

# Effectiveness of Health Education Interventions Methods to Improve Contraceptive Knowledge, Attitude, and Uptake Among Women of Reproductive Age, Ethiopia: A Systematic Review and Meta-Analysis

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## Abstract

**Background:** Globally, about 600,000 women die yearly as a result of pregnancy-related causes. Access to contraceptive health education has been described as one of the crucial interventions to confront maternal mortality. Nevertheless, the effectiveness of these interventions has not been systematically reviewed.

**Objective:** To assess the effectiveness of health education intervention methods to improve contraceptive knowledge, attitude, and uptake among reproductive age group women.

**Methods:** This systematic review was conducted under Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines through a systematic literature search of articles published between 2010 and 2022 comprising information on the effects of health education on contraceptive knowledge, attitude, attitude, and utilization among the reproductive age group of women. The most known bibliographic databases and libraries: PubMed/Medline, Embase, and Cochrane library were used.

**Result:** Eleven quasi-experimental studies fulfilled the inclusion criteria were included in the review. In a random effects model, the pooled estimate of the health education effect became 0.15 (95% CI = 0.104–0.206) at a *P* value of .001, and the pooled confidence intervals of the combined estimate of effect size occur on the positive side of zero. Therefore, contraceptive health education has a statistically significant positive effect on the contraceptive outcome despite variation between interventional and control groups.

**Conclusion and recommendation:** This review found that interactive communication supported by various health education delivery methods like brochures, booklets, peer educators, and the use of different behavioral change theories are more effective than the one-way and routine counseling of the family planning (FP) health education approach.

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## Keywords

family planning service, health education, effective health education methods

## Introduction

Family planning (FP) is defined as the choice of individuals or couples to anticipate and attain their desired number of children, and the spacing and timing of their births.<sup>1</sup> It is a proven intervention to prevent unintended pregnancies, related unsafe abortion, and maternal mortality and morbidity.<sup>2,3</sup>

Among the 1.9 billion women of reproductive age living in the world in 2019, 1.1 billion FP.<sup>4,5</sup> Of those who need FP, 44% and 4% use modern and traditional methods respectively. Globally, about 600,000 women die yearly as a result of pregnancy-related causes. Sub-Saharan Africa alone accounted for around 66% of the total maternal death registered. In the least developed countries (LDCs), the maternal mortality ratio is found to be very high; is estimated at 415 maternal death per 100,000 live births.<sup>6,7</sup> access to contraception has been described as one of the key interventions to combat maternal mortality.<sup>8,9</sup>

Ethiopia is one of the countries where significant progress has been recorded in the FP program in the past decades.<sup>7,10</sup> A great majority of the health facility in Ethiopia offer oral pills (98.8%) and injectable (98.0%) followed by a male condom (95.2%), implants (75.0%) intra uterine contraceptive device (IUCD) (53.6%), female sterilization (22.6%), male sterilization (16.7%), and female condom (4.0%). The contraceptive methods mix is highly dominated by short-term contraceptive methods.<sup>11</sup>

Worldwide, the use of contraceptives has been identified as an effective approach to fertility regulation by slowing population growth.<sup>12</sup> An estimated 214 million women of reproductive age lack access to contraception resulting in an estimated 67 million unintended pregnancies, 36 million induced abortions, and 76,000 maternal deaths each year.<sup>13</sup> FP is a key intervention to limit this adverse health outcomes.<sup>6,14</sup> Such interventions can prevent 90% of abortions, 32% of maternal deaths, and 20% of pregnancy-related morbidity globally, and reduce 44% of maternal mortality in low-income countries.<sup>15</sup> Published reports showed that a birth-to-pregnancy interval of above 2 years reduced prematurity, low birth weight, as well as small for gestational age.<sup>15,16</sup> In addition to health, FP has economic and social benefits for women, families, and the population at large.<sup>14</sup> Moreover, FP slows population growth, which aids the women to possess good income potential and dedicate enough for each child, resulting in reductions in poverty.<sup>17</sup>

The published reviews explored the variation effectiveness of contraceptive health interventions for different contraceptive outcomes.<sup>5,18,19</sup> The review indicated that interactive health education messages and communication with a counselor improved contraception outcomes, and the combination of

unidirectional and interactive educational messages improved adherence to using contraceptives.<sup>20</sup>

Information on women's and men's knowledge of contraceptive methods provides a measure of awareness of contraception in the population and indicates the success of the information, education, and communication program.<sup>21</sup> In addition, knowledge of at least 1 modern contraceptive method and a positive attitude towards that contraceptive method was found to be prerequisites for the use of that contraceptive.<sup>4,11,22</sup>

Assessing the effects of health education on modern contraceptive use is very important for policymakers and program managers in designing and implementing quality-related interventions to enhance modern contraceptive use and subsequently improve maternal and child health (MCH).<sup>6,19</sup> In most of the studies, it was found that education is the prime influencing factor and education affects the attitudinal and behavioral patterns of the individuals.<sup>23</sup> In addition, educational interventions can help individuals increase their knowledge of available contraceptive methods, enabling them to make informed decisions and use contraception correctly.<sup>24</sup> Increased contraceptive knowledge is associated with a reduced risk of unplanned pregnancy, by more consistent use of highly effective contraceptives.<sup>10,25,26</sup> The findings of this study would provide evidence to FP program managers and service providers to design a targeted approach. Besides, it could be a contribution for achieving the growth transformation plan of the country and sustainable development goals.

Many women who want to avoid pregnancy do not use modern contraceptive methods due to limited or inaccurate knowledge about contraceptives or misperception.<sup>20</sup> Therefore, this review was conducted to assess the effective health education intervention methods that best suit the contraceptive educational interventions.

## Materials and Methods

### Literature Search Strategy

This systematic review was conducted under PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses: guidance for reporting of systematic reviews and meta-analyses)<sup>27</sup> guideline. This review was performed through a systematic literature search of articles published between 2010 and 2022 containing information on the effects of health education on contraceptive knowledge, attitude, and utilization among reproductive age group women. The most known bibliographic databases and libraries: PubMed/Medline, Embase, and the Cochrane Library were used. Keywords from Medical Subject Headings (MeSHs): contraceptives, short-term contraceptives, long-term reversible

contraceptives, and long-term irreversible contraceptives were used with (AND, OR, and NOT) Boolean (Search) Operators.<sup>28</sup> In addition, the references of each primary research and review were screened and citations were uploaded into an EndNote library and tested for duplications.

### Selection/Eligibility Criteria

The studies comparing 2 or more health education interventions and reporting quantitative outcomes on contraceptive knowledge, attitude, and utilization were included. The studies encompassed in this review were restricted to publications in the English language. The outcome of interest was a change in contraceptive knowledge, attitude, and utilization within given periods. Studies conducted in a similar location during the same period were considered potential duplicates and therefore excluded from the analysis.

### Data Extraction and Abstraction

The data included in this review were derived through the electronic search of published articles, titles, and abstracts after being screened using Joanna Briggs Institute's (JBI) data extraction and synthesis format<sup>28</sup> for potential eligibility. From each eligible research, the following information was extracted based on the preformed database (Excel, Microsoft, 2010) format: the author, study participants, study design, type of intervention, types of health education, a dose of health education, year of publication, year of study start and end, eligibility criteria, etc. All data were extracted independently and in duplicate using a standardized extraction form. Returned abstracts were reviewed and full texts were retrieved if they incorporated appropriate information

### Quality Assessment

The quality of each original article was examined using JBI's critical appraisal tool for systematic reviews,<sup>29</sup> which has 11 major criteria. Accordingly, primary studies with a score of  $\geq 50\%$  and above were encompassed in the meta-analysis research.

### Data Analysis

After cleaning and sorting the final database was exported into comprehensive meta-analysis software version 3.0 for analysis. Measures of health education effect were determined using effect size as measures of treatment effect and mean differences for continuous outcomes, with 95% confidence intervals at a significance level of .05. An outcome of interest was the effects of health education on contraceptive knowledge, attitude, and utilization among the reproductive age group of women. Estimates of the effects of health education were assessed for each study and a standardized mean with a 95% confidence interval was used using a random effects model. Heterogeneity was examined by the  $I^2$  and values greater than 50% were considered to depict significant heterogeneity.

When heterogeneity between studies was found to be significant, pooled estimates were based on random effect models and the Hedges method of pooling. Results were illustrated visually in forest plots. Bias was investigated by the construction of funnel plots.

## Results

### Studies Included

The search initially specified 124 citations from an electronic database in the form of abstract, bibliography, and citation; all citations were transported to endnote and cleaned for duplications and 53 articles were specified for full-text review. Of the 53 articles reviewed in full text, 11 articles were assessed based on the inclusion–exclusion criteria and quality assessment and 42 studies were eliminated before analysis for different reasons: 30 studies reported the finding of pre and post-intervention effects without experimental manipulation, 5 were removed for reporting the result of less than 3-month intervention and 3 of them coincided with larger studies, and 4 reported result in terms of a person year of follow-up (Figure 1).

### Description of Findings

The 11 studies that were maintained for the final analysis reported the effects of health education for a total of 7153 women with a range of 17 to 2000 women in each study. These women were followed for at least 6 months before the study and the studies were published during the period 2013 to 2022. All of these studies were quasi-experimental study designs contemplating the effects of health education on knowledge, attitude, and utilization of contraceptives among all age groups of women irrespective of marital status. Three studies were conducted in Nigeria, 2 in Ethiopia, 1 in Turkiye, 1 in Indonesia, 1 in Thailand, 1 in Yemen, 1 in India, and 1 in Pakistan. Five studies adopted peer educators and interactive communication as their main methods to provide health education messages about FP. Three studies adopted a teacher only approach whereas only 2 studies adopted a behavioral change theory of RAT and HBM approach to provide intervention content to participants. One study delivered brochures and booklets to participants during a health education intervention.

### Pooled Estimates and Tests

In a fixed effect model, the pooled estimate of the health education effect was 0.10 (95% CI = 0.077–0.124) at a  $P$  value of .001 and in a random effects model, and the pooled estimate of the health education effect became 0.15 (95% CI = 0.104–0.206) at  $P$  value .001. This means that the meta-analytic effect is statistically significant. Thus, the alternative hypothesis that there is an effect is accepted and then the null hypothesis is rejected. In all cases, pooled estimate from the random effects model was exploited for report and discussion. Therefore, health education has a significant effect on contraceptive

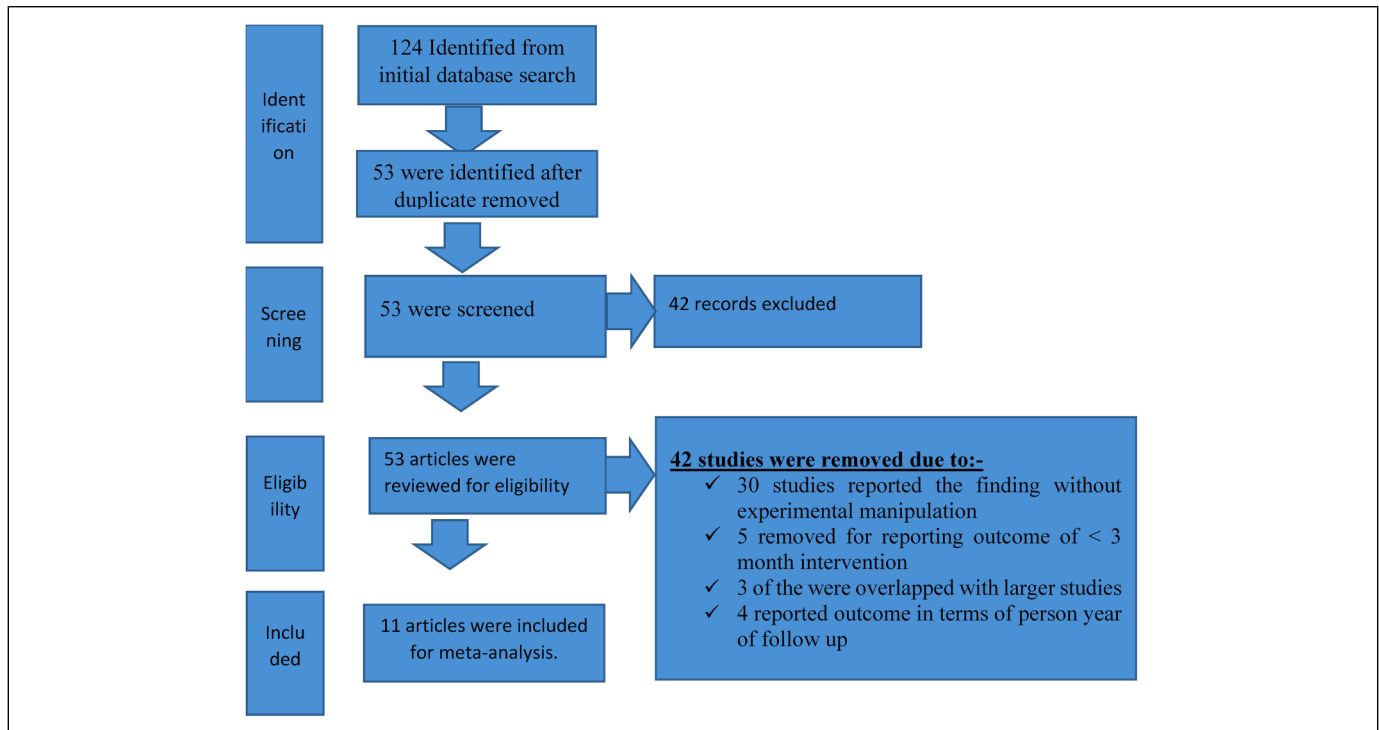
knowledge, attitude, and utilization (95% CI = 0.104–0.206, *P* value = .001) (Table 1).

**The Forest Plot**

In the following forest plot, nearly all confidence intervals are completely on the positive side of zero. These implied a statistically significant positive effect of health education. Mostly, the confidence intervals of the combined estimate of effect size occur on the positive side of zero. Therefore, contraceptive health education has a statistically significant positive effect on the contraceptive outcome despite variation between interventional and control groups. In this analysis, statistical, significance is not merely interested in the fact that there is a positive effect of an intervention but also in how large the effect is. Therefore, the following forest plot indicates that the studies experimented by Al dubhani et al.,<sup>30</sup> Azmat et al.,<sup>31</sup> and Boti et al.<sup>32</sup> employed lectures, brochures, booklet, and peer

educators with the interactive approach in their intervention groups have a larger effect size than the rest of studies. Furthermore, the studies experimented by Astika et al.<sup>33</sup> and Abebe and Mannekulih<sup>34</sup> who used the behavioral change theory approach in the intervention groups have a larger effect size. Therefore, according to these studies, one can conclude that interactive communication supported by different health education delivery methods like brochures, booklets, peer educators, and different theories of behavioral change is more effective than the one-way and routine counseling of FP health education approach.

The results of the study tested by Titilope in Nigeria showed that there are no differences between interventional groups and control groups (ES = 0.186, 95% CI = 0.01, 0.35; *P* = .034). The reason might be the researcher used the same approach to health education methods for both groups. The results of studies assessed by Astika et al have the largest effect size among all other studies in the interventional group (ES =



**Figure 1.** Flowchart for study search, selection, and screening for the review.

**Table 1.** Pooled Estimates for Effect Size and Tests.

Model	Effect size and 95% confidence interval						Test of null (two-tailed)	
	Number of studies	Point estimate	Standard error	Variance	Lower limit	Upper limit	Z-value	<i>P</i> value
Fixed	22	0.101	0.012	0.000	0.077	0.124	8.468	.001
Random effects	22	0.155	0.026	0.001	0.104	0.206	5.974	.001

0.974, 95% CI = 0.39, 1.55;  $P = .001$ ). The reason might be the researcher adopted: the MCH book, balanced counseling strategy, and RAT in the health education intervention. The results of the study examined by Somesh et al. indicated the effects of health education are statistically insignificant in both groups (ES = -0.01, 95% CI = -0.28, 0.26;  $P = .938$ ). These studies used the same health education delivery methods for both groups.

### Estimating the Extent of Heterogeneity

Heterogeneity tests implied significant variations between studies ( $Q = 61.51$ ,  $P = .001$ ), where  $Q$ -value, the weighted sum of squares on a standardized scale was significantly different compared with the expected weighted sum of squares and  $I$ -squared indicated that 65.86% of the observed dispersions are attributed to real rather than spurious variations.

### Subgroup Analysis and Publication Bias

In more practical terms the effects of an intervention on a contraceptive outcome, the results of the combined meta-analysis cannot be used as evidence for its effectiveness or lack of effectiveness as effect size is different among studies. The results of the subgroup analysis indicate that health education is more effective in the interventional group than in the control group.

In this meta-analysis, a funnel plot was used to check publication bias. Accordingly, the observed effect sizes with similar precision (ie, with similar standard error) are more or less symmetrically distributed around the combined effect size. Therefore, there was no publication bias in this meta-analysis.

### Discussion

Of the 11 included studies in this systematic review and meta-analysis, 3 studies adopted face-to-face lectures, 5 studies adopted peer educators and interactive communication as their primary methods to deliver health education messages about FP whereas only 2 studies used a behavioral change theory of RAT and HBM approach to delivering intervention content to participants. One study delivered brochures and booklets to participants during a health education intervention.

This review found that the combination of certain contraceptive health education delivery methods is more effective than one-way method despite certain variations in their effectiveness in another way. For example, the pooled effect size of the study conducted by Thongnopakun and Pumpaibool,<sup>35</sup> Ereno,<sup>36</sup> and Al dubhani et al.<sup>30</sup> were 0.38%, 0.50%, and 97%, respectively. These researchers included peer education, balanced counseling strategy, behavioral change theories, and role play besides face-to-face lectures in their health education delivery methods. The finding of this review was similar to the cohort study conducted in Zimbabwe and Nigeria.<sup>37,38</sup> Nevertheless, the pooled effect size of the study conducted by Balasubramaniam et al.,<sup>39</sup> Azmat et al.,<sup>31</sup> and Charles-eromosele and Odeyemi<sup>40</sup> were 1.1%, 7.4%, and 1.8%, respectively. These

researchers used only routine counseling and face-to-face lecture health education delivery methods.

Several studies in this review confirmed that the effectiveness of different health delivery methods varied with the proportion of the intervention time (ie, once, daily, weekly, or biweekly) bases. Positive changes in outcomes were found in studies that delivered the intervention information on a weekly or biweekly basis, suggesting that too frequent delivery was associated with more uptake of contraceptives.<sup>31,41,42</sup> For example, Thongnopakun et al.<sup>35</sup> included peer education and role play besides face-to-face lectures and their peer-led educational program for 1hr single session per day for 8 weeks had a positive statistically significant effect on enhancing the knowledge and intentions of contraceptives. Studies assessed by Ereno<sup>36</sup> without peer educators but with more doses of health education intervention sessions of 45 min per day for 10 weeks have statistically significant positive effects.

Among the 11 included studies used for the analysis of contraceptive outcomes only 2 studies employed a behavioral change theory. One study used the health belief model, and the other study used the theory of reasoned action. They are similar derivative theories of general behavioral prediction, with the most important determinant being motivation or intention as the interventions targeted. For example, this theory tested by Astika et al.<sup>33</sup> and Abebe and Mannekulih.<sup>34</sup> demonstrated a significant effect on the outcomes of contraceptive education. This indicates that well-tested behavioral change theories are useful to help guide the design and implementation of FP interventions and programs. These findings were similar to the study conducted on the effect of the application of a health belief model on changing mothers' beliefs that reported that the application of a health belief model proved to be effective in changing the health beliefs about contraceptive uptake and the study conducted on the health belief model and contraceptive behavior reported that cues to action are the variables in the model most clearly applicable to contraceptive behavior.<sup>43,44</sup> Our review originate that interventions that showed significant improvement in contraceptive uptake used a combination of unidirectional and interactive communication techniques and involved multiple health education delivery methods components. Notably, simple unidirectional health education message reminders did not affect improving contraceptives, knowledge, attitude, and uptake.

### Conclusion and Recommendation

In these systematic reviews and meta-analyses, about five reviews showed that using peer educators, and, delivering brochures, leaflets, and booklets for participants is essential for improving contraceptive knowledge, attitude and uptake. Moreover, these reviews, along with the present one, suggest that the use of behavioral change theories is important to improve targeted contraceptive behaviors. This systematic review recommended the inclusion of certain components of health education delivery methods to increase the effectiveness of the contraceptive intervention. Nevertheless, recognizing

that further investigation is deserved to clarify which health education methods and behavioral change theories are best and in what combinations lead to better FP outcomes.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Ethical Approval and Consent

Because this study is a systematic review, institutional review board approval is not needed.


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### Data Availability Statement

The authors declare that the data regarding this manuscript can be accessed as per the request of any interested body and can be accessed by email to the corresponding author using dawitgalalo04@gmail.com besides the following information.

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