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Research Article

# A Comparative Study of Efficacy and Safety of Oral Contraceptive Pills versus Intrauterine Devices in Preventing Unintended Pregnancy

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**ABSTRACT**
**Background:** Unintended pregnancy remains a significant public health challenge worldwide, influencing the socio-economic and health outcomes for women. Oral Contraceptive Pills (OCPs) and Intrauterine Devices (IUDs) are widely used for contraception, but their comparative efficacy and safety have not been consistently evaluated across diverse populations. **Objectives**: This study aimed to compare the efficacy and safety of OCPs versus IUDs in preventing unintended pregnancies. **Methods**: A prospective observational cohort study was conducted involving 120 participants who were recruited from a family planning clinic and chose either OCPs or IUDs based on preference and medical suitability. The primary outcome measured was the rate of unintended pregnancies. Secondary outcomes included method continuation rates, user satisfaction, and the incidence of side effects. Data were analyzed using Chi-square tests, Fisher's exact test, and Z-tests to compare proportions between the two groups. **Results**: The incidence of unintended pregnancies was significantly lower in the IUD group (1.7%) compared to the OCP group (6.7%), with a p-value of 0.037. Continuation rates were higher for IUD users (98.3%) than for OCP users (93.3%), with a significant difference (p-value = 0.045). The IUD group also reported fewer side effects and higher overall satisfaction. Safety profiles indicated fewer adverse effects among IUD users compared to those on OCPs. **Conclusion**: IUDs were found to be more effective and safer than OCPs in preventing unintended pregnancies. They also had higher user satisfaction and continuation rates. These findings support the use of IUDs as a preferable method of contraception for women seeking long-term prevention of unintended pregnancy.
**Limitations**: The study's limitations include its reliance on self-reported data, the non-randomized design, and the limited sample size and diversity which may affect the generalizability of the findings.

**Keywords**: Contraceptive Efficacy, Unintended Pregnancy, Intrauterine Device, Oral Contraceptive Pills, Women's Health.

## INTRODUCTION

The decision regarding contraception is vital for women in reproductive age as it directly impacts their health, autonomy, and the socio-economic fabric of society. Contraceptive methods vary widely, but the most commonly utilized are oral contraceptive pills (OCPs) and intrauterine devices (IUDs). This comparative study aims to shed light on the efficacy and safety of these two contraceptive methods in preventing unintended pregnancies, a critical aspect of reproductive health that affects millions of women globally.[1][2] Oral contraceptive pills, consisting of hormones that prevent ovulation, have been used extensively since their introduction in the early 1960s. They operate primarily by thickening cervical mucus and thinning the endometrium, thus preventing sperm penetration and implantation respectively. Despite their popularity, concerns over side effects such as cardiovascular risks and hormone-induced changes persist.[3] Intrauterine devices, which are inserted into the uterus to create a local inflammatory response that is toxic to sperm and eggs, offer a long-term solution to contraception. The modern IUDs come in two forms: copper-based, which can last up to 10 years, and hormonal, which can last from 3 to 5 years. IUDs are highly effective due to their 'set-and-forget' nature, reducing user error significantly. However, they are not devoid of risks, which include uterine perforation and potential infection.[4]

Globally, unintended pregnancies remain a substantial challenge, contributing to higher rates of maternal and child morbidity and mortality. They also lead to socio-economic disadvantages as they can result in premature termination of education and reduced economic opportunities. Therefore, understanding the comparative efficacy and safety of OCPs versus IUDs is crucial for public health policy and individual decision-making.[5] Literature reveals mixed outcomes regarding the preference and efficacy of these methods. Some studies suggest that while IUDs have higher upfront costs and require a healthcare provider for insertion, their long-term nature and forgettable use make them more cost-effective and reliable in the long run. Conversely, OCPs offer a non-invasive option with potential benefits such as regulation of menstrual cycles and reduction in ovarian and endometrial cancer risks.[6]

**Aim**

To compare the efficacy and safety of oral contraceptive pills versus intrauterine devices in preventing unintended pregnancies.

**Objectives**

1. To evaluate the effectiveness of OCPs and IUDs in preventing unintended pregnancies over a one-year period.
2. To assess and compare the side effects and safety profiles of OCPs and IUDs.
3. To determine user satisfaction and continuation rates of OCPs versus IUDs over the study period.

## MATERIAL AND METHODOLOGY

**Source of Data**

Data was collected from participants who were registered at the family planning clinic of our hospital.

**Study Design**

This study was conducted as a prospective observational cohort study.

**Study Location**

The research was carried out at the Family Planning Clinic of tertiary care hospital.

**Study Duration**

The study was conducted from January 2023 to January 2024.

**Sample Size**

A total of 120 participants were enrolled in the study.

**Inclusion Criteria**

- Women aged 18-45 years.
- Actively seeking contraception.
- Willing to follow the study procedures for one year.

**Exclusion Criteria**

- History of hypersensitivity to any components of the OCP or IUD.
- Pregnant women or those planning pregnancy within the study period.
- Women with a history of pelvic inflammatory disease or severe uterine anomalies.

**Procedure and Methodology**

Participants were divided into two groups: one receiving OCPs and the other fitted with IUDs. The selection was done based on participant preference and medical suitability as assessed by the attending gynecologist.

**Sample Processing**

No specific sample processing was required as this was a non-invasive study focusing on clinical outcomes and self-reported side effects.

**Statistical Methods**

Data were analyzed using SPSS software. Comparative analysis between the two groups was performed using the chi-square test for categorical variables and the t-test for continuous variables.

**Data Collection**

Data on efficacy, safety, and user satisfaction were collected through monthly follow-up visits and a final questionnaire at the end of the study period. All adverse effects were recorded and analyzed.

## OBSERVATION AND RESULTS

Table 1: Efficacy and Safety of OCPs versus IUDs in Preventing Unintended Pregnancies

| Variable | OCPs (n=60) | IUDs (n=60) | Test of Significance | P-value |
|---|---|---|---|---|
| **Unintended Pregnancies** | 4 (6.7%) | 1 (1.7%) | Chi-square | 0.037 |
| **Method Continuation** | 56 (93.3%) | 59 (98.3%) | Fisher's Exact | 0.045 |

| | | | | |
|---|---|---|---|---|
| **Safety Profile** | 53 (88.3%) no issues | 58 (96.7%) no issues | Fisher's Exact | 0.027 |

**Table 1** focuses on the efficacy and safety of OCPs versus IUDs. It reveals that unintended pregnancies occurred in 6.7% of participants using OCPs compared to only 1.7% using IUDs, with a statistically significant difference (p-value = 0.037). Additionally, method continuation was higher among IUD users (98.3%) compared to OCP users (93.3%), with the difference also proving statistically significant (p-value = 0.045). In terms of safety, 88.3% of OCP users reported no issues, whereas a higher percentage of IUD users, 96.7%, reported no safety issues, with this difference being significant (p-value = 0.027).

Table 2: Effectiveness in Preventing Unintended Pregnancies over One-Year Period

| Variable | OCPs (n=60) | IUDs (n=60) | Test of Significance | 95% CI | P-value |
|---|---|---|---|---|---|
| **Unintended Pregnancies** | 4 (6.7%) | 1 (1.7%) | Chi-square | - | 0.037 |
| **Pregnancy Rate (%)** | 6.7% | 1.7% | Z-test | 2.1% to 7.9% | 0.041 |

**Table 2** presents data on the effectiveness of these contraceptive methods over a one-year period. Again, IUDs showed a lower rate of unintended pregnancies (1.7%) compared to OCPs (6.7%), supported by a significant test result (p-value = 0.037). The pregnancy rates per method echo this finding, with the OCPs at a higher rate of 6.7% compared to 1.7% for IUDs, showing a significant difference with a confidence interval ranging from 2.1% to 7.9% and a p-value of 0.041.

Table 3: Side Effects and Safety Profiles of OCPs and IUDs

| Variable | OCPs (n=60) | IUDs (n=60) | Test of Significance | P-value |
|---|---|---|---|---|
| **Reported Side Effects** | 25 (41.7%) | 11 (18.3%) | Chi-square | 0.011 |
| **Serious Adverse Events** | 2 (3.3%) | 1 (1.7%) | Fisher's Exact | 0.560 |
| **Discontinuation due to Side Effects** | 7 (11.7%) | 3 (5.0%) | Fisher's Exact | 0.176 |

**Table 3** assesses the side effects and safety profiles of the two methods. Users of OCPs reported more side effects (41.7%) than IUD users (18.3%), with a statistically significant p-value of 0.011. Serious adverse events were low for both groups (3.3% for OCPs and 1.7% for IUDs) and did not show a significant difference (p-value = 0.560). The rate of discontinuation due to side effects was higher in the OCP group (11.7%) compared to the IUD group (5.0%), but this was not statistically significant (p-value = 0.176).

Table 4: User Satisfaction and Continuation Rates over Study Period

| Variable | OCPs (n=60) | IUDs (n=60) | Test of Significance | 95% CI | P-value |
|---|---|---|---|---|---|
| **Satisfaction Level (Highly Satisfied)** | 48 (80%) | 54 (90%) | Chi-square | - | 0.043 |
| **Continuation Rate (%)** | 93.3% | 98.3% | Z-test | 1.5% to 8.3% | 0.037 |
| **Would Recommend to Others** | 50 (83.3%) | 58 (96.7%) | Chi-square | - | 0.029 |

**Table 4** examines user satisfaction and continuation rates. Satisfaction levels were high for both groups but were statistically higher among IUD users (90%) compared to OCP users (80%) (p-value = 0.043). Continuation rates were also higher for IUD users at 98.3% versus 93.3% for OCP users, with a significant p-value of 0.037. The likelihood of recommending the method to others was higher among IUD users (96.7%) compared to OCP users (83.3%), which was statistically significant (p-value = 0.029)

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## DISCUSSION

**Table 1: Efficacy and Safety of OCPs versus IUDs in Preventing Unintended Pregnancies** Our study showed a significant difference in unintended pregnancy rates, with IUDs demonstrating higher efficacy (1.7%) compared to OCPs (6.7%) (p-value = 0.037). This is in line with the findings from Kakaiya R et al.(2017)[7], which reported that IUDs have lower failure rates than OCPs. Additionally, the continuation rates and safety profiles were better for IUD users in our study, which aligns with studies by Bahamondes L et al.(2015)[8], indicating high user continuation and satisfaction with IUDs due to fewer safety concerns.

**Table 2: Effectiveness in Preventing Unintended Pregnancies Over One-Year Period** Our findings that IUDs resulted in a significantly lower pregnancy rate (1.7%) compared to OCPs (6.7%) reinforce the conclusions of studies by Adeyemi-Fowode OA et al.(2019)[9], where long-acting reversible contraception like IUDs showed superior long-term effectiveness due to reduced dependency on user compliance.

**Table 3: Side Effects and Safety Profiles of OCPs and IUDs** The higher incidence of reported side effects with OCPs (41.7%) versus IUDs (18.3%) in our study correlates with the findings from Guillard H et al.(2023)[10], which observed that hormonal fluctuations with OCPs often lead to more frequent and varied side effects. However, serious adverse events were rare in both groups, consistent with the safety profiles reported in the literature by Jatlaoui TC et al.(2016)[11].

**Table 4: User Satisfaction and Continuation Rates Over Study Period** Our results indicated higher satisfaction (90%) and continuation rates (98.3%) for IUD users compared to OCP users (80% and 93.3%, respectively). These findings are supported by Birgisson NE et al.(2015)[12], who reported higher satisfaction and continuation rates among IUD users, likely reflecting the effectiveness and convenience of long-term use without daily attention.

## CONCLUSION

The comparative study of Oral Contraceptive Pills (OCPs) versus Intrauterine Devices (IUDs) in preventing unintended pregnancies has revealed several critical insights into the efficacy, safety, and user satisfaction associated with these two popular contraceptive methods. The results have highlighted a distinct advantage of IUDs over OCPs in several key areas. Firstly, the study demonstrated a significant difference in the effectiveness of preventing unintended pregnancies, with IUDs showing a markedly lower rate of unintended pregnancies compared to OCPs. This superior efficacy of IUDs can be attributed to their minimal reliance on user compliance, providing a more consistent and reliable form of contraception over extended periods. The findings align with broader research that suggests long-acting reversible contraception methods like IUDs are more effective largely due to decreased human error. In terms of safety, both contraceptive methods were found to be generally safe for use. However, IUDs had a higher user continuation rate and fewer reports of safety-related issues, indicating a better overall safety profile. This aspect of IUDs enhances their appeal, particularly for users seeking a long-term solution with minimal daily maintenance. User satisfaction and continuation rates were also higher among IUD users, reflecting the convenience and efficacy of IUDs. The data suggest that once users overcome the initial procedure required for IUD insertion, they tend to continue with this method due to its effectiveness and low maintenance. The study's findings support the conclusion that while both OCPs and IUDs are viable and safe options for preventing unintended pregnancies, IUDs offer several advantages that may make them a preferable choice for many women. These advantages include higher efficacy, better safety profiles, and greater overall user satisfaction. Healthcare providers should consider these results when advising patients on contraceptive options, tailoring recommendations to individual needs and circumstances to optimize contraceptive efficacy and user satisfaction.

## LIMITATIONS OF STUDY

1. **Sample Size and Diversity**: The study was conducted with a sample size of 120 participants, which, while sufficient for initial observations, may not capture the full variability and potential outliers present in the general population. Furthermore, the study's demographic homogeneity limits the generalizability of the results to all population groups, as different ethnic and

age groups may respond differently to these contraceptive methods.

2. **Short Duration**: The one-year observation period provides initial data on the effectiveness and safety of the contraceptive methods but does not account for long-term effects and changes in user satisfaction or method efficacy over time. Long-term studies are needed to better understand the sustainability of satisfaction and efficacy.
3. **Self-Reporting Bias**: Aspects of the study reliant on self-reported data, such as side effects and satisfaction levels, may be subject to bias. Participants may underreport negative experiences or side effects due to recall bias or social desirability bias.
4. **Lack of Randomization**: The assignment of participants to either the OCP or IUD group was based partly on participant preference and medical suitability, which could introduce selection bias. A randomized controlled trial design would provide a more rigorous assessment of the comparative efficacy and safety of these methods.
5. **Exclusion Criteria**: The exclusion of participants with certain medical conditions, such as a history of pelvic inflammatory disease or severe uterine anomalies, might limit the applicability of the findings to all potential users of OCPs and IUDs. The results may not fully represent outcomes for women with complex reproductive health histories.
6. **Non-consideration of Other Variables**: Factors such as socio-economic status, prior contraceptive use, and partner preferences, which can significantly impact the choice and efficacy of contraceptive methods, were not controlled or analyzed in this study. These factors could influence the outcomes and the interpretation of the effectiveness and safety of the methods.
7. **No Follow-Up Post-Discontinuation**: The study did not track participants who discontinued use of either contraceptive method for reasons other than side effects, potentially omitting data on other significant factors influencing discontinuation.

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