

THE EFFECT OF POSTNATAL CARE ON THE POSTPARTUM CONTRACEPTIVE USE IN ETHIOPIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

Tesfalem Tilahun Yemane^{1*}, Mengestu Mera², Abebe Kassa¹, Nigusie Tadesse¹

ABSTRACT

BACKGROUND: Effective postpartum contraception is crucial for maternal health and birth spacing. Postnatal care (PNC) visits represent a pivotal opportunity to encourage its use. Despite this, postpartum contraceptive uptake remains low in Ethiopia. Thus, this systematic review and meta-analysis seeks to evaluate the impact of postnatal visits on the utilization of postpartum contraception in Ethiopia.

METHODS: A systematic review and meta-analysis of published studies were conducted. Articles were systematically searched across multiple databases, including PubMed, HINARI, Science Direct, Cochrane Library, ETH Library, and Google Scholar. Data were analyzed using STATA 14 software. Publication bias was assessed using funnel plots and Egger's test. A random-effects model was employed to estimate the pooled prevalence of postpartum contraceptive use in Ethiopia.

RESULTS: The findings of the present systematic review and meta-analysis revealed that postnatal care visits significantly increase the utilization of postpartum contraception [pooled effect size 2.92 (95% CI, 2.21, 3.881)]. Postnatal care can provide critical information and support to women during the postpartum period, including information about family planning and contraceptive options.

CONCLUSION: Postpartum contraception is pivotal for maternal and child health. Postnatal care visits represent a crucial opportunity to promote its uptake. Healthcare providers can use these visits to educate women about contraceptive methods, discuss their advantages and potential risks, and help them choose the most suitable option for their needs.

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KEYWORDS: Postnatal care, postpartum contraceptive use, systematic review, meta-analysis, Ethiopia.

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1. Department of Nursing, College of Health Science, Dessie, Ethiopia

2 Department of Health Service Management, Public Health, Wollo University, Dessie, Ethiopia

INTRODUCTION

Postnatal care (PNC) encompasses essential healthcare provided to a woman and her newborn immediately after childbirth, extending up to six weeks (42 days) thereafter¹. The World Health Organization (WHO) recommends a series of PNC visits: within the first 24 hours, at 48-72 hours, between days 7-14, and at 6 weeks postpartum¹. Despite these guidelines, global PNC coverage stands at 59%, with a lower rate of 45% in sub-Saharan Africa². In Ethiopia, only 34% of women received PNC within the first 2 days after delivery according to the 2019 Ethiopia Demographic and Health Survey (EDHS)³.

Postpartum contraceptive use is critical for maternal and child health, enabling appropriate birth spacing, and reducing maternal and infant mortality⁴⁻⁶. The Ethiopian Ministry of Health and WHO recommend a minimum birth interval of 2 years to optimize maternal and child health outcomes^{7,8}. Integration of family planning (FP) counseling during antenatal, immediate postpartum, and PNC services is crucial in achieving these goals^{8,9}.

Shorter birth intervals are associated with higher risks of adverse maternal and infant health outcomes, including premature delivery and infant mortality^{7,10}. Postpartum family planning can significantly reduce these risks, with studies indicating potential reductions of 30% in maternal mortality and 10% in infant mortality¹¹.

Globally, over 90% of women desire to delay pregnancy for at least two years before giving birth^{5,12}. Also, more than 60% of women in low- and middle-income countries have unmet needs for family planning services¹³. In sub-Saharan Africa (SSA), 20% of women give birth within two years after giving birth, and half of women have unmet needs for family planning services^{13,14}. Thus, increasing access to effective postpartum contraception is vital to helping women achieve their reproductive intentions^{5,13,14}.

Despite global efforts, postpartum contraceptive use in Ethiopia remains low, with substantial unmet

needs^{9,15}. PNC visits present critical opportunities for counseling and provision of contraceptive methods^{9,16-18}. However, the effectiveness of PNC in promoting postpartum contraceptive use requires further exploration. Therefore, this systematic review and meta-analysis aims to analyze and synthesize existing evidence on the impact of PNC services on postpartum family planning uptake in Ethiopia. This synthesis will inform policymakers and stakeholders involved in enhancing family planning services in Ethiopia.

METHOD AND MATERIALS

Study Design and Protocol Registration:

A systematic review and meta-analysis were conducted to quantify the pooled effect of PNC on postpartum contraceptive use. To report this systematic review and meta-analysis, an updated Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 statement was adapted¹⁹. The protocol has been registered on the International Prospective Register of Systematic Reviews, the University of York Center for Reviews and Dissemination. Available from: https://www.crd.york.ac.uk/prospero/display_record.php?RegistrationIDnumber=CRD42020156574.

Search Strategies

A comprehensive search was conducted to identify relevant studies for this systematic review and meta-analysis. The following databases were used: PubMed, HINARI, ScienceDirect, Cochrane Library, ETH Library, and Google Scholar. The search strategy combined keywords and MeSH terms related to postnatal care, postpartum contraceptive use, and Ethiopia. Specific search terms included “postnatal care,” “postpartum contraception,” “family planning,” “maternal health,” “Ethiopia,” and their variations. Search strings were tailored for each database to ensure coverage of both indexed terms and free-text terms. Boolean operators (AND, OR) were used to combine search terms effectively. In the article search, the following keywords were used: “Postpartum family planning” OR “Postpartum contraceptive” AND Prevalence

OR utilization OR use AND determinants OR “Factors associated” OR predictors OR postnatal OR “postnatal care.”

This systematic review and meta-analysis employed the PICO (Population, Intervention, Comparison, and Outcomes) framework to identify eligible studies. The study population (P) consisted of reproductive-age women (15-49 years) within their first 12 months postpartum; the intervention (I) was PNC follow-up; the comparison (C) group included women who did not receive PNC follow-up; and the outcomes (O) focused on the utilization of postpartum contraceptives within 12 months after delivery.

Criteria for Eligibility

Inclusion Criteria

The inclusion criteria for this review encompassed studies published in English that investigated the association between postnatal care visits and postpartum contraceptive use. Only studies conducted in Ethiopia were considered. Additionally, the review included studies published within the timeframe of January 30, 2013, to January 30, 2024.

Exclusion Criteria

Studies were excluded if they did not address the relationship between postnatal care and postpartum contraceptive use, were not conducted in Ethiopia, were not in English, or lacked accessible full texts. Additionally, studies that did not report PNC visits or their outcomes were excluded. Furthermore, review articles, conference proceedings, protocols, and grey literature were also excluded.

Study Selection

All articles identified in the search were imported into EndNote X7, where duplicate studies were removed. The initial screening of studies for inclusion was based on titles and abstracts. Full-text reviews were then conducted by two independent reviewers (TTY and AK). Potentially eligible articles were identified through this process. Any disagreements between the reviewers (TTY and AK) were resolved through discussion and, if necessary, with the involvement of an additional reviewer

(NT). The overall selection process was summarized using the PRISMA flow diagram¹⁹.

Quality Assessment of the Studies

Three reviewers (TTY, NT, and MM) independently assessed the quality of the included studies. A modified version of the Newcastle-Ottawa Scales was used to evaluate the quality of the studies²⁰. The studies were divided into three categories: (0-4) low quality, (5-7) medium quality, and (8-10) high quality²¹.

Data Extraction

All data were extracted by two independent reviewers (TTY and MM) using the JBI data extraction tool. Discrepancies were resolved through discussion, with a third reviewer (AK) involved as needed. For each included article, the following information was extracted: author(s), publication year, study area and region, study setting, study design, sample size, and adjusted odds ratio with confidence interval. The extracted data were first entered into a Microsoft Excel spreadsheet and then exported to STATA 14 software for analysis.

Data Analysis, Heterogeneity, and Publication Bias

Data analysis was conducted using STATA 14 software. Descriptive statistics summarized the characteristics of included studies. The pooled effect size was calculated using a random-effects model to accommodate study variability. Heterogeneity was assessed using the I^2 statistic and Cochran's Q test: I^2 values below 25% indicated low, 25-50% moderate, 51-75% substantial, and above 75% considerable heterogeneity, prompting subgroup and sensitivity analyses²². A significance level of $p < 0.05$ indicated heterogeneity.

Publication bias was evaluated through funnel plots, Egger's weighted regression, and Begg's rank correlation tests. Forest plots presented odds ratios with 95% confidence intervals (CI) for pooled effect sizes. Given heterogeneity, a random-effects model estimated pooled effects. Subgroup analyses explored variability sources based on region, publication year, study setting, and sample size. If publication bias was detected, the trim-and-fill method adjusted pooled estimates accordingly.

RESULT

STUDY SELECTION

A total of 1,208 articles were searched through electronic databases and grey literature. From these, 144 articles were excluded due to duplications, while the remaining 1,064 articles were reserved for further screening. Of these remaining articles, 776 and 221 were excluded by their titles and abstracts,

respectively. A total of 67 full-text articles were assessed for eligibility criteria. Finally, 10 articles with appropriate quality were included in the final systematic review and meta-analysis. Furthermore, to summarise the selection procedure, the PRISMA flow diagram was used. (Fig 1)

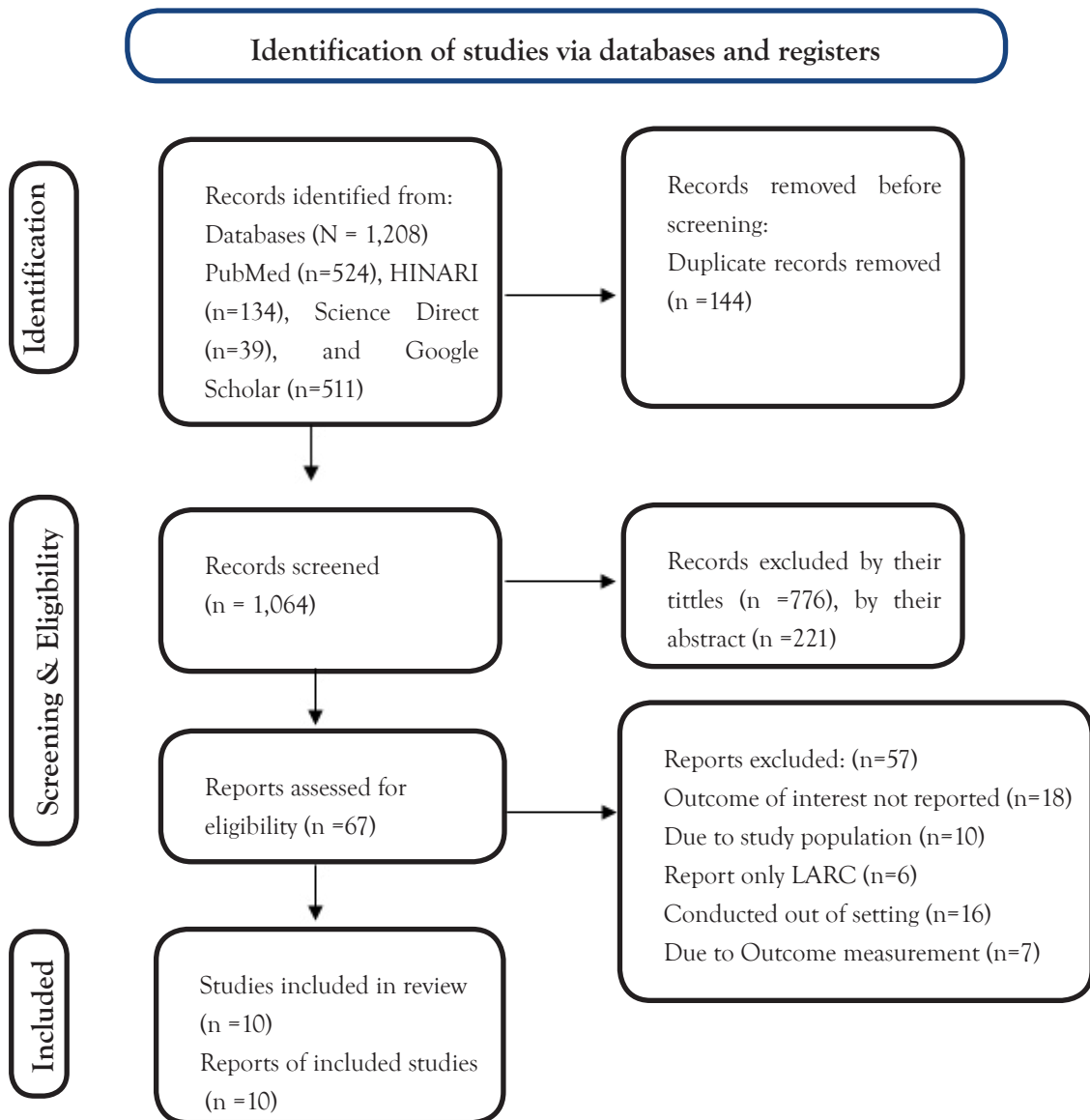


Figure 1. Description of schematic presentation of the PRISMA flow diagram to select and include studies, 2024.

CHARACTERISTICS OF INCLUDED STUDIES

As described in Table 1, these, 10 original articles were included in this systematic review and meta-analysis. The selected articles were published from 2016 to 2022. All included studies are cross-sectional in nature. In this study, 6157 postpartum women were involved. The sample size of the included studies ranged from 342¹⁸ to 1109¹⁷. Out of 10 studies, six studies were conducted both in urban

and rural settings^{16, 23-27}, three in urban²⁸⁻³⁰, and one in rural¹⁷ settings. The mean age of postpartum women ranged from 25.4²³ to 29.82 years²⁹. The response rate of the included studies ranges from 95.6%²⁵ to 100% response rate^{17,28}. Finally, regarding the quality score of the included studies, 7 of the 10 studies had high quality (8-10 points), and the remaining 3 studies had medium quality (5-7 points). Further descriptions and characteristics of the studies are included in Table 1.

Table 1: Descriptive summary of 10 studies included in the systematic review and meta-analysis of the effect of postnatal care on postpartum family planning use among women of the reproductive age group in Ethiopia, 2024.

Author	Publication Year	Region	Study Design	Sample size	Mean age of women's	Response Rate (%)	AOR ES (95% CI)	Quality score (10pt)
Abraha , et al. ¹⁷	2018	Tigray	CBCS	1109	28.7	100	2.00 (1.33, 3.01)	7
Abraha T,et al. ¹⁶	2017	Tigray	CBCS	590	27.4	98.2	2.36 (1.15, 4.86)	8
Asires, et al. ³⁰	2017	Addis Ababa	IBCS	833	27.3	98.6	5.90 (1.70, 20.53)	8
Dona et al. ²³	2018	SNNP	CBCS	684	25.4	98.4	1.90 (1.23, 2.94)	8
Getachew , et al. ²⁴	2016	SNNP	CBCS	420	27.5	99.7	2.84 (1.44, 5.59)	7
Jaleta, et al. ²⁵	2019	Benishangul	CBCS	820	28	95.6	7.80 (3.96, 15.36)	8
Seifu, et al. ²⁷	2020	Oromia	CBCS	354	29.8	96.4	2.5 (1.3, 5.9)	8
Teka et al. ²⁶	2018	Oromia	CBCS	603	26.9	97.9	4.34 (2.37, 7.94)	7
Yimam, et al. ²⁹	2021	Afar	CBCS	342	29.82	97.8	2.54 (1.37, 4.68)	8
Mihretie, et al. ²⁸	2022	Amhara	CBCS	402	28.1	100	2.96 (1.57, 5.57)	8

Note: SNNP, Southern Nation Nationalities, and People regional state. AOR; Adjusted Odds Ratio. CBCS, Community based cross-sectional. IBCS, Institution based cross sectional.

PUBLICATION BIAS AND HETEROGENEITY

Publication bias was presented on traditional funnel plots. The shape of the traditional funnel plots indicates a symmetrical distribution (Figure 2). Moreover, to ascertain the funnel plot, Begg's and Egger's tests were conducted. Begg's and Egger's test results revealed the absence of statistically significant publication bias ($p = 0.28$ and $p = 0.060$, respectively). Statistical heterogeneity was checked by using the Cochran's-Q test and the I² test and through visual examination of the forest plot (overlap of confidence intervals). In this analysis,

moderate heterogeneity was observed across the included studies and detected by the Cochran Q test (Q test $p < 0.001$) and I² statistics (I² = 50.5%) (Figure 3). Because of this, a random effects model was used to estimate the effect of PNC follow-up on postpartum contraceptive use. By considering publication year, study setting, and sample size, sub-group analysis was performed to identify the possible source of heterogeneity, but none of these variables were found to be statistically significant (Table 2).

Table 2: Subgroup analysis for the effect of postnatal care on postpartum family planning use among women of the reproductive age (15-49 years) group in their first 12 months after delivery in Ethiopia, 2024 (n = 10).

Variable	Subgroup	Number of studies	Sample size	I2	ES (95% CI)
By Regions	Tigray	2	1,699	0.00%	2.08 (1.46, 2.97)
	Oromia	2	957	19.8%	3.46 (2.03, 5.89)
	SNNP	2	1,104	0.00%	2.14 (1.48, 3.08)
	Others	4	2,397	57.4%	4.07 (2.31, 7.18)
By Sample size*	≥ 615	4	3,446	80.4 %	3.28 (1.68, 6.41)
	< 615	6	2,711	0.00 %	2.92 (2.23, 3.83)
By study setting	Both	6	3,471	64.2%	3.15 (2.05, 4.85)
	Urban	3	1,577	0.00%	2.98 (1.97, 4.51)
	Rural	1	1,109	-	2.00 (1.33, 3.01)
By publication year	<2020	7	5,059	66.7%	3.12 (2.09, 4.68)
	≥2020	3	1,098	0.00%	2.67 (1.83, 3.91)

Note: *Sample size for subgroup analysis categorized by taking the mean sample size

The vertical line indicates the effect size whereas the diagonal line indicates the precision of individual studies with a 95% confidence interval.

META-ANALYSIS

The effect of postnatal care follow-up on the utilization of postpartum modern contraceptives As shown in the forest plot, the results of the 10 included studies indicated that the pooled effect

size of postpartum modern contraceptive utilization among those mothers who had postnatal care visits was 2.92 (95% CI, 2.21, 3.88) compared to those mothers without having PNC visits in the random effects model (Figure 3). The findings of this systematic review and meta-analysis revealed that having postnatal care visits increases the utilization of postpartum modern contraceptives.

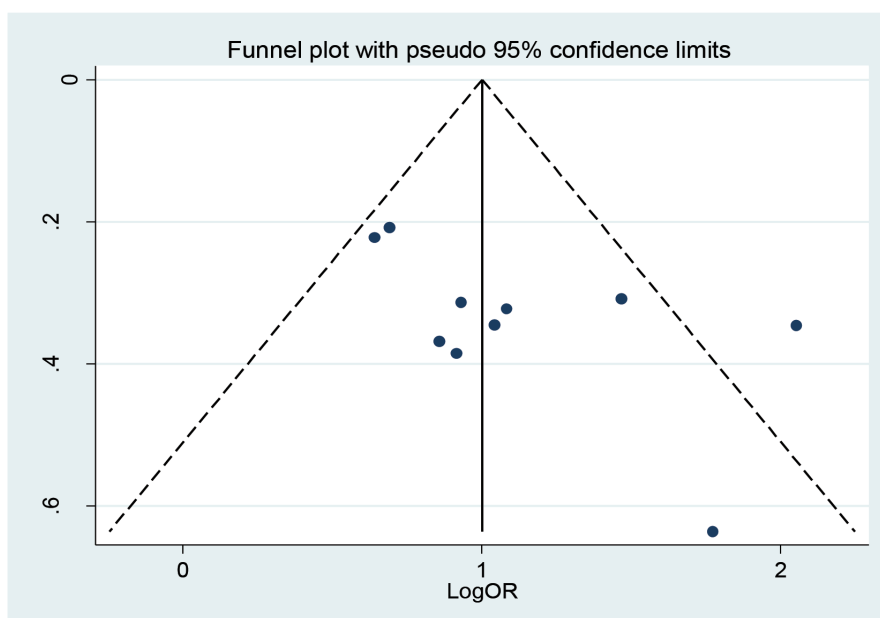


Figure 2: Funnel plot of the 10 included studies of the effect of PNC on utilization of postpartum contraceptives in Ethiopia, 2024.

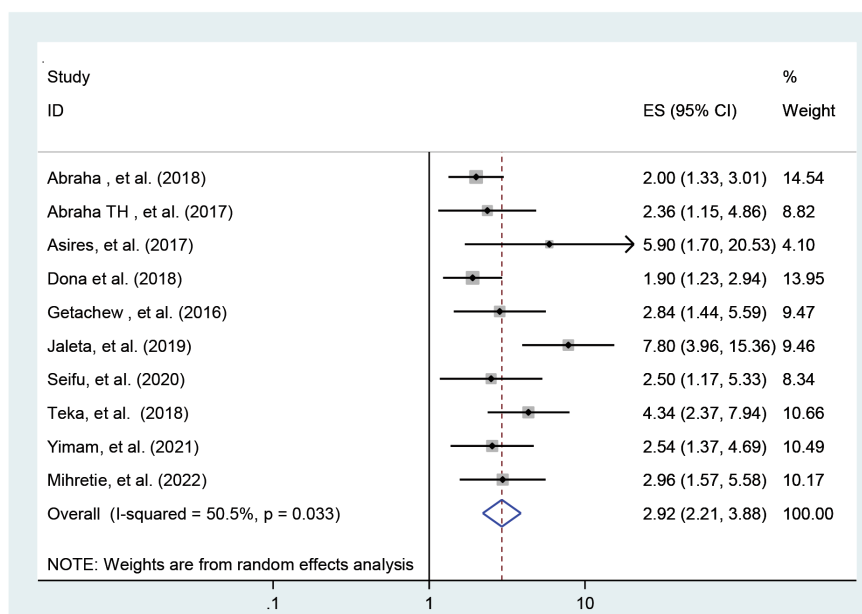


Figure 3: Forest plot of 10 included studies, which reveal the effect of PNC on utilization of postpartum contraceptive in Ethiopia, 2024.

SUBGROUP ANALYSIS

To decrease sizeable heterogeneity, subgroup analysis was performed based on the regions where the studies were conducted, the sample size of the studies, the study setting, and the year of publication. Based on subgroup analysis, the effect of postnatal care follow-up on utilization in the Tigray region was 2.08, 95% CI (1.46, 2.97), Southern Nation and Nationalities was 2.14, 95% CI (1.48, 3.08), and Oromia was 3.46, 95% CI (2.03, 5.89) (Table 2). With regard to sample size, the larger the sample size the more precise the effect size.

DISCUSSION

The findings of this systematic review and meta-analysis revealed that PNC follow-up has a significant effect on the utilization of postpartum contraceptives. The current meta-analysis reported that having postnatal care services was positively associated [2.92 (95% CI, 2.21, 3.88)] with the use of contraceptives during the postpartum period. This suggests that women who receive postnatal care are almost three times more likely to use contraceptives after giving birth compared to those who do not receive postnatal care.

This finding is consistent with USAID findings from 17 countries, a systematic review and meta-analysis conducted in low- and middle-income countries, and low-income countries in SSA³¹⁻³³. Those findings suggest that the utilization of contraceptives among postpartum women will increase substantially if more women use postnatal care. Similarly, a systematic review in sub-Saharan Africa found that family planning counseling during antenatal care, delivery, and postnatal care significantly increased the uptake of modern contraceptives in the postpartum period³⁴. The continuity of care during the postnatal period can foster trust in the healthcare system and providers, making women more likely to accept contraceptive services⁹.

The possible explanation for this finding is that women might get the opportunity for contraceptive counseling and the benefits of birth spacing from health professionals during PNC follow-up. In addition, PNC provides an important opportunity for healthcare providers to deliver appropriate contraceptive methods. Furthermore, the WHO emphasizes the importance of incorporating family planning counseling into postnatal care services

to encourage healthy birth spacing and prevent unintended pregnancies⁶.

The techniques for testing the publication bias of the included studies were considered. It was examined by performing Egger's correlation and Begg's regression intercept tests at a 5% significant level. The results of Begg's and Egger's tests indicated that there was no statistically significant publication bias across the included studies, as evidenced by $p = 0.28$ and $p = 0.06$ in Begg's and Egger's tests, respectively. In this meta-analysis, to identify the possible sources of heterogeneity, subgroup analysis was performed based on the regions and sample size. However, the result of the subgroup analysis indicated that the source of moderate heterogeneity was not because of the study regions or sample size.

CONCLUSIONS

Ultimately, the results of this systematic review and meta-analysis showed that women who receive postnatal care were more likely to use contraceptives after giving birth compared to those who do not receive postnatal care. Integrating family planning counselling and services into all maternal and child health (MCH) units could be an effective strategy to increase postpartum contraceptive use. Therefore, maximizing postnatal care visits helps to improve the utilization of postpartum contraceptives, as well as the outcome of maternal and child health. Thus, enhancing maternal continuum of care is an effective strategy to maximize both postnatal care and postpartum contraceptive utilization.

DECLARATIONS

Limitations of the Study

Only English articles were considered for this review. In addition, the majority of studies were obtained from the Oromia, Tigray, and SNNP regions. Therefore, the results may not be strongly representative of the other regions due to the small number of studies included.

Acknowledgement

Not applicable

Abbreviations

PNC; Postnatal Care.

MeSH; Medical Subject Headings.

AOR; Adjusted Odds Ratio.

PPFP; Postpartum Family Planning,

PRISMA; Preferred Reporting Items for Systematic Review and Meta-Analysis.

WHO; World Health Organization.

Data Availability

The authors declare that the data will be available upon reasonable request to the corresponding author.

Conflict OF Interest

The authors declared that we have no competing interests regarding the publication of this paper.

Funding Statement

No funding was obtained for this work.

Authors' contributions

All authors have contributed to this study. TTY contributed to the conception of the research protocol, protocol preparation and registration, study design, literature review, data extraction, data analysis, interpretation, and drafting of the manuscript. NT participated in a literature review, data extraction, and quality assessment. AK participated in the literature review, data extraction, and quality assessment. MM participated in a literature review, data extraction, and quality assessment. All authors read and approved the final manuscript.

CORRESPONDING AUTHOR:

Tesfalem Tilahun Yemane

Department of Nursing, College of Health Science,
Dessie, Ethiopia

E-mail: tesfalemtilahun1@gmail.com

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SUPPORTING INFORMATION

S1 Fig 1: Description of schematic presentation of the PRISMA 2020 flow diagram to select and include studies, 2024.

S2 Fig 2: Funnel plot of the 10 included studies of the effect of PNC on utilization of postpartum contraceptives in Ethiopia, 2024.

S2 Fig 3: Forest plot of 10 included studies, which reveal the effect of PNC on utilization of postpartum contraceptive in Ethiopia, 2024.

S1 Table 1: Descriptive summary of 10 included studies in the systematic review and meta-analysis of the effect of postnatal care on postpartum family planning use among women of the reproductive age group in Ethiopia, 2024.

S2 Table 2: Subgroup analysis for the effect of postnatal care on postpartum family planning use among women of the reproductive age (15-49 years) group in their first 12 months after delivery in Ethiopia, 2024 (n = 10).