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COMPARING OUTCOME OF IMMEDIATE POSTPARTUM INSERTION OF INTRAUTERINE CONTRACEPTIVE DEVICE IN VAGINAL VERSUS CESAREAN SECTION DELIVERY

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ABSTRACT

Background: Early post-partum insertion of intrauterine contraceptive device is a good measure to lower the unmet family planning need, but the results are not predictable depending on the mode of delivery. There is a paucity of local data relating safety and effectiveness between vaginal and cesarean delivery in Pakistani women.

Aim: To compare outcomes of immediate postpartum IUCD insertion after vaginal versus cesarean delivery with respect to expulsion, lost string, infection, menstrual irregularity, and user satisfaction.

Methods: This descriptive study was carried out at the Department of Obstetrics and Gynecology, DHQ Teaching Hospital Gujranwala from 24th November 2025 to 23rd may, 2026.Gestational age of 36 weeks and above was used to select one hundred women aged 18-40 years who were delivered by cesarean section and 47 vaginal delivery. IUCD was placed within six hours of birth and the participants were followed up to three months. The SPSS 25 was used to analyze the data through chi-square and independent t-tests.

Results: Expulsion was significantly higher after vaginal delivery (21.3%) compared with cesarean (7.5%). Lost string was more frequent in the cesarean group (18.9% vs 6.4%). Infection (5.7% vs 6.4%) and menstrual irregularity (11.3% vs 12.8%) were similar between groups. User satisfaction remained high in both cesarean (86.8%) and vaginal (83.0%) cohorts. Quantitative variables showed no significant association with expulsion.

Conclusion: Postpartum IUCD is safe and acceptable, and the method of immediate postpartum can be used after both delivery modes, which has a high retention after cesarean and high expulsion after vaginal birth. Enhancement of counseling and follow up services can also enhance results.

KEYWORDS: Immediate postpartum IUCD, cesarean section, vaginal delivery, expulsion, lost string, postpartum contraception.

INTRODUCTION

Postpartum family planning has been identified as one of the important strategies that should be implemented immediately after childbirth to deal with the unmet global need of contraception among women of reproductive age (1). The postpartum period is an ideal time challenging to capitalize on, while the women are still alive because they can be introduced to reliable contraception until they receive follow-up after delivery (2). One of the most viable forms of reversible contraceptive use is intrauterine contraceptive devices, which have less than 1% failure rates in normal application (3). The immediate postpartum IUCD is one inserted 10 minutes after the placental delivery, after vaginal delivery, or during a cesarean section (4). The continuation rates of IUCDs are usually better compared to short acting methods that are initiated when the child is born. The primary clinical issue after the insertion of a device itself is expulsion of the devices in the first few weeks (5).

The procedure of vaginal birth insertion is comparatively easy and could be conducted by trained midwives with the help of special forceps (6). In cesarean section, the uterine cavity can be directly viewed and the device can be placed in the funda. Various comparative studies found lower expulsion when cesarean insertion was performed as compared to vaginal insertion (7). Systematic reviews show pooled estimates of expulsion with the use of vaginal birth of 10-27% and lower expulsion with intra-cesarean placement. Possible risk of pelvic infection following immediate postpartum IUCD insertion has always been found to be low (8). There is also evidence that the use of postpartum IUCD does not have a detrimental effect on the performance of breastfeeding (9). Majority of user satisfaction has been reported irrespective of route of delivery. However, the heterogeneity of the study designs still poses a constraint to the firm conclusions (6).

The usage of IUCDs by married women is about 14% globally, with regional disparities in usage (2). The take-up of effective, postpartum contraception in South Asia is still below its optimal level despite high facility-based delivery rates (6). It has been reported that up to 40% of pregnancies occurring within the first year after birth are unintended. The close inter-pregnancy periods are closely related to maternal anemia, preterm delivery, and infant death (4). It is proven that immediate postpartum IUCD provision decreases the chances of belonging to the same pregnancy within twelve months (12). Economic appraisals reveal that the postpartum IUCD programs are very cost-effective to the health systems. Acceptance and continuation of the method is dramatically enhanced by the use of antenatal counseling (5).

In Pakistan, the unmet demand of family planning is still high with rates of about 17% among married women. The prevalence rate of contraceptives in the country stands at approximately 34%, meaning that it can be significantly improved (10). Over 1/3 of births is less than 24 months after a prior birth, putting mothers and babies at risk of things they could have avoided (11). The introduction of postpartum IUCD initiatives has been undertaken in a number of provinces although results are not well known locally (12). The cesarean section rate in the country has been increasing significantly over the last years, which has resulted in an increasing population of people who can receive intra-cesarean insertion (13). Few minor studies were able to compare vaginal and cesarean paths in contexts of Pakistan. Insight into route-specific safety and effectiveness is vital to the enhanced national postpartum family planning strategies. Hence, the study aims at comparing and assessing the immediate postpartum IUCD insertion after vaginal childbirth versus cesarean birth among Pakistani women.

METHODOLOGY

Study Design, Setting and Duration

This was a descriptive study that was carried out at the Department of Obstetrics and Gynecology, DHQ Teaching Hospital, Gujranwala. This study took place in a period of six months from 24th November 2025 to 23rd May, 2026 upon the consent of the synopsis by the College of Physicians and Surgeons Pakistan. Enrollment, intervention, and follow-up all activities were conducted within this specific time. It was a large tertiary care hospital that was the referral center of both urban and rural patients in the district. Normal vaginal birth and cesarean section facilities were twenty-four hour round the clock. Recruitment and follow-up of participants were done in post-delivery wards and outpatient department. The research location provided the chance to include women with varied sociodemographic factors. Ethical and administrative consent was received before data collection started.

Sample Size and Sampling Technique

The WHO sample size calculator was used to calculate the sample size. The estimated number of cases was 100 with confidence level of 95%, margin of error of 9% and assuming that the percentage of cesarean section is 28%. The recruitment of the participants was done using non-probability consecutive sampling technique. All the women that met the eligibility criteria at the time of the study were contacted. Recruitment was done until 100 sample was obtained. The study was descriptive in nature and thus there was no randomization made. The sampling plan was viable within the time. They were all vaginal and cesarean based on real clinical indication. All eligible women were given an equal opportunity to participate.

Sample Selection Criteria

The screening of women was based on pre-established inclusion and exclusion criteria. They included females between the age of 18 and 40 years with gestational age exceeding 36 weeks, parity less than five years and delivery through normal vaginal birth or through C-section. Women who were anemic that had hemoglobin below 10 g/dl were left out. Women whose membranes were ruptured prematurely to exceed 18 hours were not enrolled. Patients with postpartum hemorrhage with more than 500 ml of blood loss following vaginal birth or above 1000 ml following cesarean section were excluded. The females with congenital malformation of uterus were also discarded. Any history of active infection of genital tract recorded in the medical record resulted in the exclusion of the study.

Data Collection

A total of 100 females who met the selection criteria were recruited in the post-delivery wards. Each participant was informed and provided informed written consent before he was included. Structured proforma was used to record demographic information such as name, age, gestational age, body mass index, parity, lifestyle, education, residence and socioeconomic status. The mode of delivery was recorded and the women were then delivered. At this point subjects were sorted into two categories based on vaginal or cesarean birth. The researcher inserted postpartum intrauterine contraceptive device in the first 6 hours after delivery under aseptic conditions. Every female was recommended to have regular postnatal check-ups and they were also scheduled to follow up. In the outpatient department, the participants were followed during three months and asked to report as soon as there was any complication like infection, menstrual irregularity, lost string, or expulsion. Any results obtained in the follow-up were recorded in the pro forma attached.

Data Analysis

The data collected were put into SPSS version 25 and analyzed. The Shapiro Wilk test was used to check the normativity of quantitative variables. Quantitative variables like age, gestational age and body mass index were given

as mean and standard deviation. Qualitative variables such as parity, residence, education, lifestyle, socioeconomic status, mode of delivery, and their outcome that is infection, menstrual irregularity, lost string, and expulsion was represented in terms of frequency and percentage. The comparison of the outcomes was performed with mode of delivery using chi-square test. A p-value of 0.05 and below was declared as statistically significant. Additional stratification of data was on age, gestational age, BMI, parity, residence, education, lifestyle, and social economic status. Once stratified comparisons of groups were made with chi-square test and results were compared again with mode of delivery across all stratum. To examine the relationship between quantitative demographic variables and IUCD expulsion, independent t-test was used. The desired level of significance was maintained at p value 0.05.

RESULTS

Baseline Demographic Characteristics

Out of 100 women, 53 had cesarean section and 47 had vaginal birth. Participants in both groups were mainly aged between 26-32 years old, constituting 41.5% of the cesarean group and 36.2% of the vaginal group and only 23% of the total sample was older than 32 years. The majority of women gave birth to a gestation period of 39-40 weeks (44%), whereas there was a similar pattern in both forms of delivery. In terms of nutritional status, BMI 25-29.9 kg/m 2 was observed in 43% of all participants and obesity (BMI 30 and above) was more common in the cesarean section compared to the vaginal section. Women who were slightly more than half of the women were primiparous especially in the vaginal delivery group. The greatest proportion of participants (44%), was urban and semi-urban areas, then rural residence. The most prevalent was secondary level education and more than 50% of the women had a sedentary lifestyle. The largest group in the two groups was the middle socioeconomic group, which demonstrated a general similarity in baseline features between cesarean and vaginal cohorts.

Table 1: Baseline Demographic Characteristics of Participants (n=100)

Variable	Categories	Cesarean (n=53) n (%)	Vaginal (n=47) n (%)
Age (years)	18–25	18 (34.0)	20 (42.6)
	26–32	22 (41.5)	17 (36.2)
	33–40	13 (24.5)	10 (21.2)
Gestational age	37–38 weeks	21 (39.6)	19 (40.4)
	39–40 weeks	24 (45.3)	20 (42.6)
	>40 weeks	8 (15.1)	8 (17.0)
BMI (kg/m²)	<25	15 (28.3)	18 (38.3)
	25–29.9	23 (43.4)	20 (42.6)
	≥30	15 (28.3)	9 (19.1)
Parity	Primipara	25 (47.2)	27 (57.4)
	Multipara (2–4)	28 (52.8)	20 (42.6)
Residence	Rural	24 (45.3)	20 (42.6)
	Urban	19 (35.8)	17 (36.2)
	Semi-urban	10 (18.9)	10 (21.2)
Education	None/Primary	16 (30.2)	18 (38.3)
	Secondary	23 (43.4)	19 (40.4)
	Higher	14 (26.4)	10 (21.3)
Lifestyle	Active	14 (26.4)	16 (34.0)
	Sedentary	30 (56.6)	25 (53.2)
	Gym exercise	9 (17.0)	6 (12.8)
Socioeconomic status	Low	20 (37.7)	18 (38.3)
	Middle	25 (47.2)	22 (46.8)
	High	8 (15.1)	7 (14.9)

Follow-up Outcomes

Three-month follow-up outcomes showed widely similar safety profiles between the two methods of delivery. The menstrual irregularity was found to be 11.3% among women in the cesarean and 12.8% in the vaginal, which is almost equal. The post-insertion infection rate was very low in both groups as it occurred in 5.7% of cesarean and 6.4% of vaginal participants, which shows the same level of procedural safety. The most common was loss of retrieval string that was observed more frequently after cesarean insertion and not after vaginal delivery with the percentage being 18.9% and 6.4% respectively. On the contrary, the vaginal style of delivery experienced a significantly greater rate of device expulsion of 21.3% compared to the cesarean section of 7.5% in line with anticipated variation in uterine involution and method of placenta placement. General contentment in the level of user satisfaction was high and

similar with 86.8 satisfaction in the cesarean section and 83.0 satisfaction in the vaginal section. These results indicate that both methods were relatively safe and acceptability, with certain complications depending on the delivery method.

Table 2: Follow-up Outcomes after Immediate Postpartum IUCD Insertion (n=100)

Variables	Categories	Cesarean (n=53) n (%)	Vaginal (n=47) n (%)
Menstrual irregularity	Yes	6 (11.3)	6 (12.8)
	No	47 (88.7)	41 (87.2)
Infection	Yes	3 (5.7)	3 (6.4)
	No	50 (94.3)	44 (93.6)
Lost string	Yes	10 (18.9)	3 (6.4)
	No	43 (81.1)	44 (93.6)
Expulsion	Yes	4 (7.5)	10 (21.3)
	No	49 (92.5)	37 (78.7)
User satisfaction	Satisfied	46 (86.8)	39 (83.0)
	Not satisfied	7 (13.2)	8 (17.0)

Normality Test Outcomes

The age had a W value of 0.973 and a p-value of 0.112, which means that the distribution of age was not significantly different than the normal distribution. Gestational age also was normally distributed with W 0.981 and p-value of 0.184. The body mass index showed a p-value of 0.096 with W value 0.968, which was once again in favor of normal distribution. The assumption of a normal distribution was met by the variables since the p-values of all of them were above the comparable value of 0.05. Thus, the quantitative variables were to be compared with the help of the parametric tests, including the independent t-test. These results verified the appropriateness of the intended statistical plan. Parametric methods were then later used to provide subsequent analyses.

Table 3: Test of Normality for Quantitative Variables (Shapiro–Wilk Test)

Variable	Shapiro–Wilk W	p-value
Age (years)	0.973	0.112
Gestational age (weeks)	0.981	0.184
BMI (kg/m²)	0.968	0.096

Correlation and Comparative Outcomes

The statistically significant relationship was exhibited between expulsion of IUCD and mode of delivery where vaginal delivery (21.3%) showed higher association than the cesarean delivery (7.5%) with p=0.042. Lost string was also far more common following cesarean insertion (18.9%) than vaginal delivery (6.4%), although it was not statistically significant at p=0.047. The post-partum infection rates were low, and almost equal in both groups and did not show significant difference (p=0.884). Menstrual irregularity was also equally distributed in both cesarean and vaginal groups with no significant difference (p=0.821). The general level of satisfaction was also high and not significantly different between the two cohorts (p=0.588). These findings suggest that safety and acceptability were relatively the same whereas certain complications varied depending on delivery route.

Table 4: Association of Postpartum IUCD Outcomes with Mode of Delivery (Chi-Square Test)

Outcome	Cesarean n=53 n (%)	Vaginal n=47 n (%)	χ^2 value	p-value
Expulsion	4 (7.5)	10 (21.3)	4.12	**0.042**
Lost string	10 (18.9)	3 (6.4)	3.96	**0.047**
Infection	3 (5.7)	3 (6.4)	0.02	0.884
Menstrual irregularity	6 (11.3)	6 (12.8)	0.05	0.821
User satisfaction	46 (86.8)	39 (83.0)	0.29	0.588

The mean age of women expelled was somewhat greater than the average age of women without expulsion, but the difference lacked statistical significance (p=0.228). No significant relationship also existed between gestational age at birth and expulsion status (p=0.360). Body mass index was more likely to be higher in expelled women, and it almost but not statistically significant (p=0.076). The same pattern was shown by parity, which had a higher mean parity in the expulsion group, but the correlation was not significant (p=0.063). This set of results indicates that mode of delivery was mostly associated with expulsion but not baseline quantitative characteristics. The findings confirmed the previous chi-square test that showed procedural and not demographic determinants.

Table 5: Comparison of Quantitative Variables with Expulsion Status (Independent t-Test)

Variable (Mean ± SD)	Expulsion Yes (n=14)	Expulsion No (n=86)	t-value	p-value
Age (years)	29.8 ± 4.6	28.1 ± 4.9	1.21	0.228
Gestational age (weeks)	39.1 ± 1.1	38.8 ± 1.2	0.92	0.360
BMI (kg/m²)	28.7 ± 3.4	26.9 ± 3.6	1.79	0.076
Parity (number)	2.3 ± 0.9	1.9 ± 0.8	1.88	0.063

DISCUSSION

This study was conducted with the purpose of comparing the results of immediate postpartum IUCD installation during vaginal and cesarean births with a special emphasis on safety, expulsion, lost string, and user satisfaction. The current results showed that the overall satisfaction was high in both groups with an 86.8% score following cesarean or 83.0% following vaginal delivery implying that the technique is highly acceptable in the immediate postpartum. Sadia et al. (2025) also reported similar high acceptability in a study of 250 Pakistani women with a higher than 80% level of satisfaction in both of these delivery modes (10). Another variable the current research was maintained low infection rate at 5.7% in cesarean and 6.4% in vaginal group, which was in favor of early insertion. Also recorded in the Egypt of Abdel-Ghany et al. (2022) in 200 postpartum insertions with infection below 7%, which was very close to these findings (14). In this study, menstrual irregularity was only mentioned in 12% of the participants, which is similar, at 10% in a prevising study by Sadia et al. (2025). The similar results of these studies provide reasons to think that immediate postpartum IUCD does not introduce significant gynecological morbidity in various populations.

Another important finding of this study was that expulsion was much higher after vaginal delivery at 21.3% and only 7.5% after intra-cesarean insertion and this finding was supported by Meena et al., (2025) in a cohort of 120 women in India. The biological plausibility of the difference is that direct fundal positioning of the device in cesarean section provides a better placement (15). In a Cochrane review of over 2,609 women across various countries, Sothornwit et al. (2022) found that the post-vaginal effect of expulsion is two to three times greater (16). Al-Mahmoudi et al., (2022) of Egypt that involved 120 cases also reported 20% expulsion in vaginal as compared to 9% in cesarean group (17). The present figures then go in line with the international evidence and enhance external validity. These statistics point out that mode of delivery continues to be the best determinant of retention.

Another notable result was lost retrieval string that was observed in 18.9% of cesarean and 6.4% of vaginal insertions in this study. The same value was almost the same, with lost string of 17% following cesarean delivery, as reported by Hassan et al., (2025) among 112 women in Egypt (18). This observation was supported by an Australian study by Wojcik et al., (2022), of 193 participants, which reported greater non-visible strings after cesarean at 19%. (19). The mechanism is associated with increased uterine cavity and withdrawal of threads in the endocervical canal in the post-surgical placement. Despite the possibility of anxiety inducing lost string, the majority of the studies such as the one by Escobar and Shearin (2019) indicated that in over 90% of cases, ultrasonography determines proper position (20). Thus, the increased lost string rate in cesarean group cannot be discussed as the failure of the method. This issue can be dealt with counseling and access to ultrasound.

The similarity in incidence of infection and menstrual disorder in the groups of this study is also a further point to the general safety of immediate postpartum IUCD. The research results of Cooper et al., (2020) based on national surveillance data of the United Kingdom on thousands of women found that postpartum insertion does not raise the risk of pelvic infection over baseline obstetric risk. Meena et al., (2025) in an Indian study also reported menstrual irregularity of about 11% which is almost the same as 12% in this case (15). These similarities across countries indicate that the approach will act in uniformity across different health systems. Both-arm high levels of satisfaction above 80% also reflect the continuation of 82% described by Sadia et al. (2025) in Pakistan (10). The current research thus contributes to the local findings that Pakistani women react to the approach in a fairly similar way to that of international groups. This alignment increases the trust in the implementation of the intervention on the national level.

In addition, the critical analysis of current findings with the existing literature proves that immediate postpartum IUCD is a viable approach with a predictable profile of complications. The rate of expulsion following vaginal and cesarean in this study (21.3% and 7.5%, respectively) falls within the range of values reported by Sothornwit et al. (2022) in a study that included over 2,000 women in different parts of the world. The increased lost string of 18.9% in the cesarean group also compares with the 17% to 20% in the United Kingdom and India as cited in Cooper et al., (2020) and Khurshid et al., (2020) (21,22). The figure of low infection of less than 7% is in line with large American data examined by a recent study (23). Therefore, the present study offers context-specific validation of the fact that the two routes are safe, and cesarean section presents better retention and vaginal delivery has a higher risk of expulsion.

This study has a few limitations to discuss. Firstly, only three months of follow-up were done, thus no long-term follow-up due to continuation after one year, expulsions, and consequences of subsequent fertility were not possible. The use of ultrasound in the confirmation of IUCD position was not conducted routinely in all the lost string cases which could have caused misclassification of results. Also, the experience of the provider and the method of insertion

could not be measured objectively, when in fact these factors can have a significant impact on expulsion rates. In spite of all this, the study was useful in providing local evidence of the immediate post-partum IUCD practice.

CONCLUSION

The use of immediate postpartum IUCD insertion was proven to be safe and highly acceptable as a birth control method in women who have given birth either vaginally or by a caesarean delivery. General complications like infection and menstrual irregularity were low and nearly identical across groups and reflected good safety profile. The rate of expulsion was much higher with vaginal delivery than with cesarean insertion, and lost retrieval string was commoner with cesarean insertion than with vaginal delivery, indicating that there are procedure-specific differences. User satisfaction did not show any differences between the two cohorts, and this implies that majority of women were content with the approach in the early postpartum period. Demographic factors like age, BMI, gestational age and parity did not play a significant role on the outcomes and mode of delivery and method of insertion technique proved to be crucial. It supports the enhancement of postpartum family planning services, including special counseling on potential complications by delivery route.

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