



HEALTH BELIEF MODEL–BASED HEALTH EDUCATION AND MATERNAL HEALTH BEHAVIORS DURING PREGNANCY: A LITERATURE REVIEW

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ABSTRACT

Maternal health behaviors are a critical determinant of successful maternal healthcare outcomes; however, adherence to recommended health behaviors during pregnancy remains a significant challenge. Health education based on the Health Belief Model (HBM) has been recognized as an effective approach for modifying health behaviors by addressing individual perceptions and motivational factors. This literature review aimed to synthesize empirical evidence on the effectiveness of Health Belief Model–based health education in improving maternal health behaviors during pregnancy. This study employed a systematic literature review in accordance with the PRISMA 2020 guidelines. Articles were retrieved from PubMed, ScienceDirect, Google Scholar, and national journal databases, covering publications from 2020 to 2025. A comprehensive literature search was conducted using predefined keywords, including Health Belief Model, Health Behaviors During Pregnancy, Health Education, and Pregnant Women. A total of 312 articles were identified, of which 72 duplicates were removed. The remaining 240 articles were screened based on titles and abstracts, resulting in the exclusion of 205 articles. Subsequently, 35 full-text articles were assessed for eligibility. Based on predefined inclusion and exclusion criteria, 10 open-access studies involving pregnant women, applying the Health Belief Model, and reporting maternal health behavior outcomes were included in the qualitative synthesis. Health Belief Model–based health education was found to significantly improve maternal health behaviors, including adherence to antenatal care (ANC) visits, nutritional practices, compliance with iron–folic acid supplementation, physical activity, and disease prevention behaviors. Health education grounded in the Health Belief Model is an effective and relevant approach for enhancing maternal health behaviors during pregnancy and warrants integration into evidence-based maternal healthcare services.

Keywords: health behaviors during pregnancy; health belief model; health education; pregnant women

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INTRODUCTION

Maternal health remains a global public health priority due to persistently high levels of maternal morbidity and mortality, most of which are largely preventable (Melati et al., 2024). During pregnancy, maternal health behaviors such as adherence to antenatal care (ANC) visits, adequate nutritional practices, compliance with iron–folic acid supplementation, appropriate physical activity, and disease prevention behaviors play a critical role in determining maternal and neonatal health outcomes (Nisa & Rahmanindar, 2023). Although maternal health services are widely available in many settings, their utilization and adherence remain suboptimal, indicating that service availability alone is insufficient to promote meaningful and sustained behavioral change among pregnant women (Khodaveisi et al., 2021).

Health education is one of the primary strategies for improving health behaviors during pregnancy (Şenol et al., 2024). However, conventional health education approaches often emphasize one-way information delivery and inadequately address the cognitive, perceptual, and motivational factors that influence individual health-related decision-making. As a result, such interventions do not consistently lead to sustained behavioral change (Tungaraza & Joho, 2022).

The Health Belief Model (HBM) is one of the most widely applied behavioral theories for explaining and predicting health behaviors. The model posits that individual behavior is shaped by perceptions of susceptibility to and severity of a health condition, perceived benefits and barriers to taking action, cues to action, and self-efficacy (Fitri & Yendri, 2022).

In recent years, a growing body of research has applied HBM-based health education to improve various maternal health behaviors during pregnancy, including ANC utilization, nutritional practices, supplement adherence, physical activity, and disease prevention. Most studies report improvements in knowledge, attitudes, and health behaviors following HBM-based interventions (Sary et al., 2025). Nevertheless, the available evidence remains fragmented, characterized by heterogeneity in study designs, types of interventions, targeted behaviors, and socio-cultural contexts. Moreover, many studies focus on a single health behavior, limiting a comprehensive understanding of the overall effectiveness of HBM-based health education throughout pregnancy (Wahyu et al., 2022).

To date, literature that specifically synthesizes and critically examines the scientific evidence on the effectiveness of Health Belief Model–based health education across multiple maternal health behaviors during pregnancy remains limited. Therefore, this literature review aims to synthesize and critically analyze existing research findings on the application of Health Belief Model–based health education in influencing maternal health behaviors during pregnancy.

METHOD

This study employed a systematic literature review aimed at synthesizing empirical evidence on the effectiveness of Health Belief Model (HBM)–based health education in improving maternal health behaviors during pregnancy. The literature search and selection process was conducted in accordance with the PRISMA 2020 guidelines. A systematic search was performed across multiple scientific databases, including PubMed, ScienceDirect, Google Scholar, and national journal databases, using keywords related to the “Health Belief Model”, “Health Behaviors During Pregnancy”, “Health Education”, “Pregnant Women”.

During the identification phase, a total of 312 articles were retrieved. After removing 72 duplicate records, 240 articles remained for title and abstract screening. At the screening stage, 205 articles were excluded because they did not involve pregnant women as the target population, did not apply the Health Belief Model, or did not report outcomes related to maternal health behaviors during pregnancy. Subsequently, 35 articles underwent full-text assessment for eligibility. Of these, 25 articles were excluded for not meeting the inclusion criteria, including lack of open-access availability, publication outside the 2020–2025 period, use of irrelevant study designs, or failure to report outcomes related to maternal health behaviors. Ultimately, 10 articles met all inclusion criteria and were included in the qualitative synthesis of this literature review.

The included studies met the following inclusion criteria: (1) involved pregnant women as the primary study population; (2) implemented Health Belief Model–based health education, either directly or indirectly; and (3) employed standard health education, routine care, or non-HBM approaches as comparators. The outcomes assessed encompassed changes in maternal health behaviors during pregnancy, particularly adherence to antenatal care (ANC) visits, nutritional behaviors, compliance with iron supplementation, physical activity, and disease prevention behaviors. Studies with experimental, quasi-experimental, pretest–posttest, analytic cross-sectional, and qualitative designs were included, with publication years ranging from 2020 to 2025. Only full-text, open-access articles published in English or Indonesian were considered eligible for analysis.

Conversely, articles were excluded if they involved populations other than pregnant women, did not utilize the Health Belief Model as the theoretical framework for intervention or analysis, or failed to

report outcomes related to maternal health behaviors. Publications in the form of editorials, commentaries, letters to the editor, non-peer-reviewed proceedings, theses, dissertations, or conference abstracts without full-text availability were excluded. In addition, articles that were not open access, were published outside the specified time frame, demonstrated low methodological quality, or represented duplicate publications from the same dataset were also excluded from the review.

Figure 1. PRISMA 2020 Flow Diagram

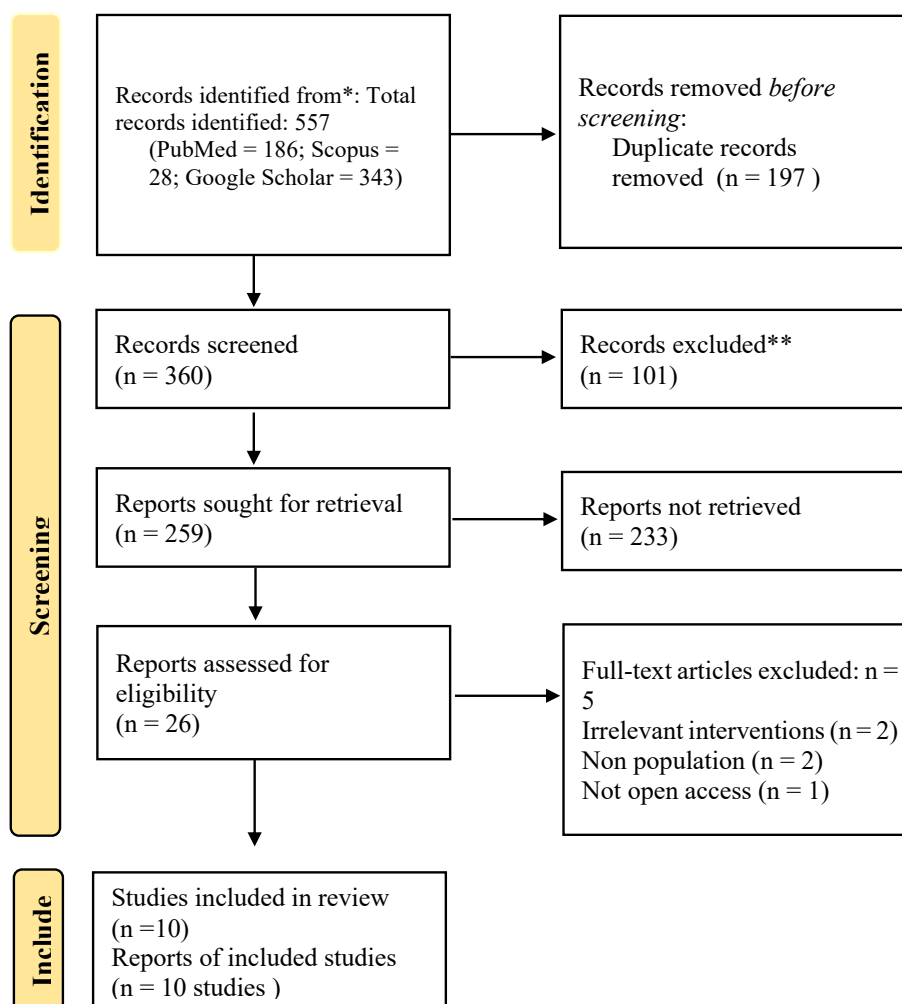


Table 1.
PICO Framework

Component	Description
P (Population)	Pregnant women across all trimesters of pregnancy
I (Intervention)	Health education based on the Health Belief Model (HBM), delivered through face-to-face education, individual or group counseling, audiovisual media, educational modules, and/or community-based approaches
C (Comparison)	Standard health education, routine antenatal care, or no Health Belief Model-based intervention
O (Outcome)	Maternal health behaviors, including adherence to antenatal care (ANC) visits, nutritional behaviors, compliance with iron-folic acid supplementation, physical activity during pregnancy, and disease prevention behaviors

Table 2.
Study Quality Assessment Based on JBI Criteria

No.	Author (Year)	Study Design	JBI Checklist	JBI Score (Items Met/Total)	Percentage	Quality Category
1	Riazi et al. (2024)	Semi-experimental	Quasi-Experimental (9 items)	8/9	88.9%	High
2	Reshid & Anato (2024)	Quasi-experimental	Quasi-Experimental (9 items)	8/9	88.9%	High
3	Shakerinejad et al. (2023)	Quasi-experimental	Quasi-Experimental (9 items)	8/9	88.9%	High
4	Feriani et al. (2025)	Quasi-experimental	Quasi-Experimental (9 items)	6/9	66.7%	Moderate
5	Khani Jeihooni et al. (2024)	Pre-post quasi-experimental	Quasi-Experimental (9 items)	8/9	88.9%	High
6	Pamungkasari & Murti (2020)	Cross-sectional	Analytical Cross-Sectional (8 items)	6/8	75.0%	Moderate
7	Rosdiana et al. (2025)	Scoping review	Systematic Review (11 items)	7/11	63.6%	Moderate
8	Nyando et al. (2023)	Qualitative	Qualitative Research (10 items)	8/10	80.0%	High
9	Pormehr-Yabandeh et al. (2025)	Cross-sectional	Analytical Cross-Sectional (8 items)	6/8	75.0%	Moderate
10	Hidayati et al. (2025)	Descriptive	Descriptive Studies (8 items)	4/8	50.0%	Low-Moderate

Methodological quality assessment was conducted using the Joanna Briggs Institute (JBI) critical appraisal tools, tailored to the design of each included study. The assessment results indicated that most articles demonstrated moderate to high methodological quality, with scores ranging from 50% to 89%. Studies employing quasi-experimental and qualitative designs generally exhibited stronger methodological rigor compared to descriptive and cross-sectional studies. No studies were excluded based on quality appraisal; however, identified methodological limitations were carefully considered in the interpretation of the synthesized findings.

RESULT

Table 3.
Summary of Included Studies

No	Study Title	Author (Year)	Objective	Method	Sample Size	Main Findings	Country	Limitations	Outcomes
1	The effect of nutrition education based on the Health Belief Model (HBM) on food intake in pregnant Afghan immigrant women: A semi-experimental study	Riazi et al. (2024)	To determine the effect of HBM-based education on nutritional intake among pregnant women	Semi-experimental	116	HBM-based education improved dietary intake and healthy eating behaviors	Afghanistan	Did not specifically focus on ANC; primarily nutrition-related	HBM-based education positively influenced healthy dietary behaviors
2	Effectiveness of community-based nutrition education and counselling provided during pregnancy: Effects on knowledge and attitude towards iron-folic acid supplementation	Reshid & Anato (2024)	To assess the effect of HBM-based nutrition education on IFAS knowledge and adherence	Quasi-experimental	198	HBM-based education significantly improved knowledge and compliance with IFAS	Ethiopia	Outcome not directly related to ANC visits	IFAS adherence was significantly higher (p < 0.001)

No	Study Title	Author (Year)	Objective	Method	Sample Size	Main Findings	Country	Limitations	Outcomes
3	Investigating the effect of multimedia education based on the Health Belief Model in preventing COVID-19 in pregnant women	Shakeri nejad et al. (2023))	To examine the effect of HBM-based education on COVID-19 preventive behaviors	Quasi-experimental	120	HBM-based education enhanced preventive health behaviors	Iran	Focused on COVID-19 prevention rather than ANC	HBM-based education significantly modified protective behaviors
4	Effectiveness of the Health Belief Model-based husband empowerment module in enhancing postpartum contraceptive support readiness: A quasi-experimental study	Feriani et al. (2025)	To evaluate the effect of an HBM-based module on husbands' readiness to support postpartum contraception	Quasi-experimental	60	HBM-based module improved husbands' readiness to provide support	Indonesia	Focused on husbands; antenatal behaviors were indirect	Significant improvement in dimensions of husband support readiness
5	Effectiveness of educational intervention in improving physical activity and nutritional performance among pregnant women: A pre-post quasi-experimental study using the Health Belief Model	Khani Jaihooni et al. (2024)	To evaluate the effectiveness of HBM-based education on physical activity and nutrition	Pre-post quasi-experimental	200	HBM-based education improved physical activity levels and nutritional behaviors	Iran	Intervention not part of routine ANC	HBM-based education effectively enhanced lifestyle behaviors
6	Factors affecting the use of antenatal care in Semarang, Central Java: Application of the Health Belief Model	Pamungkasari & Murti (2020)	To examine HBM-related factors associated with ANC utilization	Cross-sectional	250	Perceived benefits and barriers were associated with ANC utilization	Indonesia	Cross-sectional design limited causal inference	HBM components influenced ANC attendance behavior
7	Health Belief Model in pregnant women in the free nutritional meal program: A review	Rosdiana et al. (2025)	To review the application of HBM in nutritional interventions for pregnant women	Scoping review	12 studies	HBM influenced nutritional behavior interventions	Indonesia	Review study; not primary ANC-focused	HBM effectively predicted behavioral components
8	Perceptions of pregnant women on antenatal care visits during their first trimester at Area 25 Health Center in Lilongwe, Malawi: A qualitative study	Nyando et al. (2023)	To explore pregnant women's perceptions of pregnancy and ANC using the HBM framework	Qualitative	55	HBM-related perceptions influenced decisions to attend ANC	Malawi	No intervention; behavior exploration only	HBM perceptions affected early ANC attendance
9	Application of the Health Belief Model to explain preconception care among women with sickle cell disease: A cross-sectional study	Pormehrih et al. (2025)	To apply HBM to explain preconception care behaviors	Cross-sectional	413	HBM constructs predicted adoption of preconception care	Iran	Not specific to ANC; pregnancy-related behaviors	HBM components were associated with health behaviors
10	Health Belief Model approach to understand pregnant women's perceptions of HIV/AIDS prevention in the Jekan Raya Community Health Center working area, Palangkaraya City	Hidayati et al. (2025)	To describe perceptions of HIV/AIDS prevention during pregnancy using HBM	Descriptive	30	HBM explained perceptions related to HIV/AIDS prevention	Indonesia	Outcome not related to ANC attendance	HBM perceptions influenced HIV/AIDS prevention behaviors

DISCUSSION

Key Findings

The synthesis of ten included studies indicates that Health Belief Model (HBM)–based health education consistently contributes to improvements in maternal health behaviors during pregnancy, both directly and indirectly. Intervention studies demonstrated that the application of HBM was effective in enhancing nutritional behaviors, adherence to supplementation, physical activity, and disease prevention behaviors among pregnant women (Riazi et al., 2024; Reshid & Anato, 2024; Khani Jeihooni et al., 2024; Shakerinejad et al., 2023). In addition, observational and qualitative studies highlighted that key HBM constructs particularly perceived benefits, perceived barriers, and self-efficacy play a critical role in influencing pregnant women’s decisions to utilize antenatal care (ANC) services and engage in other health-promoting behaviors (Pamungkasari & Murti, 2020; Nyando et al., 2023). These findings reinforce the relevance of HBM as an applicable and robust theoretical framework for maternal health education across diverse sociocultural contexts.

Positive Effects of HBM-Based Interventions

Overall, HBM-based interventions demonstrated significant positive effects on improving maternal health behaviors. HBM-oriented education was shown to enhance nutritional intake and dietary quality among pregnant women (Riazi et al., 2024), increase knowledge and adherence to iron–folic acid supplementation (Reshid & Anato, 2024), and improve physical activity levels and healthy lifestyle behaviors during pregnancy (Khani Jeihooni et al., 2024). Moreover, HBM-based approaches were effective in strengthening disease prevention behaviors, including COVID-19 and HIV/AIDS prevention, by increasing perceived susceptibility and perceived benefits of preventive actions (Shakerinejad et al., 2023; Hidayati et al., 2025). These positive outcomes suggest that theory-driven health education is more effective in addressing cognitive and motivational determinants of behavior compared with conventional information-based approaches.

Limitations of the Available Evidence

Despite predominantly positive findings, several limitations warrant careful consideration. First, most studies employed quasi-experimental or cross-sectional designs, which limit the ability to draw strong causal inferences (Pamungkasari & Murti, 2020; Pormehr-Yabandeh et al., 2025). Second, ANC attendance was not consistently treated as a primary outcome, with many studies focusing instead on related behaviors such as nutrition, supplementation, or disease prevention (Riazi et al., 2024; Shakerinejad et al., 2023; Khani Jeihooni et al., 2024). Third, several studies were characterized by relatively small sample sizes and context-specific settings, potentially limiting the generalizability of findings (Feriani et al., 2025; Hidayati et al., 2025). Furthermore, qualitative and descriptive studies provided valuable contextual insights but did not quantitatively assess intervention effectiveness (Nyando et al., 2023).

Contribution to Knowledge Development

This literature review demonstrates that the Health Belief Model is a consistent and flexible theoretical framework for explaining and modifying maternal health behaviors during pregnancy. A key contribution of the reviewed studies is the reinforcement of evidence that behavioral change in maternal health is influenced not only by service availability but also by individual perceptions of risk, benefits, and barriers (Pamungkasari & Murti, 2020; Nyando et al., 2023). In addition, the integration of HBM into diverse intervention modalities ranging from community-based education and multimedia approaches to family empowerment highlights the adaptability of the model across different cultural and health system contexts (Reshid & Anato, 2024; Shakerinejad et al., 2023; Feriani et al., 2025). Collectively, these findings position HBM as a valuable framework that bridges cognitive, social, and behavioral dimensions of maternal health.

Practical Implications

The findings of this review have important practical implications for healthcare providers and policymakers. Maternal health education programs should be grounded in behavioral theory, particularly the Health Belief Model, to enhance their effectiveness in promoting sustained health behaviors. Interventions targeting the reduction of perceived barriers, enhancement of perceived benefits, and strengthening of self-efficacy may be effectively integrated into routine ANC services (Riazi et al., 2024; Reshid & Anato, 2024). Furthermore, involving family members especially husbands in HBM-based educational interventions may strengthen social support and positively influence maternal health behaviors (Feriani et al., 2025). Such approaches are particularly relevant for implementation in primary healthcare and community settings, especially in low- and middle-income countries.

Research Gaps and Future Directions

Despite promising evidence, several research gaps remain. First, randomized controlled trials (RCTs) specifically evaluating the impact of HBM-based interventions on ANC attendance are still scarce. Second, few studies have examined the long-term sustainability of behavior change following the completion of HBM-based interventions (Khani Jeihooni et al., 2024; Reshid & Anato, 2024). Third, the mediating role of individual HBM constructs in driving maternal health behavior change has not been sufficiently explored through comparative and analytical approaches (Pamungkasari & Murti, 2020; Nyando et al., 2023). Future research should therefore prioritize longitudinal and experimental designs with ANC adherence as a primary outcome to strengthen the evidence base on the effectiveness of Health Belief Model-based health education during pregnancy.

CONCLUSION

Based on the synthesis of the ten reviewed articles, it can be concluded that Health Belief Model (HBM)-based health education is effective in improving a range of maternal health behaviors during pregnancy, including nutritional practices, adherence to supplementation, physical activity, disease prevention behaviors, and decision-making related to maternal health service utilization. Core HBM constructs such as perceived benefits, perceived barriers, perceived susceptibility, and self-efficacy were consistently shown to play a pivotal role in shaping and modifying health behaviors throughout pregnancy. Although the majority of evidence indicates positive effects, methodological limitations and heterogeneity in assessed outcomes highlight the need for further research employing more robust experimental designs, particularly with a specific focus on antenatal care (ANC) adherence. Overall, the Health Belief Model represents a relevant and practical theoretical framework for the development of evidence-based maternal health education interventions.

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