deliveries conducted during the study period:

$$PPIUCD\ Acceptance\ Rate = \frac{Number\ of\ women\ who\ accepted\ and\ recieved\ PPIUCD\ insertion}{Total\ number\ of\ institutional\ deliveries} \times 100$$

Secondary outcomes included:
[1] PPIUCD expulsion within six weeks postpartum
[2] Voluntary removal of PPIUCD
[3] Reasons for removal, including pain, excessive bleeding, foul-smelling vaginal discharge, family pressure and other documented causes
[4] Complaints or complications reported during follow-up, including lower abdominal pain, abnormal vaginal bleeding, vaginal discharge, missing threads and suspected infection
[5] Continuation status at six weeks postpartum

Data collection and follow-up:
Relevant information was collected from delivery registers, PPIUCD registers, inpatient case records and postpartum follow-up registers. Women with PPIUCD insertion were followed through the available hospital records up to six weeks after delivery. For each eligible woman, the recorded complaints, expulsion, removal and continuation status were documented. No direct patient contact was undertaken because the analysis was based exclusively on existing hospital records.

Statistical analysis:
Data were entered into Microsoft Excel and analyzed using appropriate statistical software. Continuous variables were summarized as mean with standard deviation (SD) or median with interquartile range, depending on the distribution of data. Categorical variables were expressed as frequency and percentage. Associations between categorical variables, such as age group, parity, mode of delivery and PPIUCD-related outcomes, were assessed using the chi-square test or Fisher's exact test, as appropriate. A two-sided p-value of less than 0.05 was considered statistically significant.

Table 1: Acceptance of PPIUCD according to mode of delivery

Parameter	Number	Percentage
Total deliveries	20,500	100.00%
Vaginal deliveries	18,367	89.59%
LSCS deliveries	2,133	10.41%
Total PPIUCD accepted	3,150	15.37%
PPIUCD accepted after vaginal delivery	1,749	9.52% of vaginal deliveries
PPIUCD accepted after LSCS	384	18.00% of LSCS deliveries
Vaginal acceptance rate trend	6.04% to 12.42%	Gradual increase
LSCS acceptance rate trend	18.00% to 18.00%	More or less constant

Table 2: Age distribution of PPIUCD acceptors

Age Group (Years)	Frequency (n)	Percentage (%)
21 – 25	589	18.7%
26 – 30	1,638	52.0%
31 – 35	860	27.3%
36 – 40	63	2.0%
Total	3,150	100.0%

Mean ± SD	27.92 ± 2.12	-
Min – Max	21 – 38	-

Table 3: Distribution of acceptors according to literacy level

Literacy Status	Frequency (n)	Percentage (%)
Illiterate	98	3.1%
Primary	513	16.3%
Secondary	819	26.0%
Higher Secondary	665	21.1%
Graduate	1,055	33.5%
Total	3,150	100.0%

Table 4: Distribution of acceptors according to socioeconomic status

Socioeconomic Status	Frequency (n)	Percentage (%)
Upper	189	6.0%
Upper Middle	1,071	34.0%
Lower Middle	558	17.7%
Upper Lower	999	31.7%
Lower	333	10.6%
Total	3,150	100.0%

Table 5: Follow-up status at 6 weeks after PPIUCD insertion

Follow-up Outcome	Number	Percentage
Total acceptors	3,150	100.0
Returned for follow-up	2,895	91.9
Lost to follow-up	255	8.1
Expulsions among followed-up women	74	2.56% of followed-up cohort
Evaluated for continuation/removal	2,821	—
Continued use at 6 weeks	2,601	92.21% of evaluated cohort
Removed at 6 weeks	220	7.79% of evaluated cohort

Table 6: Relationship between complications and continuation vs removal at 6 weeks

Complication / Complaint	Total Cases (n)	Continued n (%)	Removed n (%)	P-value
None	2,503	2,503 (100.0%)	0 (0.0%)	<0.001*
Bleeding	120	46 (38.34%)	74 (61.66%)	<0.001*
Family Pressure	49	0 (0.0%)	49 (100.0%)	<0.001*
Abdominal Pain	49	7 (14.28%)	42 (85.72%)	<0.001*
PID	21	0 (0.0%)	21 (100.0%)	<0.001*
Prolonged Lochia	79	45 (56.96%)	34 (43.04%)	<0.001*
Total Evaluated	**2,821**	**2,601 (92.21%)**	**220 (7.79%)**	—

Results and Discussion:

Despite being supplied free under the National Family Planning program, eligible Indian women have rarely used IUCD for postpartum and interval contraception **[13, 20 and 21].** The national average for PPIUCD coverage in India is 16.3%, ranging from 1.2% to 40.2%. PPIUCD has a 15.62% acceptance rate in this study **(Table 1).** This rate is lower than Banu *et al.* **[11]** from Kozhikode (18%), Radhika *et al.* **[22]** across six Indian medical colleges (28.7%), Nasrin *et al.* **[23]** from Lahore (33% and Nalini *et al.* **[24]** from Jharkhand (36.23%). However, it is far higher than acceptance rates reported by Kaiser *et al.* **[25]** from Kashmir (14%), Bhudhrani and Godria **[26]** from Vadodara (12.7%). These comparative data imply that PPIUCD is gradually acquiring community acceptance, indicating a beneficial reproductive health behavior shift. Crucially, our data shows a constant increase in PPIUCD approval among vaginally delivered women over two years, demonstrating how continuous counseling services and awareness tactics have improved and responded to community requirements. LSCS (18.0%) was more acceptable than vaginal delivery (9.52%) in our study **(Table 1).** Gupta *et al.* **[13]** found 34.1% PPIUCD acceptance in caesarean deliveries versus 29.7% in vaginal births, while Shrivastava *et al.* **[27]** found 7.17% acceptance in LSCS versus 2.79% in vaginal deliveries. Gaur and Mendiratta **[28]** found that 68% of PPIUCD insertions occurred after vaginal birth. Our acceptors were 37% primigravidas and 63% multigravidas as for parity. Multiparous women are more accepting, as shown by Gaur and Mendiratta **[28]** and Bhattacharyya *et al.* **[29]** (51.60% multiparous vs. 30.60% primiparous). Gupta *et al.* **[13]** found higher acceptance among primigravidas (61.7%), showing that parity and PPIUCD adoption vary by regional cohort and counseling dynamics. The mean age of women in our study was 27.92 ± 2.12 years, (**Table 2**) similar to Voorkara *et al.* **[30]** and earlier studies by Biswas and Biswas **[31]** and Rani *et al.* **[32],** where acceptance was primarily among women in their late 20s. Our cohort had 33.5% graduates and 21.1% higher secondary literacy, **(Table 3)** which supports the well-established link between female education and contraceptive adoption reported by Agrawal *et al.* **[20],** Gupta *et al.* **[33]**, Kumar *et al.* **[34]** and Voorkara *et al.* **[30].** In our research, the majority of PPIUCD acceptors were from the upper middle (34.0%) and upper lower (31.7%) socioeconomic classes, with minimal acceptance observed in the upper (6.0%) and lower (10.6%) classes (**Table 4**). The significant participation among moderate and low-income demographics reflects the effectiveness of the complimentary institutional delivery and focused counselling highlighted by Agrawal *et al.* **[20]**. Furthermore, the high acceptance among the upper-middle class is corroborated by Gupta *et al.* **[33],** Kumar *et al.* **[34]** and Voorkara *et al.* **[30]** who observed a significant association between the higher socioeconomic status, better education and higher acceptability of contraceptives. The 6-week continuation rate of 92.21% matches previous important Indian studies: Kashmir (92.2%) **[25]**, the multicenter Indian medical college cohort (90.3%) **[22]** and a comprehensive national program review (88.7%) **[18, 21 and 31].** Voorkara *et al.* **[30]**, Shrivastava *et al.* **[27]** and Kanakuze *et al.* **[35]** reported short-term follow-up rates of 5.0% to 9.19%, which matches our 7.79% 6-week removal rate **(Table 5).** Our series spontaneous expulsion rate at six weeks was 2.56%, which is low and comparable to Bhattacharyya *et al.* (2.74%) **[29]**, Voorkara *et al.* (2.86%) **[30]**, Kaiser *et al.* (3.6%) **[25]** and a multicentric review among 16 Indian facilities (3.6%). Gupta *et al.* reported a 5.6% expulsion rate at six months **[13],** while Singal *et al.* **[36]** reported 15.4% expulsions after post-placental vaginal insertion compared to intra-caesarean placement (1.7%). Our low expulsion rate emphasizes the therapeutic value of precise insertion method, fundal location and provider expertise **[13, 36]**. About 10% of our sample had devices removed or expelled by six weeks. Persistent bleeding, abdominal pain, foul-smelling vaginal discharge/infection and family disapproval prompted removal **(Table 6).** These removal drivers are found in significant Indian literature, including Gupta *et al.,* Voorkara *et al.* **[13, 30],** Radhika *et al.* **[22]**, Kanakuze *et al.* **[35],** Bhagat *et al.* **[37]**, Bharia *et al.* **[38]** Bhattacharyya *et al.* **[29]** and Shrivastava *et al.* **[27]**. Recently,

Srivastava *et al*. **[18]** found that nearly half of early removals are caused by bleeding and pain, whereas partner or family opposition accounts for a smaller but critical portion. Finding align strongly with the Medhi *et al*. **[39]**, who showed that comprehensive antenatal counseling—specifically involving joint decision-making with partners—was the single strongest determinant of PPIUCD acceptance and retention in Indian tertiary centers. Similarly, a 2026 observational analysis by Kapse and Andurkar **[40]** emphasized that structured education is absolutely critical to improving uptake and reducing early discontinuation, reinforcing our finding that socio-cultural barriers and family pressure must be proactively managed through collaborative counseling. According to the a scoping review by Najan *et al*., **[41]** which was published in 2025, and other randomized controlled trial by Najan *et al*., **[42]** which was published in 2023 antenatal family planning counseling, which is focused and structured, leads to greater acceptance and retention of PPIUCD as compared to routine counseling. Similarly, a 2025 observational analysis by Sadhika *et al*. **[43]** emphasized that structured education is absolutely critical to improving uptake and reducing early discontinuation, reinforcing our finding that socio-cultural barriers and family pressure must be proactively managed through collaborative counseling. In our study, family pressure and persistent discomfort were absolute drivers of removal (100% and 85.72%, respectively), supporting Gupta *et al*. **[13]**. Bhattacharyya *et al*. **[29]**, Bharia *et al*. **[38]** and Srivastava *et al*. **[18]** all note that family pressure actively hinders PPIUCD and women's reproductive autonomy in India. Our institutional evaluation shows moderate initial acceptability, great short-term continuance and low expulsion rates, showing that immediate postpartum IUCD insertion is a safe, highly retention-worthy practice for post-delivery family planning in Central India.

Conclusion:

Trained doctors in Central India may safely, effectively and retainably implant immediate PPIUCDs for postpartum family planning without spontaneous ejection. Clinical side effects including vaginal bleeding and lower abdominal pain and sociocultural barriers like family rejection cause early discontinuation, not device problems. Enhancing conventional antenatal and post-operative counseling to prepare women for benign side effects, actively engaging partners in reproductive education and aggressive follow-up therapy can reduce discontinuation and satisfy unmet family planning needs.

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