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Comparative Effectiveness and Early Discontinuation of Jadelle versus PPIUCD in Multiparous Women

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ABSTRACT

Objective: To compare bleeding pattern changes, 3-month continuation, device expulsion and reasons for early discontinuation between Jadelle and PPIUCD among multiparous postpartum women at a tertiary care hospital, Karachi.

Methodology: A prospective preference-based (non-randomised) comparative study enrolled 100 multiparous postpartum women (50 per group) between 1st October 2025 to 30th December 2025. Jadelle was inserted within 48 hours of delivery in non-breastfeeding women and at 3 weeks or later in breastfeeding women. PPIUCD (CuT 380A) was inserted post placental, transcervically within 48 hours, or during caesarean section. Participants were followed up at 1, 2, and 3 months after insertion by using structured proformas.

Results: Jadelle users were younger (mean 32.2 vs. 34.8 years, p=0.001). Heavy/irregular bleeding at 1 month was more frequent with Jadelle (70% vs. 50%; p=0.10 after continuity correction) and the groups converged by 3 months (16% in each). Device expulsion occurred exclusively in PPIUCD (8/50, 16%; Fisher's exact p=0.006). Three-month continuation was 80% with Jadelle and 52% with PPIUCD (risk difference 28 percentage points, 95% CI 10 to 46; p=0.006). Menstrual irregularity was the sole reason for Jadelle discontinuation; PPIUCD discontinuation was driven by expulsion (16%), social pressure (16%), desire to conceive (4%), menstrual irregularity (8%) and pain (4%). No pregnancy was recorded in either group (0/100).

Conclusion: In this single-centre, preference-based cohort, Jadelle showed higher 3-month continuation (80% vs. 52%). Bleeding disturbance was the main reason for stopping Jadelle, and expulsion the main reason for stopping PPIUCD, especially in older, higher-parity women. Method-specific pre-insertion counselling is therefore important. The groups differed in age and were not randomised, follow-up was short and the study was not powered to establish contraceptive efficacy; larger studies with 12-month follow-up are needed.

Keywords: early discontinuation; long-acting reversible contraception; levonorgestrel implant; Jadelle; PPIUCD.

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Introduction

Pakistan has one of the highest rates of unmet need for family planning globally with postpartum women constituting a particularly vulnerable group. Despite programmatic commitments to postpartum family planning (PPFP) uptake of long-acting reversible contraceptives (LARCs) remains suboptimal. National survey data show that only 16% of postpartum women in Pakistan use a modern method and 30% of modern-method users stop within 12 months.[1] Within military healthcare settings structured family planning services are more accessible; however comparative data on LARC performance in this population are scarce.

The Jadelle subdermal implant containing two rods of 75 mg levonorgestrel each provides effective contraception for up to 5 years with no user-dependency.[2] It acts mainly by suppressing ovulation and thickening cervical mucus.

The same progestogenic action thins the endometrium and makes its blood vessels fragile which explains the frequent irregular or prolonged bleeding in the first months of use. The postpartum intrauterine contraceptive device (PPIUCD) typically the CuT 380A copper IUD can be inserted immediately postplacental within 48 hours of delivery or during caesarean section offering non-hormonal long-acting protection for up to 10 years.[2]

It acts through a copper-induced inflammatory reaction that is toxic to sperm and impairs fertilization; it can increase menstrual bleeding and pain and when placed in the early postpartum period it may be expelled from the enlarged contracting uterus. Under the WHO Medical Eligibility Criteria postpartum use of both methods is permitted but the category depends on insertion timing and breastfeeding status (5th edition 2015: copper IUD category 1 within 10 minutes of placental delivery and category 2 from 10 minutes to 4 weeks; implant category 2 in breastfeeding women before 6 weeks and category 1 in other postpartum women.[3]

Although both methods are highly effective when in place, their real-world effectiveness is largely influenced by continuation rates. Systematic reviews and cohort studies indicate that LARC users have higher continuation rates than users of short-acting contraceptive methods.[4] Furthermore, the timing of postpartum insertion influences expulsion and continuation rates, while bleeding irregularities associated with implants and device expulsion associated with intrauterine devices are the most common reasons for early discontinuation.[5,6] However, local comparative evidence remains limited. A Pakistani study compared the clinical outcomes of Jadelle and Cu-T, but prospective data on continuation rates and reasons for discontinuation, particularly among multiparous women receiving immediate postpartum contraception, remain scarce.[7]

This study therefore aimed to compare bleeding pattern changes, 3-months continuation, expulsion, and the reasons for discontinuation between Jadelle and PPIUCD among multiparous postpartum women. We hypothesized that the two methods would differ in their continuation and in their main reasons for discontinuation (bleeding disturbance for Jadelle; expulsion and non-medical reasons for PPIUCD.[7]

Methodology

This prospective comparative study was conducted at the Department of Obstetrics and Gynaecology of a tertiary care hospital in Karachi, Pakistan. Women were enrolled between 1 October 2025 and 31 December 2025, and the final 3-month follow-up was completed on 31 December 2025. Ethical approval was obtained from the Institutional Review Board, and written informed consent was obtained from all participants. The study is reported in accordance with the STROBE guidelines.

Eligible participants were postpartum women who had delivered at the study hospital, were aged 18–45 years, and were multiparous (parity ≥2; grand multiparity was defined as parity ≥5). They were required to be willing to attend follow-up visits at 1, 2, and 3 months, have no contraindications to the selected contraceptive method according to the WHO Medical Eligibility Criteria (MEC), 5th edition (2015), and provide written informed consent.

The exclusion criteria included active pelvic inflammatory disease or puerperal sepsis, uterine anomalies distorting the uterine cavity (for PPIUCD), postpartum haemorrhage exceeding 1000 mL (for PPIUCD), rupture of membranes exceeding 18 hours at the time of insertion (for PPIUCD), and known allergies to device components.

Women were counselled using a standardized, non-directive approach regarding all available contraceptive methods, and each participant independently selected her preferred method. Accordingly, allocation was preference-based rather than randomized. During the recruitment period, 108 women were screened, of whom 100 were eligible. Eight women either declined participation or were excluded. Of the 100 enrolled participants, 50 selected Jadelle and 50 selected PPIUCD.

The sample size was calculated using the WHO sample size calculator for comparing two proportions.[8] Assuming 3-month continuation rates of 80% for Jadelle (based on published data from similar settings) and 55% for PPIUCD, with a two-sided α of 0.05 and 80% statistical power, the standard formula yielded approximately 54 participants per group (increasing to approximately 60 per group after allowing for 10% attrition). The sample size of 45 participants per group reported in the earlier version could not be reproduced using these assumptions. Therefore, 50 women were enrolled in each group, and the study may have been underpowered to detect differences in the primary outcome. This limitation is addressed in the Discussion section.

Jadelle (two 75 mg levonorgestrel rods; Bayer AG) was inserted subdermally into the non-dominant upper inner arm using the supplied trocar under local anaesthesia with 1% lignocaine. The procedure was performed by trained medical staff within 48 hours of delivery in non-breastfeeding women and at 3 weeks or later in breastfeeding women. Insertion was performed within 48 hours in 38 women, whereas it was delayed in 12 women. All participants received a method information card in Urdu explaining the anticipated side effects.

The CuT 380A was inserted using the technique appropriate to the timing of insertion: postplacentally, within 10 minutes of placental delivery (n=28); transcervically, within 48 hours of delivery (n=14); or during caesarean section (n=5). Three additional insertions were performed following abortion. These participants were included in the PPIUCD group and are identified separately in Table 4. All insertions were performed by trained staff in accordance with standard PPIUCD protocols.

Follow-up assessments were conducted at 1, 2, and 3 months after insertion through clinic visits and telephone contacts. During clinic visits, the presence of Jadelle implants was confirmed by palpation. PPIUCD position was assessed by [specify whether thread examination was performed and whether ultrasonography was used when threads were not visible]. For participants assessed by telephone, the method of confirming device status should be specified. Pregnancy was assessed based on reported symptoms and/or urine pregnancy testing. Women reporting bleeding-related concerns received counselling and were offered appropriate treatment [specify the treatment provided and the number of women treated before device removal].

Bleeding patterns were classified as normal, scanty, heavy/irregular, or amenorrhoea. Heavy bleeding was defined as bleeding perceived by the participant to be heavier than her usual menstrual flow, whereas irregular bleeding was defined as bleeding or spotting occurring at unpredictable intervals. As lochia and the return of menstruation may overlap with contraceptive method-related bleeding changes during the initial postpartum weeks, follow-up months were calculated from the date of insertion, and the 1-month findings were considered exploratory.

Continuation was defined as the device remaining in situ, without removal or expulsion, at 3 months. Each discontinuation was assigned one primary reason. Expulsion was classified as complete or partial and was confirmed through clinical examination or imaging. The term "outreach" referred to acceptance of a contraceptive method following contact through the hospital's family planning outreach or awareness activities.

Data were collected using structured proformas documenting baseline characteristics, including age, body mass index (BMI), parity, educational level, occupation, medical history, and reasons for contraceptive method acceptance. Follow-up data included bleeding patterns, device expulsion status, device removal, and reasons for removal.

Data were analysed using SPSS version 26.0 (IBM Corp.). Continuous variables were expressed as mean ± standard deviation (SD) or median with interquartile range (IQR), as appropriate, while categorical variables were presented as frequencies and percentages.

Between-group comparisons were performed using the independent-samples t-test or Mann–Whitney U test for continuous variables and the chi-square test (with continuity correction) or Fisher's exact test for categorical variables, as appropriate. Fisher's exact test was applied when any expected cell count was less than 5.

Bleeding patterns were compared overall and subsequently by individual categories, with Holm adjustment applied for multiple comparisons. Changes in bleeding patterns over time were assessed using generalized estimating equations. Continuation rates were reported as risk differences and relative risks (RRs), with corresponding 95% confidence intervals (CIs).

To account for potential confounding, multivariable logistic regression analysis was performed for discontinuation, with contraceptive method as the main exposure variable and adjustment for age, parity, and breastfeeding status. The number of covariates was restricted in consideration of the number of outcome events (approximately one covariate per 10 events). Age (≥35 years) and parity (≥5) were also examined as potential effect modifiers. A p-value of less than 0.05 was considered statistically significant.

Results

A total of 100 women were enrolled, with 50 participants in each group. All participants completed the 3-month follow-up. Baseline characteristics were generally comparable between the groups, except for age, which

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Table I: Baseline demographic and clinical characteristics of study participants (n=100).

Characteristic	Jadelle (n=50)	PPIUCD (n=50)	Total (n=100)	p-value
Mean age (years)	32.2 ± 3.4	34.8 ± 4.2	33.5 ± 3.9	0.001
Mean BMI (kg/m²)	24.3 ± 2.1	25.1 ± 2.8	24.7 ± 2.5	0.11
Parity, median	3	3	3	0.38
Parity, IQR	[Q1–Q3]	[Q1–Q3]	[Q1–Q3]	—
Grand multiparous (parity ≥5), n (%)				
Breastfeeding, n (%)				
Urban residence / housewife	50 (100%)	50 (100%)	100 (100%)	—
Education: illiterate/primary	36 (72%)	28 (56%)	64 (64%)	0.10
Education: intermediate/above	14 (28%)	22 (44%)	36 (36%)	0.10
No medical comorbidities	49 (98%)	49 (98%)	98 (98%)	1.00
Reason: easy to insert	50 (100%)	30 (60%)	80 (80%)	descriptive
Reason: spouse advised	0 (0%)	10 (20%)	10 (10%)	descriptive
Reason: non-hormonal	0 (0%)	6 (12%)	6 (6%)	descriptive
Reason: outreach	0 (0%)	4 (8%)	4 (4%)	descriptive

was significantly lower among Jadelle users. Reasons for contraceptive method selection also differed between the groups (Table I).

Bleeding patterns differed between the groups during follow-up. Normal bleeding was more frequent among PPIUCD users, whereas scanty bleeding was more common among Jadelle users at the later follow-up assessments. Heavy/irregular bleeding was initially more frequent in the Jadelle group; however, the difference was not statistically significant after continuity correction. By 3 months, heavy/irregular bleeding rates were similar in both groups. No cases of amenorrhoea were reported (Table II).

Overall, discontinuation was higher among PPIUCD users, resulting in significantly greater 3-month continuation with Jadelle. Menstrual irregularities were the only reported reason for Jadelle discontinuation, whereas PPIUCD discontinuation was associated with device expulsion, social pressure, desire to conceive, menstrual irregularities, and pain (Table III).

Table II. Bleeding pattern at 1, 2, and 3 months by contraceptive group.

Bleeding pattern	Jadelle n (%)	PPIUCD n (%)	Total n (%)	p-value
At 1 month				
Normal	10 (20%)	23 (46%)	33 (33%)	0.006
Scanty	5 (10%)	2 (4%)	7 (7%)	0.44 (Fisher)
Heavy/irregular	35 (70%)	25 (50%)	60 (60%)	0.04 (0.10 corrected)
Amenorrhoea	0 (0%)	0 (0%)	0 (0%)	—
At 2 months				
Normal	22 (44%)	34 (68%)	56 (56%)	0.02
Scanty	13 (26%)	4 (8%)	17 (17%)	0.02
Heavy/irregular	15 (30%)	12 (24%)	27 (27%)	0.50
At 3 months				
Normal	23 (46%)	34 (68%)	57 (57%)	0.03
Scanty	19 (38%)	8 (16%)	27 (27%)	0.01
Heavy/irregular	8 (16%)	8 (16%)	16 (16%)	1.00

At 3 months the devices still in place were 40 (Jadelle) and 26 (PPIUCD). Counts at 2 and 3 months currently sum to 50 per group although implants and IUDs had been removed or expelled.

In the PPIUCD group discontinuation was more varied. Device expulsion occurred in 8 women(16%; Fisher's exact p=0.006 vs Jadelle. All 8 expulsions occurred in women aged ≥35 years with parity ≥5 consistent with the known association between grand multiparity uterine cavity enlargement and expulsion risk.[7--11] Social pressure alone or combined with desire to conceive accounted for 8 removals (16%) desire to conceive alone for 2 (4%) menstrual irregularity for 4 (8%) and pain for 2 (4%). Menstrual irregularity as a reason for removal was more frequent with Jadelle (20% vs. 8%) but this was not statistically significant (Fisher p≈0.14).

Table III. Reasons for discontinuation and 3-month continuation. (n=100)

Reason for discontinuation	Jadelle n (%)	PPIUCD n (%)	Total n (%)	p-value
Menstrual irregularities	10 (20%)	4 (8%)	14 (14%)	≈0.14
Device expulsion	0 (0%)	8 (16%)	8 (8%)	0.006
Social pressure (with or without desire to conceive)	0 (0%)	8 (16%)	8 (8%)	0.006
Desire to conceive (alone)	0 (0%)	2 (4%)	2 (2%)	0.50
Pain / dysmenorrhoea	0 (0%)	2 (4%)	2 (2%)	0.50
Total discontinuation	10 (20%)	24 (48%)	34 (34%)	0.006
Continuation at 3 months	40 (80%)	26 (52%)	66 (66%)	0.006
Total women (n)	50	50	100	—
Check: continuing + discontinued	40 + 10 = 50	26 + 24 = 50	66 + 34 = 100	—

Among the 50 PPIUCD acceptors post placental insertion was the most common approach (n=28 56%) followed by extended postpartum transcervical insertion within 48 hours (n=14 28%) insertion during caesarean section (n=5 10%) and post-abortion (n=3 6%). The 8 expulsions occurred in the transcervical within-48-hours group (5 of 14 36%) and in the post placental group (3 of 28 11%) with none after caesarean or post-abortion insertion. This difference was not statistically significant (Fisher p≈0.09) with these small numbers although the direction is in line with published evidence that transcervical postpartum insertion carries a higher expulsion risk than immediate post placental insertion.[8] Insertion types are detailed in Table IV.

TabIe IV: PPIUCD insertion types and expulsions in the PPIUCD group. (n=50)

PPIUCD insertion type	n	Percentage	Expulsions n (%)
Postplacental (within 10 min of placental delivery)	28	56%	3 (11%)
Extended postpartum transcervical (within 48 hours)	14	28%	5 (36%)
During caesarean section	5	10%	0 (0%)
Post-abortion	3	6%	0 (0%)
Total	50	100%	8 (16%)

The crude odds of discontinuation were 3.7 times higher with PPIUCD than with Jadelle (95% CI 1.5 to 9.0). After adjustment for age, parity and breastfeeding status, the odds ratio was aOR, 95% CI from SPSS. Because all expulsions occurred in older women of high parity, the effects of age and parity cannot be separated in this sample. No pregnancy was recorded during follow-up (0/100; 0/50 per group). The upper 95% confidence limit for the pregnancy rate is about 3.6% overall and 7.1% per group.

Discussion

This prospective comparative study provides real-world evidence on LARC performance in a tertiary healthcare population in Karachi, Pakistan. The principal finding is that three-month continuation was higher with Jadelle (80%) than with PPIUCD (52%), a difference of 28 percentage points (95% CI 10 to 46). The main reasons for stopping differed by method: bleeding disturbance for Jadelle, expulsion and personal or social factors for PPIUCD. No pregnancies were recorded in either group, but the study is too small and too short to measure efficacy.[12]

The 3-month Jadelle continuation rate of 80% is at the lower end of the range of short-term data from South Asian and Sub-Saharan African settings where 3 to 6-month continuation of 78 to 92% has been reported for subdermal implants.[9] The PPIUCD continuation of 52% was lower and should be compared with[6] and local series. Possible reasons for the difference include the high proportion of older higher-parity women among those who had expulsions mixed insertion timings and personal or social reasons for removal. These explanations are hypotheses that this study cannot test.

All Jadelle discontinuations were menstrual-related underscoring that bleeding disturbance is the dominant clinical challenge with this method.[10] The bleeding trajectory followed the expected progestogenic pattern with abnormal bleeding in 70% at 1 month and 16% at 3 months. Two cautions apply. First 1-month bleeding after delivery combines lochia and return of menses with the effect of the method. Second the fall in bleeding over time partly reflects women with the worst bleeding having already had their implant removed and our table did not remove them from the denominator. The 20% removal for bleeding despite a method card on expected side-effects suggests room for better counselling and symptomatic treatment before removal. This highlights the importance of pre-insertion counselling that explicitly describes this expected course and reassures women about the benign nature of initial bleeding changes.[11]

The PPIUCD expulsion rate of 16% was higher than the 9 to 12% typically reported for post placental insertion in other studies[4] and all expulsions occurred in women aged ≥35 years with parity ≥5 so age and high parity cannot be separated. Grand multiparity is a recognized risk factor for expulsion owing to a larger uterine cavity and relative uterine atony in the postpartum period.[12] The higher expulsion with transcervical insertion within 48 hours (36%) than with post placental insertion (11%) is in the direction of the published literature[13, 14, 15] but was not statistically significant and the number of expulsions was small. Under-detection is also possible if position was not checked by thread or ultrasound. From a programme perspective for highly parous older women seeking PPIUCD explicit counselling about expulsion risk and early follow-up verification (thread check at 4 to 6 weeks) are particularly important.

Social pressure and desire to conceive accounted for 10 of the 24 PPIUCD discontinuations (42%) and none of Jadelle removals. One possible explanation is that an IUD can be removed more easily than an implant but we did not collect data to test this. The observation that 20% of PPIUCD acceptors cited spousal advice as their primary

motivation suggests that continuation may depend on spousal support over time; couple counselling at the time of acceptance may help.[13, 14] Local studies on spousal influence on contraceptive choice support this concern.

No pregnancy occurred in 100 women over 3 months. This does not demonstrate that either method is 100% effective: the upper 95% confidence limit is about 3.6% the follow-up is short and the 8 women with expelled IUDs were unprotected until they were seen. The efficacy of both methods rests on the established literature[16,17,18,19] not on this study. Continued use with heavy or irregular bleeding concerns acceptability not contraceptive failure.

Strengths and limitations: Strengths include prospective follow-up, standardized proformas and the same follow-up schedule in both group.[19] Limitations of this study include the relatively short 3-month follow- up, preference-based rather than randomized allocation with baseline differences in age (and probably breastfeeding and parity) that adjustment may not fully remove, a sample smaller than that required by the sample size calculation, mixed insertion timings and routes in the PPIUCD group, ascertainment of expulsion that depended on method, and the single-centre setting that may limit generalizability to the broader population.

Conclusion

In this single-centre, preference-based study of multiparous postpartum women, 3-month continuation was higher with Jadelle than with PPIUCD (80% vs. 52%). Jadelle discontinuation was exclusively attributed to menstrual irregularities, whereas PPIUCD discontinuation was associated with device expulsion (all cases occurring in women aged ≥35 years with parity ≥5), social pressure, and the desire to conceive. These findings highlight the importance of method-specific counselling, including discussion of bleeding changes and available treatment options for Jadelle users, as well as expulsion risks and early follow-up for PPIUCD users. However, the non-randomised design, differences in age between groups, short follow-up period (3 months), and limited sample size restrict the interpretation of these findings and do not establish comparative contraceptive efficacy. Larger prospective studies with at least 12 months of follow-up are recommended to provide stronger evidence for informing national postpartum family planning guidelines.

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