

## Healthcare in Low-resource Settings



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**Intervention model in reducing the unmet need for contraception: a systematic literature review on technology-based, community, and health worker interventions**

Lia Nurdini,<sup>1,2</sup> Legina Anggraeni,<sup>1</sup> Loveria Sekarrini,<sup>1</sup> Petriana Ekklesia Mahmud,<sup>1</sup> Sabarinah Prasetyo<sup>1</sup>

<sup>1</sup>Faculty of Public Health, Universitas Indonesia, Depok; <sup>2</sup>Faculty of Medicine and Health Sciences, Universitas Jambi, Jambi, Indonesia

**Corresponding author:** Lia Nurdini, Faculty of Public Health, Universitas Indonesia, Depok; Faculty of Medicine and Health Sciences, Universitas Jambi, Jambi, Indonesia.

E-mail: [nurdinialia1@unja.ac.id](mailto:nurdinialia1@unja.ac.id)

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## **Abstract**

The unmet need for contraception is a serious public health problem, and efforts to reduce the unmet need for family planning are a challenge due to the many and complex factors that contribute to the unmet needs. The aim of this study was to systematically review scientific evidence on intervention models that effectively reduce the unmet need for contraception. This study used a systematic review to identify relevant scientific articles. The article search was based on the PICO approach and used a database from <https://www.scopus.com/>, <https://www.sciencedirect.com/>, <https://pubmed.ncbi.nlm.nih.gov/>, <https://www.mdpi.com/>, <https://www.jstor.org/>, <https://www.nature.com/>, <https://link.springer.com/>. The reviewed material was full-text articles and open-access articles published from 2013 to 2023. Data extraction included author, country, type of intervention, research design, sample, and main research findings. Twelve studies were included in our qualitative synthesis. Technology-based interventions, such as mobile phone instant messaging apps, were implemented in countries like Tajikistan, Bolivia, and Mozambique. Community-based interventions included the Community Family Health=Family Wealth program

in Uganda, the Tékponon Jikuagou (TJ) program in Benin, and the Married Adolescent Girls Club (MAG club) and Participatory Women's Group Intervention in Bangladesh. Health worker-led interventions involved community health volunteers in Nepal, postpartum contraceptive counseling, contraceptive counseling for all ages, structured counseling for childbearing couples in Indonesia, and the "Consult and Choose" client-centered family service in Jordan. The findings underscore that varying intervention models can significantly enhance contraceptive use, tailored to specific cultural and regional contexts. These interventions, therefore, hold substantial implications for public health practices aiming to address and reduce the global unmet need for contraception. This systematic review provides valuable insights into the effectiveness of diverse interventions and suggests avenues for public health strategies to expand contraceptive access and use globally.

## **Introduction**

The unmet need for contraception is a serious public health problem, with various negative impacts, such as unwanted pregnancies, unplanned births, abortions, and increased maternal and child health risks.<sup>1</sup> The unmet need figure from year to year still has not reached the unmet need figure targeted by The National Population and Family Planning Board (Indonesian: Badan Kependudukan dan Keluarga Berencana Nasional, abbreviated BKKBN) in the strategic planning of BKKBN in 2020-2024, of about 7.4%,<sup>2</sup> and the high number of unmet needs in Indonesia has the potential to lead to high maternal mortality rates.<sup>3</sup> This is due to an unwanted pregnancy.

Indonesia has the third highest Maternal Mortality Rate (MMR) compared to ASEAN countries in 2017, with 177 deaths per 100,000 births.<sup>4</sup>

The unmet need for contraception is a condition in which couples of childbearing age want to delay or avoid pregnancy but do not use contraception. Various factors can cause this, for example:<sup>5</sup> i) lack of access to contraceptive information and services; ii) dissatisfaction with available contraceptive methods; iii) concerns about contraceptive side effects; iv) social norms and stigma related to contraception. Reducing the unmet need for family planning is a challenge due to the many complex factors that contribute to the unmet need. Therefore, appropriate and targeted interventions are needed to reduce the unmet need for contraception. The results of systematic review research also showed that most of the reviews (15 studies) focused on psychosocial interventions, followed by incentives (6 studies) and technology-based interventions (6 studies).<sup>6</sup>

Tailored and specific interventions can enhance the health of mothers and children.

An intervention model that combines contraceptive education and counseling, access to affordable and quality contraception, and social support can be an effective solution to reduce the unmet need for contraception. A systematic review of the literature on intervention models in reducing the unmet need for contraception can make a significant contribution to increasing the understanding of this problem, encouraging innovation, and improving policies and practices to achieve universal access to contraception. The aim of this research is to systematically review scientific evidence on effective intervention models to reduce the unmet need for contraception.

However, the implementation of these intervention models faces several challenges, particularly in diverse cultural and socioeconomic settings. These include variability in acceptance based on cultural norms and beliefs about family planning, economic barriers that limit access to contraception, and the scalability of interventions across different healthcare infrastructures. A

thorough understanding of these factors is essential for designing interventions that are not only effective but also culturally sensitive and economically feasible.

## **Materials and Methods**

### ***Study design***

This study used a systematic review to identify relevant scientific articles. The systematic review was prepared using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyzes) methodology. Keyword and synonym combinations were developed and applied in article searches based on the PICO approach. Population (P), women of childbearing age; Intervention (I), the intervention was an intervention model to reduce the unmet need for contraception, and this intervention combined various components, such as contraceptive education and counseling, access to affordable and quality contraception, and social support; Comparison (C), none; Outcome (O), use of contraception.

### ***Inclusion and exclusion criteria***

The inclusion criteria were: i) type of research, intervention for unmet need for contraception, ii) sample/respondents are women, iii) articles published from 2013 – 2023 and open access, iv) articles in English. The exclusion criteria are: i): type of review article (systematic literature review, meta-analysis), ii) research conducted in developed countries.

### ***Search strategy***

Literature search was made by using the database from <https://www.scopus.com/>, <https://www.sciencedirect.com/>, <https://pubmed.ncbi.nlm.nih.gov/>, <https://www.mdpi.com/>,

<https://www.jstor.org/>, <https://www.nature.com/>, <https://link.springer.com/>. This research uses keywords in the process of searching for scientific articles with the following format: (((Intervention[Title/Abstract]) AND ("Unmet need for Family planning"[Title/Abstract])) OR ("unmet need for contraception"[ Title/Abstract])). All databases obtained on the website are then stored in the reference management application called Zotero.

### ***Screening***

The included studies were evaluated based on their titles and abstracts, and the full texts were screened. To prevent bias in the selection of scientific articles based on predetermined inclusion and exclusion criteria, scientific articles that meet the eligibility criteria are identified and then independently reviewed by two reviewers. Duplicates were removed automatically; if they were not relevant, they were manually removed. Tools for scavenging titles, abstracts, and duplicates were available on the website <https://www.rayyan.ai/>.

### ***Data extraction***

Twelve scientific articles were successfully evaluated and confirmed for data extraction (Figure 1). The information collected and entered in the table includes the author, country, type of intervention, research design, sample, and main research findings. The researchers then compared the types of intervention and the main findings concerning the unmet need for contraception. To resolve any discrepancies between reviewers during data extraction, a third reviewer was consulted to reach a consensus.

### ***Quality assessment***

The assessment of risk of bias was a key element of this systematic review workflow. We use the Risk-of-bias VISualization (robvis) application using the URL <https://mcguinlu.shinyapps.io/robvis/>. Robvis is a web application designed to visualize the risk of bias assessments performed in systematic reviews.<sup>7</sup> The five domains used in the Robvis website application are i) bias due to randomization; ii) bias due to deviations from intended intervention; iii) bias due to missing data bias; iv) bias due to outcome measurement; v) bias due to selection of report results. Each domain has three options: high, some concerned, and low. A more detailed explanation of these tools underscores that each domain is assessed independently and contributes to an overall risk of biased judgment, ensuring rigorous evaluation of study quality.

## **Results**

Supplementary materials, Table 1 presents a summary of the 12 extracted articles, encompassing three intervention groups: technology-based interventions, community-based interventions, and health worker-delivered interventions through education and counseling. These interventions were implemented across a diverse range of countries, including Tajikistan, Uganda, Nepal, Benin, Bolivia, Bangladesh, Jordan, Indonesia, and Mozambique.

Supplementary materials, Table 1 highlights the varying outcomes observed across the intervention groups, demonstrating the diverse potential and effectiveness of these models in reducing the unmet need for contraception.

Supplementary materials, Table 2 shows three intervention groups studied, including technology-based interventions, community, and health workers through education and counseling to increase knowledge, access, and use of contraception. Group 1 is a technology-based intervention carried out in Tajikistan, using mobile phone app instant messaging, increasing the use of modern



contraception, and Bolivia, using mobile phone app instant messaging, increasing the use of modern contraception. Mozambique using SMS reminder messages increases contraceptive use.

Group 2 is a community-based intervention carried out in Uganda using the Community Family Health = Family Wealth intervention model to increase knowledge and use of contraception. Benin and the Tékponon Jikuagou (TJ) program increase the discussion of contraception and social norms. Bangladesh, with the Married Adolescent Girls Club (MAG Club) model, increases knowledge and use of contraception, and participatory women's group interventions increase knowledge and use of contraception.

Group 3 is the intervention through health workers carried out in Nepal with community health workers such as Female Community Health Volunteers (FCHV) increasing access and use of contraception and postpartum contraceptive counseling increasing contraceptive use, and contraceptive counseling increasing knowledge and use of contraception. In Indonesia, structured counseling for childrenbearing-age couples (in Indonesia: Pasangan Usia Subur, abbreviated as PUS), increases contraceptive use. In Jordan, with client-centered family planning service interventions: "Consult and Choose" (CC) increased contraceptive choice and use.

### ***Quality assessment***

Figure 2 shows that 9 articles have a low risk of bias and 3 articles whose bias falls into the same concern category. Domain 3, regarding bias due to missing data, is of concern because most articles in the researchers' assessment fall into the category of some concern.

### **Discussion**

The research results show that three interventions have been implemented to reduce the unmet need for contraception in developing countries: technology-based, community-based, and health worker interventions. Each intervention provides varying and inconsistent results. The results of another review regarding contraceptive use in low and middle-income countries show four intervention groups that include:<sup>6</sup> i) psychosocial interventions, such as contraceptive counseling; ii) incentive-based interventions, such as performance pay programs; iii) m-Health technology-based interventions, such as messaging by cell phone; iv) community-based interventions. Efforts to reduce the unmet need for contraception are a complex problem and require a combination of various interventions. Different interventions are needed for different population subgroups and geographic regions.<sup>20</sup> Traditions, beliefs, and norms of local society,<sup>21</sup> individual aspirations/preferences,<sup>22</sup> and the availability of family planning services can influence adolescents' attitudes and desires toward family planning programs.<sup>23</sup>

Research on technology-based interventions to reduce the unmet need for contraception shows mixed results. On the one hand, interventions via mobile app instant messaging in Tajikistan did not show additional benefits in increasing the acceptance of effective contraception among adolescents.<sup>8</sup> This suggests that technology-based interventions may not always be effective in increasing contraceptive use and that further investigation is needed to examine the factors that influence their effectiveness. On the other hand, research in Bolivia shows that technology-based interventions can help increase contraception use. This intervention uses a mobile application to provide information and education about contraception to women and has been shown to increase the use of modern contraception.<sup>12</sup> Furthermore, research in Mozambique shows that SMS reminder messages can potentially increase the likelihood that women receive family planning services.<sup>19</sup>

Mobile applications have great potential to improve the access and quality of family planning services. This is because mobile applications for family planning programs can be applied to provide information and education on reproductive health and contraception,<sup>24</sup> reminders to take contraceptive pills or contraceptive injections,<sup>25</sup> consultation with health workers by chat or video call, ordering and purchasing contraception online.<sup>26</sup>

The use of mobile phones and smartphones in lower-middle-income countries is increasing rapidly and has the potential to be an effective tool for delivering programs aimed at improving family planning outcomes. However, a systematic review of the literature shows that there is not enough evidence to conclude whether technology-based interventions can increase contraceptive use.<sup>24</sup>

The integration of technology-based interventions with community and health worker-based approaches presents a promising avenue for enhancing the effectiveness of each model. By combining the rapid dissemination and personalization capabilities of mobile technologies with the trust and local knowledge provided by community health workers, interventions can be both broadly reached and deeply impactful. For example, community health workers can use mobile tools to track and manage patient information, deliver targeted health education, and support adherence to contraceptive methods through reminders and follow-ups sent via mobile apps. This combined approach leverages the unique strengths of each intervention model and can be tailored to meet the diverse needs of different communities.

Intervention through healthcare workers has an important role in increasing contraceptive use and reducing the unmet need for contraception. Research in Nepal shows that training healthcare workers can improve their knowledge and ability to provide postnatal contraceptive counseling.<sup>10</sup> This shows that appropriate training can help health workers provide quality contraceptive services. Other research in Nepal suggests that postpartum counseling and IUD insertion can

increase demand and help women manage the spacing between pregnancies.<sup>13</sup> This suggests that interventions that focus on long-term contraceptive methods can help reduce the unmet need for contraception. In Indonesia, structured counseling has been proven to be able to increase knowledge, attitudes, and use of modern contraception among couples of childbearing age.<sup>17</sup> This shows that effective counseling can help women and men choose and use appropriate contraception. In Jordan, the client-centered family planning service intervention: "Consult and Choose" (CC) was shown to be effective in increasing contraceptive choice and use.<sup>16</sup> This intervention shows that by providing complete information and choices, adolescents can choose the contraception that best suits their needs.

Research shows that there is a significant relationship between the role of health workers in providing contraceptive counseling and the use of contraceptives, but the correlation is low.<sup>27</sup> Low closeness can be caused by several obstacles in providing contraceptive counseling faced by health workers, namely, public understanding of contraceptive services is limited to the act of providing or installing contraception, low level of education, age factor in demographic data (>35 years).<sup>27</sup> Community-based interventions have been proven to be effective in increasing contraceptive use and reducing the unmet need for contraception. Community-based intervention is an approach to solving problems or achieving goals that involve the active participation of community members. These interventions are designed and implemented taking into account local needs and culture. Various studies show that these interventions can help change norms and behavior regarding contraception, as well as increase access to and knowledge about contraception. In Uganda, an intervention that included group discussions of couples was shown to increase contraceptive use and reduce the desire to have children.<sup>9</sup> This suggests that community-based interventions can help couples discuss and decide on contraceptive use openly and clearly. In Benin, the Tékponon

Jikuagou (TJ) program uses a social network approach to encourage social and behavioral change regarding contraception.<sup>11</sup> This program has proven effective in increasing discussion about contraception and encouraging the use of modern contraception. In Bangladesh, the Married Adolescent Girls Club (MAG Club) has been proven effective in providing information on contraception, improving contraceptive practices, and reducing the unmet need for contraception among adolescent girls.<sup>15</sup> Other research in Bangladesh shows that participatory women's groups can potentially increase women's health knowledge, including knowledge about contraception.<sup>18</sup> However, more research is needed to examine the effectiveness of this group in meeting the unmet need for contraception and other health aspects.

In general, community-based interventions are an effective strategy to reduce the unmet need for contraception. These interventions can help change norms and behavior regarding contraception, as well as increase access and knowledge about contraception. Community health professionals play an important role in increasing access to family planning services and increasing contraceptive use in the community.<sup>28</sup>

Based on the results of this review, community- and health worker-based interventions can increase knowledge and use of contraception, even in resource-limited environments such as low- and middle-income countries. Myths, culture, local wisdom, and intrapersonal factors significantly influence health service utilization patterns.<sup>29</sup> Successful efforts to reduce the unmet need for family planning are complex because they must simultaneously address the interplay between the local sociocultural context, individual beliefs, aspirations, and preferences, and the environment of contraceptive provision at the national and local levels.<sup>20</sup> In addition, community-based interventions contribute to empirical evidence on the sustainable impact of community-based

interventions on increasing the use of family planning among married adolescent girls in low and middle-income countries.<sup>30</sup>

Based on the experience of each country in efforts to reduce the unmet need for contraception, there are several advantages of community-based interventions, namely: i) easier access, ii) a more personal approach, iii) stronger social support, and iv) higher sustainability.

Community-based interventions can reach groups that are difficult to reach, such as married teenagers in rural or remote areas, and these interventions are carried out in places that are easily accessible to the community, such as posyandu, village halls, or places of worship.

These interventions involve community members in the planning and implementation process so that it is more appropriate for local needs and culture, and this intervention allows more personal interaction and communication between service providers and service recipients.

These interventions help build social support networks among community members, which can help women use contraception. Support from family, friends, and neighbors can help women overcome barriers to using contraception.

These interventions involve active participation in the community and build the capacity of the community to provide family planning services independently.

Community-based interventions have been proven to be effective in increasing contraceptive use and reducing the unmet need for contraception. These interventions are designed and implemented taking into account local needs and culture. The potential for integrating technology with community and health worker efforts could further enhance these interventions by providing scalable solutions that are sensitive to local contexts and highly effective at reaching and engaging target populations.

## Conclusions

All three types of intervention—technology-based, community-based, and health worker-based—have shown potential to reduce the unmet need for contraception. The effectiveness of these interventions can vary significantly depending on the context and other factors. While technology-based interventions have shown mixed results, community, and health worker-based interventions have been consistently effective in increasing contraceptive use and reducing the unmet need for contraception. These interventions facilitate changes in norms and behavior related to contraception and enhance access to and knowledge about contraceptive options.

To maximize the impact of these interventions, the importance of multidisciplinary collaboration cannot be overstated. Engaging a diverse range of professionals—including educators, healthcare providers, technologists, and community leaders—ensures that interventions are not only well-rounded but also tailored to meet the unique needs of different communities. This research produces evidence that can serve as a guide to select and implement appropriate interventions across various settings, such as schools, health facilities, and communities. Such collaborative efforts are crucial for developing comprehensive strategies that address the multifaceted challenges of improving contraceptive use effectively.

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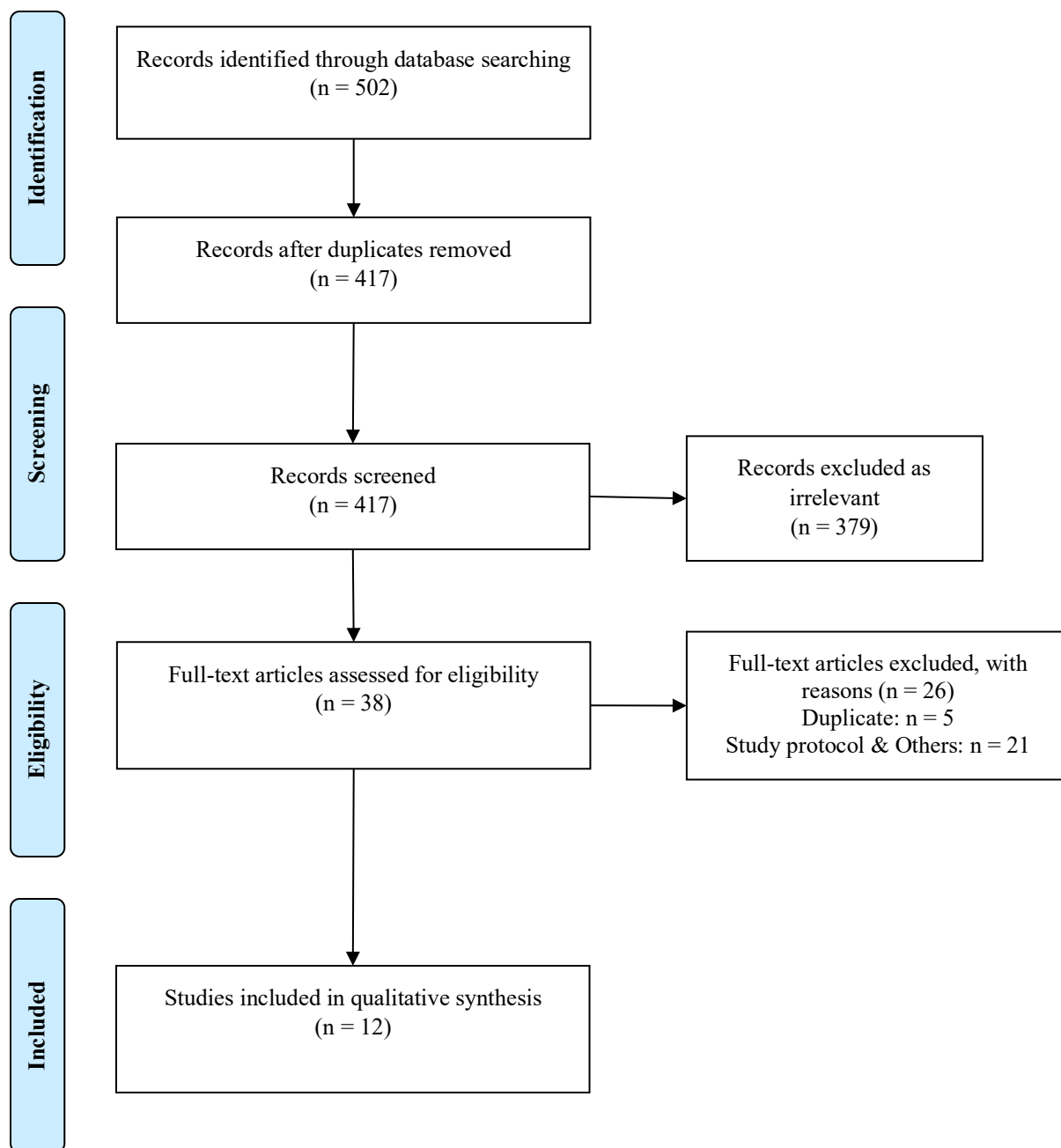
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### **Online Supplementary Materials**

**Table 1.** Characteristics of the included studies.

**Table 2.** Intervention group, type of intervention and main research findings.



**Figure 1.** PRISMA flow diagram.

		Risk of bias domains					
		D1	D2	D3	D4	D5	Overall
Study	O. McCarthy et al., 2018						
	Sileo et al., 2023						
	Thapa et al., 2020						
	Kim et al., 2022						
	O. L. McCarthy et al., 2020						
	Pradhan et al., 2019						
	Huber-Krum et al., 2020						
	Huda et al., 2019						
	Kamhawi et al., 2013						
	Simanjuntak et al., 2016						
	Harris-Fry et al., 2016						
	Leight et al., 2022						

Domains:  
D1: Bias arising from the randomization process.  
D2: Bias due to deviations from intended intervention.  
D3: Bias due to missing outcome data.  
D4: Bias in measurement of the outcome.  
D5: Bias in selection of the reported result.

Judgement  
 High  
 Some concerns  
 Low

**Figure 2.** Traffic light risk of bias plot of ROB2 assessments created using robvis and the color-blind palette.

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