



# Oral Contraceptives: Analyzing Effectiveness and Utilization Challenges to Improve Reproductive Health Outcomes

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## Abstract

**Background:** Oral contraceptives (OCs) are widely used for preventing unintended pregnancies and offering various reproductive health benefits. However, their utilization is influenced by numerous factors, including access, education, and cultural beliefs. This meta-analysis aims to systematically review studies from 2019 to 2023 focusing on OC utilization patterns and effectiveness. **Methods:** A comprehensive search across PubMed, Scopus, and Google Scholar identified 50 relevant articles, from which nine studies were selected based on predefined criteria. Data extraction included demographic factors, adherence rates, side effects, access to OCs, and pregnancy outcomes. Quality assessments were performed using the Newcastle-Ottawa Scale and the Cochrane Risk of Bias tool, followed by statistical analysis using random-effects models. **Results:** The analysis revealed a pregnancy rate as low as 0.3% among perfect OC users, showcasing their high effectiveness. However, significant barriers persist, including poor adherence, discontinuation due to side effects, and disparities in access, particularly in low-income regions. Cultural perceptions and insufficient education further

hinder optimal OC utilization. **Conclusion:** While OCs represent a reliable contraceptive method with substantial health benefits, ongoing challenges impede their optimal use. A multifaceted approach focusing on improved education, enhanced healthcare provider counseling, and targeted access initiatives is essential to increase OC utilization and reproductive health outcomes globally. Addressing these challenges will empower individuals to make informed family planning decisions, ultimately reducing unintended pregnancies and enhancing quality of life.

**Keywords:** Oral Contraceptives, Utilization Patterns, Effectiveness, Adherence, Reproductive Health

## Introduction

Oral contraceptives (OCs) have become one of the most widely used contraceptive methods globally, known for both their efficacy in preventing unintended pregnancies and their role in addressing various reproductive health concerns (Smith et al., 2020; Zhang et al., 2021). Between 2019 and 2023, research has extensively documented OCs' effectiveness alongside the complex factors influencing their use across diverse demographics (Johnson et al., 2022; Perez & Lee, 2023). When used correctly, OCs achieve a remarkably low failure rate of approximately 0.3%, making them a reliable contraceptive option (Brown et al., 2019). Beyond contraception, OCs offer additional health benefits, including menstrual cycle regulation, reduced menstrual pain, and a lower risk of ovarian and endometrial cancers (Garcia et al., 2020; Singh & Patel, 2022). However, access to these benefits varies widely due

**Significance** | This analysis is crucial for identifying barriers to oral contraceptive use, enhancing effectiveness, and improving reproductive health outcomes for diverse populations.

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to factors such as accessibility, education, cultural beliefs, and individual health concerns (Kim & Taylor, 2023).

This meta-analysis systematically reviews studies published from 2019 to 2023, focusing on patterns of OC use and their effectiveness. An extensive literature search was conducted across databases such as PubMed, Scopus, and Google Scholar, yielding 50 relevant articles that provided insights into the factors affecting OC utilization. Of these, nine studies were selected based on inclusion criteria emphasizing demographics, adherence rates, side effects, access, and pregnancy outcomes (Brown et al., 2019; Perez & Lee, 2023).

Results from this analysis highlight both the benefits and challenges associated with OC use. The high effectiveness of OCs in pregnancy prevention remains a major advantage, contributing significantly to reproductive health for many women (Smith et al., 2020; Johnson et al., 2022). Nonetheless, barriers such as poor adherence, side effects, and disparities in access continue to limit their optimal use, especially in low-income regions (Zhang et al., 2021; Singh & Patel, 2022). Cultural attitudes and limited education on OC use further exacerbate these challenges, leading to underutilization in populations that could benefit most (Garcia et al., 2020; Kim & Taylor, 2023).

While OCs offer the potential to enhance the quality of life for many women, substantial barriers remain in ensuring that all individuals possess the necessary knowledge and resources to use them effectively (Johnson et al., 2022; Perez & Lee, 2023). Addressing these barriers will require comprehensive efforts in education, improved counseling by healthcare providers, and targeted programs to increase OC access in underserved areas (Brown et al., 2019).

OCs provide an effective method for preventing unintended pregnancies and offer additional health benefits, but challenges such as adherence, side effects, and access disparities continue to hinder their full potential. This meta-analysis aims to shed light on these critical issues, advocating for strategies to improve OC use across diverse populations and ultimately enhance global reproductive health outcomes. By underscoring both the efficacy of OCs and the barriers to their utilization, this research contributes to a nuanced understanding of

contemporary reproductive health and family planning (Smith et al., 2020; Garcia et al., 2020; Kim & Taylor, 2023).

## Materials and Methods

This meta-analysis systematically reviewed studies examining the utilization patterns and effectiveness of oral contraceptives (OCs) published from January 2019 to December 2023, following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for transparency and rigor. A comprehensive literature search was conducted across multiple

electronic databases, including PubMed, Scopus, Google Scholar, and Web of Science. The search strategy incorporated predefined keywords such as "oral contraceptives," "utilization patterns," "effectiveness," "adherence," "side effects," and "family planning," utilizing Boolean operators (AND, OR) to refine results.

Initially, 50 potentially relevant articles were identified based on specific inclusion criteria, which required studies to be peer-reviewed, published in English, and focused on human subjects regarding OC utilization and effectiveness. Included studies encompassed quantitative research designs, including large-scale surveys, cohort studies, randomized controlled trials, and cross-sectional studies that provided demographic information influencing OC use, such as age, socioeconomic status, and geographical location. Studies were excluded if they were not in English, lacked peer-review status, focused on non-oral contraceptive methods, or did not provide sufficient data for analysis.

Data extraction was performed independently by two researchers using a standardized form to ensure consistency. Extracted variables included study characteristics (author(s), year of publication, study design, sample size, and geographical location), demographic information (age, gender, socioeconomic status, and education level), utilization patterns (OC usage rates, adherence levels, and influencing factors), effectiveness data (pregnancy rates among users), adverse effects (side effects leading to discontinuation), and information on access and availability of OCs.

The quality of included studies was evaluated using the Newcastle-Ottawa Scale (NOS) for observational studies and the Cochrane Risk of Bias tool for randomized controlled trials. Studies scoring six or higher on the NOS were deemed high quality for inclusion. Statistical analysis involved synthesizing data using random-effects models to account for study variability and calculating effect sizes with odds ratios (OR) for dichotomous outcomes and mean differences (MD) for continuous outcomes. Heterogeneity among studies was assessed with the  $I^2$  statistic, where values exceeding 50% indicated substantial heterogeneity. Sensitivity analyses were conducted to verify the robustness of results, and potential publication bias was assessed through funnel plots and Egger's test.

## Results

The analysis of the selected studies revealed valuable insights into the multifaceted aspects of oral contraceptive use (table 1), including effectiveness, adherence challenges, and the impact of socio-economic factors on utilization patterns.

### Major Strengths Identified

#### *High Effectiveness in Pregnancy Prevention*

The meta-analysis found that oral contraceptives demonstrate a high level of efficacy when used correctly. Studies reported a

**Table 1.** Summary of Key Studies on Oral Contraceptive (OC) Use

Study Author	Year	Sample Size	Key Findings	Strengths	Challenges
Smith et al.	2020	5,000 women	0.3% failure rate with perfect use	High effectiveness	Adherence issues
Brown et al.	2021	3,200 women	8% failure rate with typical use	Effective when adhered to	Missed pills common
Williams et al.	2021	6,500 women	Non-contraceptive benefits like reduced cancer risk	Health benefits beyond contraception	Side effects lead to discontinuation
Martinez et al.	2019	4,000 women in high-income countries	Increased access leads to better adherence	Subsidized programs improve usage	Geographical and socioeconomic barriers in low-income areas
Nguyen et al.	2022	2,500 women in low-income regions	Low utilization rates due to cultural barriers	Efforts to improve access underway	Cultural and educational barriers
Jones et al.	2022	3,700 women	Discontinuation due to side effects, particularly VTE risk	Effective for menstrual regulation	Discontinuation due to side effects
Gomez et al.	2020	4,500 women aged 18-25	Poor adherence leads to increased pregnancy rates	OC remains popular among young women	Low adherence rates
Hassan et al.	2021	1,800 women in rural settings	Low awareness of proper OC use	Increasing education efforts	Lack of provider counseling

pregnancy rate as low as 0.3% per year among perfect users (Smith et al., 2020). This statistic underscores the effectiveness of OCs in preventing unintended pregnancies, although practical usage scenarios show varying effectiveness due to issues like missed doses or inconsistent use (Brown et al., 2021).

### ***Positive Impact on Reproductive Health***

In addition to their contraceptive benefits, the use of OCs has been associated with various non-contraceptive health advantages. These benefits include regulating menstrual cycles, reducing the risk of ovarian and endometrial cancers, and managing conditions such as polycystic ovary syndrome (PCOS) (Williams et al., 2021). Many users reported improved quality of life and increased satisfaction with their reproductive health as a result of long-term OC use.

#### ***Increased Accessibility in Developed Regions***

The review highlighted that in high-income countries, improved healthcare systems and policies have facilitated better access to contraceptive services, leading to higher rates of OC utilization. Programs offering free or subsidized OCs have significantly enhanced adherence levels and correspondingly reduced rates of unintended pregnancies (Martinez et al., 2019).

### ***Major Challenges Identified***

#### ***Disparities in Access and Utilization***

A significant concern arising from the review is the disparity in OC access and utilization, particularly in low-income regions. Many studies identified cultural, economic, and educational barriers that contribute to the low uptake of OCs in developing countries (Nguyen et al., 2022). Geographic limitations further restrict access to family planning services, which results in lower utilization rates and increased rates of unintended pregnancies.

#### ***Side Effects and Discontinuation***

Side effects remain a critical issue affecting OC utilization. Reports indicated that side effects such as nausea, weight gain, mood swings, and an elevated risk of venous thromboembolism (VTE) significantly contribute to discontinuation among users (Jones et al., 2022). Many women opted to stop using OCs due to perceived or experienced adverse effects, adversely impacting the overall effectiveness of the method.

#### ***Adherence Issues***

The meta-analysis revealed poor adherence as a recurrent challenge. Many users frequently missed doses or ceased use altogether, leading to elevated failure rates (Gomez et al., 2020). Notably, adherence issues were particularly pronounced among younger women and those lacking comprehensive knowledge regarding effective OC use.

#### ***Limited Education and Counselling***

The review highlighted a lack of education and counselling regarding the correct use of OCs, especially in low-resource settings. Numerous studies indicated that healthcare providers often failed to offer thorough guidance on OC usage, potential side

effects, and appropriate measures to take when doses were missed (Hassan et al., 2021). This knowledge gap contributes to decreased adherence and increased discontinuation rates.

### ***Discussion***

The findings from this meta-analysis highlight the significant role of oral contraceptives (OCs) in reproductive health management, particularly their effectiveness in preventing unintended pregnancies (Brown, Smith, & Patel, 2021; Smith, Taylor, & Lee, 2020). With a reported efficacy of up to 99.7% when used perfectly, OCs have established themselves as a reliable method of contraception (Smith et al., 2020). This analysis underscores not only the critical contraceptive function of OCs but also their additional health benefits, which contribute to a comprehensive understanding of their value in women's health (Williams, Evans, & Parker, 2021).

#### ***Non-contraceptive Health Benefits***

One of the major strengths of OCs identified in the literature is their range of non-contraceptive benefits (Williams et al., 2021). Beyond pregnancy prevention, OCs have been linked to a reduction in the incidence of certain reproductive cancers, such as ovarian and endometrial cancers, and are effective in managing menstrual disorders and conditions like polycystic ovary syndrome (PCOS) (Williams et al., 2021). The evidence suggesting that OCs can lead to improved quality of life through menstrual regulation and symptom management is compelling (Gomez, Johnson, & Myers, 2020). These benefits can enhance user satisfaction and may encourage continued use, particularly among those who may not initially seek OCs solely for contraceptive purposes (Martinez, Li, & Zhao, 2019).

#### ***Challenges of Adherence and Discontinuation***

Despite the high effectiveness of OCs, significant challenges persist, particularly regarding adherence (Jones, Williams, & Daniels, 2022). The meta-analysis revealed that poor adherence remains a critical barrier, with studies indicating that many users struggle with consistent daily use (Brown et al., 2021). Factors influencing adherence include forgetfulness, misunderstanding of usage guidelines, and a lack of supportive counseling from healthcare providers (Smith et al., 2020). Moreover, side effects such as nausea, mood swings, and increased risks of serious conditions like venous thromboembolism (VTE) have been identified as primary reasons for discontinuation (Zhou, Wang, & Chen, 2021). These adverse effects can undermine the perceived benefits of OCs, prompting users to abandon the method prematurely (Jones et al., 2022).

#### ***Disparities in Access***

Access to OCs is another significant issue highlighted in the review (Hassan, Nguyen, & Ahmed, 2021; Nguyen, Hassan, & Rodriguez, 2022). The analysis demonstrated that geographic and socioeconomic disparities significantly affect utilization rates

(Nguyen et al., 2022). In low-income regions, cultural stigmas and limited educational resources often hinder effective access to contraceptive options, including OCs (Hassan et al., 2021). These barriers create a cycle of disadvantage that perpetuates low usage rates and increases the incidence of unintended pregnancies (Gomez et al., 2020). The lack of availability of OCs, compounded by insufficient educational outreach, underscores the need for targeted interventions to improve access (Martinez et al., 2019).

### **Implications for Healthcare Practice**

This analysis advocates for multifaceted interventions focused on education and counselling to enhance the utilization of OCs (Smith et al., 2020). Healthcare providers play a crucial role in improving adherence by offering comprehensive education on correct OC usage, addressing concerns about side effects, and providing strategies for managing missed doses (Brown et al., 2021). Moreover, integrating discussions about non-contraceptive benefits can empower users to make informed decisions about their reproductive health (Williams et al., 2021).

Future research should focus on developing strategies that target these barriers, particularly in underserved populations (Nguyen et al., 2022). Innovative approaches, such as community-based educational programs and digital health interventions, could improve knowledge and accessibility (Hassan et al., 2021). Additionally, research into developing OCs with fewer side effects may reduce discontinuation rates and improve user satisfaction (Jones et al., 2022).

### **Conclusion**

This analysis showed the dual nature of oral contraceptives (OCs) as highly effective contraceptive methods while also highlighting significant barriers to their optimal use. Despite achieving a pregnancy failure rate as low as 0.3% with perfect use and providing critical non-contraceptive health benefits, challenges such as poor adherence, adverse side effects, and inequitable access persist, particularly in low-income and underserved populations. To enhance the effectiveness of OCs, a comprehensive approach is necessary, focusing on improved education, supportive counseling, and targeted access initiatives. Addressing these challenges can help ensure that more individuals benefit from the advantages of OCs, ultimately improving reproductive health outcomes on a global scale. Continued research into user experiences and innovative solutions will be essential in overcoming these obstacles and promoting informed family planning decisions.

### **Author contributions**

B.M.E. conceived the idea and prepared the outline of the review. M.K.D. performed literature searches and data extraction, analysis of extracted data, and manuscript preparation. S.D. supervised the manuscript preparation and prepared the final draft, did the final

revision, and all authors read and accepted the final version of the manuscript.

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### **Competing financial interests**

The authors have no conflict of interest.

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