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Original Research Article

Implanon versus Copper-T as long-acting reversible contraception: a prospective comparative study at a tertiary care centre in Southern Rajasthan

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ABSTRACT

Background: Long-acting reversible contraceptives (LARCs) such as sub-dermal etonogestrel implants and copper intrauterine devices provide highly effective contraception. However, their acceptance and continuation vary due to side effects and user preference. To compare Implanon and Copper T as long acting reversible contraceptive methods in terms of efficacy, acceptance, continuation and side effect profile among women attending a tertiary care centre in Southern Rajasthan.
Methods: A comparative prospective study was conducted in the Department of Obstetrics and Gynaecology, RNT Medical College, Udaipur, from March to August 2024. Women aged 18–45 years opting for either Implanon or Copper-T were enrolled. Data on efficacy, adverse effects, acceptance and continuation were collected and analysed using Jamovi software.
Results: Among 303 participants, 189 opted for Implanon and 114 for Copper-T. Continuation rate was significantly higher with Implanon (97.4%) compared to Copper-T (88.6%). No pregnancies were reported among Implanon users, while one pregnancy occurred in the Copper-T group (efficacy 99.1%). Implanon users commonly reported amenorrhoea (45.2%) and menstrual irregularities (40%), whereas Copper-T users experienced heavy menstrual bleeding (30%), dysmenorrhoea (24%) and abdominal pain (25%). Younger women (21–30 years) and lower parity women preferred Implanon, while higher parity women preferred Copper-T.
Conclusions: Both Implanon and Copper-T are highly effective LARC methods. Implanon demonstrated better acceptance and continuation, while Copper-T remains an effective non-hormonal alternative. Individualised counselling is essential to optimise contraceptive choice.'

Keywords: Acceptance, Copper-T, Efficacy, Implanon, Long-acting reversible contraception

INTRODUCTION

Contraception is the intentional use of methods or devices to prevent unintended pregnancy. Each year, approximately 121 million unintended pregnancies occur globally, accounting for nearly half of all pregnancies.[1] In low- and middle-income countries, unintended pregnancies contribute significantly to maternal morbidity and mortality.[2] Over 60% of unintended pregnancies end in abortion, many of which are performed under unsafe conditions.[3,4] LARCs such as sub-dermal implants and intrauterine devices are increasingly recommended due to their high efficacy, long duration of action and minimal user dependence.[5,6] Implanon is a single-rod etonogestrel-releasing sub-dermal implant that suppresses ovulation, thickens cervical mucus and induces endometrial atrophy,

providing effective contraception for up to three years.[8,9] Copper-T intrauterine devices exert a local inflammatory response toxic to sperm and ova and can provide contraception for up to ten years.[10] Acceptance and continuation of contraceptive methods are influenced by age, parity, education, perceived side effects and sociocultural factors.[7,11] Comparative evaluation of different LARC methods is essential to guide individualized contraceptive counselling. The present study was undertaken to compare the efficacy, acceptance and side-effect profile of Implanon and Copper-T among women attending a tertiary care centre in Southern Rajasthan.

METHODS

Study design

This comparative prospective study was conducted at the Department of Obstetrics and Gynaecology, RNT Medical College and Allied Hospitals, Udaipur.

Study duration

The study was conducted from March 2024 to August 2024.

Study population/ sample size

A total of 303 women aged 18-45 years opting for long-acting reversible contraception was included.

Inclusion criteria

Women aged 18–45 years, women willing for LARC methods, women who provided informed written consent were included in the study.

Exclusion criteria

Pregnancy or suspected pregnancy. History of pelvic inflammatory disease/ active genital infection. Undiagnosed abnormal uterine bleeding. Known uterine anomalies/ fibroids distorting cavity (for IUCD). Known breast malignancy or severe liver disease (for Implant). Hypersensitivity to device components, were excluded from the study.

Procedure

After detailed counselling and assessment, either Implanon or CuT 380 A was inserted under aseptic precautions as per standard protocol.

Participants were advised regarding expected side effects and warning signs. Follow-up was done to assess adverse effects, continuation/discontinuation and pregnancy outcomes."

Statistical analysis

Data were entered in MS Excel and analysed using Jamovi software. Categorical variables were expressed as frequency and percentage and compared using the chi-square tests were applied. P value <0.05 was considered statistically significant.

RESULTS

Table 1 depicts the month-wise distribution of women opting for long-acting reversible contraceptive methods during the study period. A total of 303 women were enrolled, of whom 189 (62.4%) chose Implanon and 114 (37.6%) opted for Copper-T. Across all months, the number of women selecting Implanon was higher compared to those choosing Copper-T, indicating a greater overall preference for Implanon during the study period. Table 2 shows the age-wise distribution of study participants in the Implanon and Copper-T groups. In the Implanon group, the majority of women belonged to the 21–30-year age group, whereas in the Copper-T group, most participants were aged 31–35 years. Implanon was more commonly chosen by younger women, while Copper-T was preferred by women in higher age groups.

Table 3 shows the parity-wise distribution of study participants in the Implanon and Copper-T groups. In the Implanon group, the majority of women were para 2, followed by para 1. In contrast, most women in the Copper-T group were para 2 and para 3, indicating a preference for Copper-T among women with higher parity. Table 4 compares the continuation and discontinuation rates of Implanon and Copper-T among the study participants. The continuation rate was higher in the Implanon group (97.4%) compared to the Copper-T group (88.6%), indicating better continuation with Implanon during the study period.

Table 5 depicts the adverse effects reported by women using Implanon and Copper-T. Among Implanon users, the common adverse effects were amenorrhoea and menstrual irregularities, while Copper-T users most frequently reported heavy menstrual bleeding, dysmenorrhoea and lower abdominal pain. Bleeding-related side effects were more commonly observed in the Copper-T group.

Table 6 shows the contraceptive efficacy of Implanon and Copper-T during the study period. No pregnancies were reported among Implanon users, whereas one pregnancy occurred in the Copper-T group, indicating a contraceptive efficacy of 100% for Implanon and 99.1% for Copper-T.

Table 1: Distribution of study participants according to contraceptive method chosen (n=303).

Month	Implanon (N)	Copper-T (N)
March	26	18
April	11	25
May	41	19
June	32	14
July	34	11
August	45	27
Total	189	114

Table 2: Age-wise distribution of study participants in Implanon and Copper T groups (n=303).

Age group (years)	Implanon (N)	Copper-T (N)
18–20	11	0
21–25	45	5
26–30	64	35
31–35	32	50
36–40	10	12
41–45	4	2

Table 3: Parity-wise distribution of study participants in Implanon and Copper-T groups (n=303).

Parity	Implanon (N)	Copper-T (N)
P0L0	3	0
P1L1	48	15
P2L2	74	60
P3L3	37	30
P4L4	4	9

Table 4: Continuation and discontinuation rates in Implanon and Copper -T groups (n=303).

Method	Insertions (N)	Discontinuations (N)	Continuation (N)	Continuation rate (%)
Implanon	189	5	184	97.4
Copper-T	114	13	101	88.6

Table 5: Adverse effects among users.

Adverse effect	Implanon (%)	Copper-T (%)
Menstrual irregularities	40.0	44.0
Amenorrhoea	45.2	0.0
Heavy menstrual bleeding	12.0	30.0
Dysmenorrhoea	0.0	24.0
Irregular spotting	7.0	12.0
Weight gain	5.6	0.0
Mood changes	4.3	0.0
Lower abdominal pain	0.0	25.0
Device displacement	0.5	5.0
Infection	0.0	5.0

Table 6: Contraceptive efficacy.

Method	Total users (N)	Pregnancies (N)	Efficacy (%)
Implanon	189	0	100
Copper-T	114	1	99.1

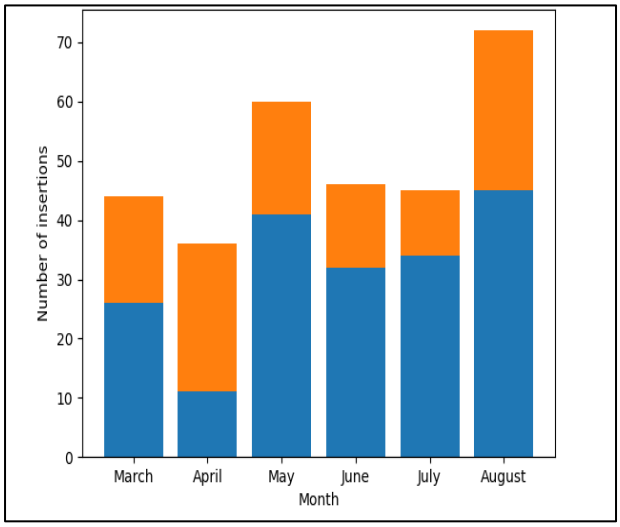

Figure 1: Monthly distribution of Implanon and Copper-T insertions.

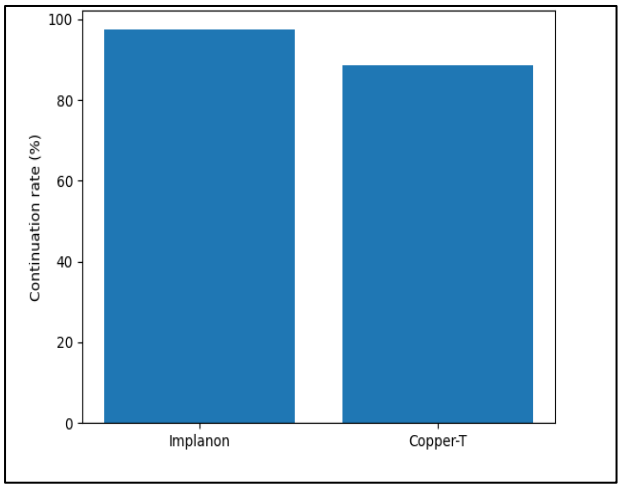

Figure 2: Continuation rates of Implanon and Copper-T.

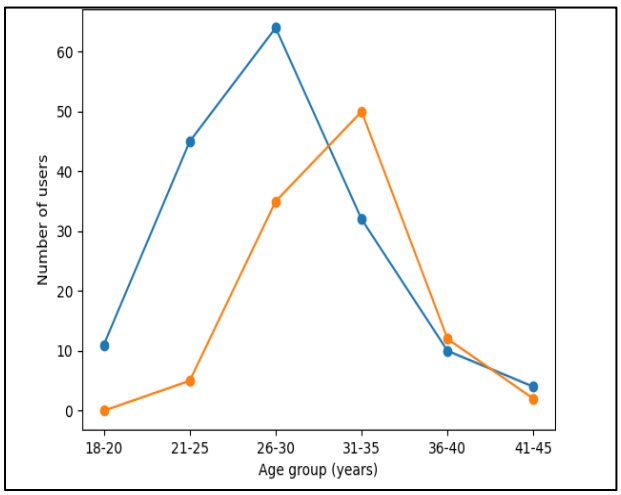

Figure 3: Age-wise distribution of implanon and Copper-T users.

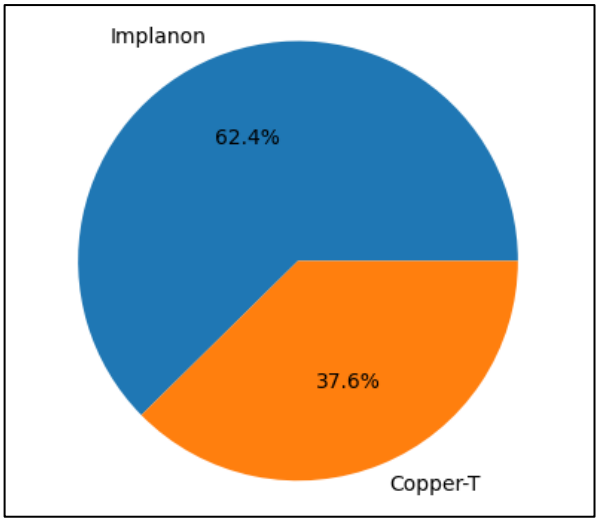

Figure 4: Distribution of contraceptive methods chosen.

DISCUSSION

In this comparative study of sub-dermal Implanon and Copper-T (CuT 380A) as long-acting reversible contraceptives (LARCs), both methods demonstrated high contraceptive efficacy. Implanon had an efficacy of 100% with no reported pregnancies, while CuT had an efficacy of 99.1%, with only one pregnancy occurring during the six-month study period. These findings are consistent with prior studies, which report Implanon failure rates below 0.1% and CuT failure rates of 0.8–1%.[8-10]

Continuation rates were markedly higher for Implanon users (97.35%) compared to CuT users (88.6%). This suggests that Implanon is better tolerated and more acceptable, likely due to its ease of use, minimal maintenance and hormonal mechanism that does not require user intervention. In contrast, CuT users experienced higher rates of early discontinuation, primarily due to bleeding-related side effects such as heavy menstrual bleeding (30%) and dysmenorrhoea (24%), consistent with findings reported in earlier studies.[6,11]

The side effect profile observed in the present study aligns with established patterns reported in the literature. Implanon users mainly experienced menstrual irregularities (40%), amenorrhoea (45.2%) and mild weight gain (5.6%), which are well-documented effects of progestin-only implants.[8,9] In contrast, CuT users reported heavier menstrual bleeding, lower abdominal pain, dysmenorrhoea and occasional device displacement or infection, which are commonly associated with copper intrauterine devices.[10] These adverse effects significantly influenced continuation rates and patient satisfaction. Age and parity analysis revealed notable trends in contraceptive choice. Implanon was predominantly chosen by younger women aged 21–30 years and those with lower parity (P1–P2), suggesting preference for reversible birth

spacing methods during peak reproductive years. Copper-T was more commonly used by women aged 31–35 years and those with higher parity (P2–P3), reflecting its acceptance among women who have largely completed their desired family size and prefer a long-term non-hormonal method. Similar age- and parity-related preferences for LARC methods have been described in previous studies.[7]

Monthly insertion trends demonstrated consistently higher uptake of Implanon compared to CuT throughout the study period. This may reflect increased awareness, better counselling and growing provider confidence in implant-based contraception, along with patient preference for convenience and effectiveness, as reported in other observational studies.[5,6] Overall, the findings of this study confirm that both Implanon and Copper-T are effective and safe long-acting reversible contraceptive options. However, hormonal implants such as Implanon demonstrate superior continuation rates and user satisfaction, whereas Copper-T remains an important alternative for women with contraindications to hormonal contraception or a preference to avoid hormonal methods.[6,10,11]

Single-centre study, short follow-up duration of six months; limited generalisability; sociocultural and economic factors influencing contraceptive choice were not assessed.

CONCLUSION

Implanon and Copper-T are safe and effective LARC options. Implanon offers superior continuation, while Copper-T remains valuable for women preferring non-hormonal contraception.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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