THE EFFECT OF HEALTH BELIEF MODEL BASED INTERVENTIONS ON THE PREVENTION OF PREGNANCY ANEMIA: SYSTEMATIC LITERATURE REVIEW

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Abstract

Anemia during pregnancy remains a serious public health problem with significant adverse effects on both maternal and neonatal outcomes. Health Belief Model (HBM)–based interventions have the potential to improve anemia prevention behaviors by enhancing pregnant women's knowledge, attitudes, perceptions, and adherence to preventive measures. Objective this systematic review aimed to analyze the effects of HBM-based interventions on anemia prevention among pregnant women. Methods a comprehensive literature search was conducted in PubMed, Scopus, ScienceDirect, ProQuest, and Google Scholar using English and Indonesian keywords based on the PICOT framework. Original studies published between 2015 and 2025 that evaluated HBM-based interventions for anemia prevention in pregnant women were included. The study selection process followed the PRISMA guidelines. Results ten studies were reviewed, consistently demonstrating that HBM-based interventions effectively improved maternal health outcomes. Significant increases in hemoglobin and hematocrit levels were observed, along with a reduction in anemia prevalence. Adherence to iron and folic acid supplementation (IFA/IFAS) increased by two to four times compared with control groups. Improvements were also found in knowledge, positive attitudes, perceived severity of anemia, and preventive behaviors, including increased iron and vitamin C intake and reduced tannin consumption. Interventions were delivered through intensive midwife-led counseling, illustrated modules, brochures, reminder SMS, messaging applications (MyPinkMom), and multicomponent nutrition education packages. Conclusion HBM-based interventions are effective in improving hemoglobin levels, IFAS adherence, and anemia prevention behaviors among pregnant women. Integrating HBM-based education into antenatal care services, through both face-to-face counseling and digital media, is strongly recommended to reduce the prevalence of pregnancy-related anemia..

*Keywords***:** *Health Belief Model, Prevention, Pregnancy Anemia, Systematic Literature Review*

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BACKGROUND

Anemia is a condition in which the number of red blood cells or the concentration of hemoglobin is lower than normal. It remains a serious global public health problem, particularly among children, adolescents, postpartum women, and pregnant women (WHO, 2025). Globally, approximately 37% of pregnant women are affected by anemia, with higher prevalence observed in regions of Asia and Africa (WHO, 2020). In Indonesia, the 2023 National Health Survey reported a decline in the prevalence of anemia among pregnant women to 27.7% (BKPK Kemenkes, 2023).

Efforts to reduce the incidence of anemia primarily focus on effective preventive strategies, including regular consumption of iron supplementation, maintaining a balanced and nutritious diet, engaging in light physical activity, and attending routine antenatal care visits. To address anemia among pregnant women, the Indonesian Ministry of Health has recently introduced a national program known as the Multiple Micronutrient Supplement (MMS). This program aims to reduce maternal mortality by preventing anemia and lowering the risks of preterm birth, low birth weight, and stunting (Kemenkes, 2024). The program is implemented through the provision of multivitamin supplements containing a broader range of micronutrients than conventional iron tablets. These supplements include 13 essential nutrients, such as iron, folic acid, vitamins, and minerals, designed to meet the nutritional needs of pregnant women (Romaña et al., 2023).

Despite the nationwide implementation of iron and folic acid supplementation programs, adherence rates and overall effectiveness remain suboptimal. This situation is influenced by several factors, including limited knowledge, low awareness, and health information delivery methods that are insufficiently engaging or easy to understand. Many pregnant women perceive anemia as a normal condition during pregnancy and therefore tend to underestimate its seriousness (Salma et al., 2024). Insufficient awareness and understanding regarding the importance of anemia prevention often lead to poor preventive behaviors, such as non-adherence to iron supplementation, inadequate nutritional intake, and irregular antenatal care visits (Erryca et al., 2022).

Health education plays a crucial role in reshaping pregnant women's perceptions and behaviors related to anemia prevention. Educational interventions help pregnant women understand the causes of anemia, including deficiencies in iron, folic acid, or vitamin B12, as well as its potential consequences for maternal and fetal health (Kemenkes RI, 2023; Widyantari, 2023). Moreover, education contributes to positive changes in attitudes and perceptions toward anemia. When pregnant women are adequately informed about the risks of anemia and effective preventive strategies, they are more likely to adopt health-promoting behaviors to avoid pregnancy-related complications, ultimately leading to a reduction in anemia prevalence among pregnant women (Abas et al., 2021).

Health education interventions grounded in theoretical models tend to be more effective than conventional approaches, as they provide a structured and comprehensive framework for understanding health behaviors and facilitating positive behavioral change (Stauffer et al., 2025). Health Belief Model (HBM) is one of the widely applied theoretical frameworks used to understand and modify individual health behaviors. This model emphasizes that health-related behaviors are strongly influenced by individuals' perceptions of disease severity and susceptibility, as well as their beliefs regarding the benefits of preventive actions (Alyafei & Easton-Carr, 2024).

Pregnant women who perceive themselves to be at a high risk of developing anemia (*perceived susceptibility*) and who understand the serious consequences of anemia for pregnancy and fetal outcomes (*perceived severity*) tend to have stronger motivation to engage in preventive behaviors. In contrast, perceptions of barriers (*perceived barriers*), such as concerns about side effects of iron supplementation or limited access to adequate information, may reduce the likelihood of taking action, even in the presence of external triggers or reminders (*cues to action*) (Choudhury et al., 2023). A study by Hassan *et al.* (2020) which examined the effects of a Health Belief Model– based intervention on improving hemoglobin levels among pregnant women with anemia, demonstrated that iron intake significantly increased in the intervention group following HBM-based educational sessions. Similarly, research conducted by Riazi *et al.* (2024) found that nutrition education grounded in the Health Belief Model effectively improved maternal nutrient intakeduring pregnancy. Consistent with these findings,, Irawati, Madinah dan Wayanti (2024) reported that key Health Belief Model components such as *perceived susceptibility, perceivedseverity, perceived benefits,* and *self-efficacy* significantly enhanced pregnant women's capacity to prevent anemia.

Although these studies provide valuable evidence, they employ diverse research designs and methodological approaches, highlighting the need for a more comprehensive synthesis of findings. Therefore, this study was conducted as a Systematic Literature Review (SLR) to comprehensively assess the effects of Health Belief Model–based interventions on anemia prevention.

METHODS

This study employed a Systematic Literature Review (SLR) design and followed the Preferred

Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline (Haddaway et al., 2022). The objective of this SLR was to identify, critically appraise, and synthesize empirical evidence regarding the effects of Health Belief Model (HBM)-based interventions on anemia prevention among pregnant women.

The research question in this systematic literature review was formulated using the PICOT framework. The population (Population) of interest consisted of pregnant women. The intervention (Intervention) examined included health education or health promotion strategies based on the Health Belief Model. The comparison (Comparison) comprised standard care, conventional education, or no intervention. The outcomes (Outcome) assessed focused on the prevention of anemia during pregnancy, measured through several indicators, including hemoglobin levels, anemia prevalence, adherence to iron and folic acid supplementation, as well as changes in knowledge, attitudes, perceptions, and anemia prevention behaviors. The time frame (Time) for this review was limited to studies published between 2020 and 2025.

A systematic literature search was conducted across several electronic databases, including PubMed, ProQuest, and Google Scholar. The search strategy employed conventional Boolean operators "AND" and "OR" in combination with keywords relevant to the research topic and title, namely "health belief model," "HBM," "pregnancy anemia," "maternal anemia," and "anemia prevention".

Articles included in this systematic literature review were original research studies that examined

Health Belief Model (HBM)-based interventions among pregnant women with the aim of preventing or reducing the incidence of anemia. Eligible studies comprised randomized controlled trials, quasi-experimental studies, and observational designs with a clearly defined intervention component grounded in HBM constructs. Only articles published between 2020 and 2025 and written in either Indonesian or English were included. In addition, studies were required to report relevant outcomes, such as hemoglobin levels, anemia prevalence, adherence to iron and folic acid supplementation (IFAS), as well as changes in knowledge, attitudes, or perceptions related to anemia prevention among pregnant women.

RESULT AND DISCUSSION

The results of the literature search conducted across multiple databases yielded a number of articles that were subsequently screened based on the predefined inclusion criteria. Following the stages of identification, screening, and eligibility assessment, a total of 10 articles met the inclusion criteria and were included for further analysis. The selected studies comprised six randomized controlled trials, three quasi-experimental studies, and one observational study with an intervention design. All included studies were published between 2020-2025, with research settings located in Ethiopia, Malaysia, and Indonesia.
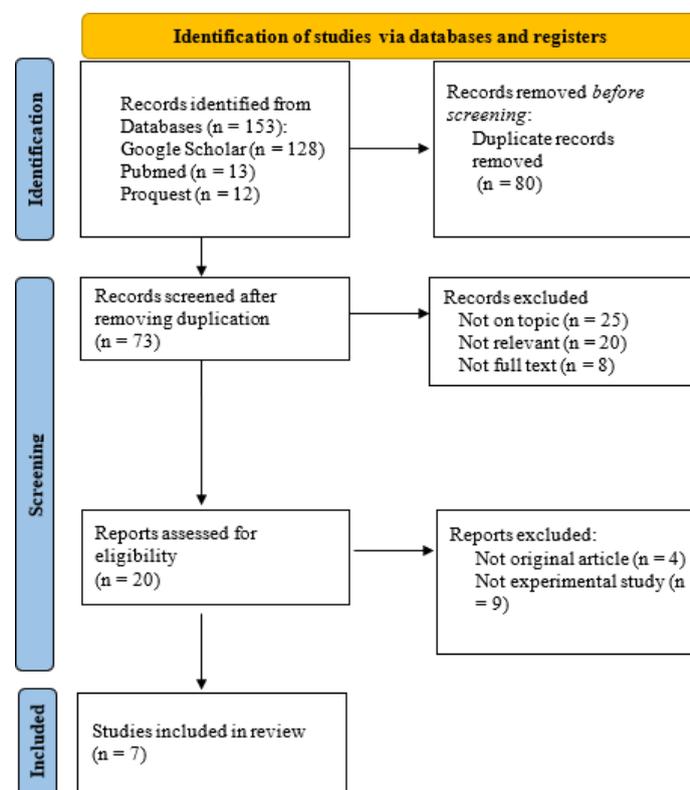
Table 1. The results of studies that meet the criteria for this systematic review are as follows

No	Title, Author	Method	Intervention	Result
1	Effect of nutrition education and iron- folic acid supplementation on anemia among pregnant women in Ethiopia: a quasi- experimental study Anchamo Anato dan Mensur Reshid (2025)	Design: Quasy Experiment Sample: 97 respondents intervention group 96 respondents in the control group	Nutrition education was delivered using video-based materials and image-based activities conducted regularly once every two weeks over a three-month period (six sessions), with each session lasting 30 to 45 minutes. The sessions were supported by daily schedules and counseling cards. Educational content was developed based on the core constructs of the Health Belief Model, including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.	The study results demonstrated that community-based nutrition education combined with iron and folic acid supplementation (IFAS) significantly reduced the prevalence of anemia among pregnant women. In addition, the intervention significantly improved maternal knowledge regarding the importance of IFAS and increased adherence to IFAS consumption compared with the control group (p < 0.001).
2	Effect of nutrition education integrating the health belief model and theory of planned behavior on dietary diversity of pregnant women in Southeast Ethiopia: a cluster randomized controlled trial Girma Beressa, Susan J Whiting dan Tefera Belachew (2024)	Design: Randomized Controlled Trial Sample: 224 respondents intervention group 223 respondent control group	Nutrition education was delivered in six sessions over a six-month period, with each session lasting 30-45 minutes. The education was accompanied by counseling cards and several key messages developed based on the constructs of the Health Belief Model (HBM). Counseling was provided through a combination of presentations, discussions, video-based demonstrations, and image-based activities. Adherence was assessed using direct observation, self-reports, and attendance records.	The study findings indicated that, following the intervention, women with higher levels of literacy and those from higher socioeconomic groups were significantly more likely to adopt more diverse dietary consumption patterns. These results highlight the influence of educational and socioeconomic factors on nutritional behaviors during pregnancy. Therefore, strengthening nutrition education through approaches grounded in the Health Belief Model (HBM) is necessary to promote healthier behavioral outcomes.
3	Community-based nutrition education and counselling provided during pregnancy: effects on knowledge and attitude towards iron-folic acid supplementation Mensur Reshid dan Anchamo Anato (2024)	Design: Quasy Experiment Sample: 99 respondents intervention group 99 respondent control group	The educational intervention was delivered using video media, image-based activities, demonstrations, and presentations. Education sessions were conducted once every two weeks over a three-month period, resulting in a total of six sessions, each lasting 30 to 45 minutes. Each session was supported by a daily schedule and counseling cards to reinforce key messages. The educational content was developed based on the constructs of the Health Belief Model, including perceived susceptibility, perceived severity, perceived	Community-based nutrition education interventions using the Health Belief Model (HBM) approach were shown to be effective in improving pregnant women's knowledge and positive attitudes toward IFAS consumption. Knowledge increased significantly by up to 35 percentage points (p < 0.001), with a 2.6-fold higher likelihood of achieving improved knowledge compared to baseline conditions. In addition, a significant positive change in attitudes supporting IFAS

No	Title, Author	Method	Intervention	Result
			benefits, perceived barriers, cues to action, and self-efficacy.	consumption was observed (p = 0.001).
4	Effect of intensive nutrition education and counseling on hemoglobin level of pregnant women in East Shoa zone, Ethiopia: randomized controlled trial Ermias Bekele Wakwoya, Tefera Belachew, dan Tsinuel Girma (2023)	Design: Randomized Controlled Trial Sample: 163 respondents intervention group 163 respondent control group	Pregnantwomen in the intervention group received an Intensive Nutrition Education and Counseling Package (INECP) consisting of three components: (1) three sessions of nutrition counseling based on the Health Belief Model delivered by trained midwives, (2) weekly reminder messages in the local language (a total of 18 messages), and (3) educational brochures also prepared in the local language. To ensure intervention quality, the midwife counselors participated in a three-day intensive training program that included role-play exercises using a modified module adapted from WHO and Ethiopian Ministry of Health guidelines	The intervention was effective in improving hemoglobin status and reducing the prevalence of anemia among pregnant women. The mean hemoglobin level in the intervention group increased from 12.08 ± 1.15 g/Dl to 12.53 ± 1.18 g/Dl ($p = 0.01$), while the prevalence of anemia decreased from 14.7% to 9.2%. At the end of the study, hemoglobin levels among pregnant women in the intervention group were significantly higher than those in the control group ($\beta = 0.50$; $p < 0.01$).
5	The effectiveness of a theory-based intervention program for pregnant women with anemia: A randomized control trial Raudah Abd Rahman, Idayu Badilla Idris, Zaleha Md Isa, Rahana Abd Rahman (2022)	Design: Randomized Controlled Trial Sample: 60 respondents intervention group 60 respondent control group	The MyPinkMom program, based on the Health Belief Model, was implemented over a six-week period using WhatsApp as the primary delivery platform. During the first week, participants received daily educational videos with a duration of 3–5 minutes for six consecutive days. This was followed by weekly reminder messages from weeks two to five. The control group received only standard information on anemia during pregnancy delivered by nurses based on the antenatal care handbook.	The MyPinkMom Health Belief Model–based program delivered through a messaging application was proven to be effective in preventing anemia during pregnancy. The intervention significantly improved hemoglobin levels, knowledge, attitudes, subjective norms, and perceived behavioral control related to adherence to iron supplementation, as well as dietary intake of iron and vitamin C, while simultaneously reducing tannin intake. Moreover, the increase in hemoglobin levels in the intervention group occurred more rapidly and was significantly greater compared to the control group.
6	Effect of Integrated Pictorial Handbook Education and Counseling on Improving Anemia Status, Knowledge, Food Intake, and Iron Tablet Compliance Among Anemic Pregnant Women in	Design: Quasy Experiment Sample: 70 respondents intervention group 70 respondent control group	The intervention for pregnant women with anemia consisted of two home visits (45-60 minutes each) conducted by well-trained village midwives appointed by the local government. The interval between the first and second home visits was two weeks. The first home visit focused on individual education delivered through an illustrated	Individual education using an illustrated anemia guidebook combined with a counseling program was shown to be effective in improving hemoglobin and hematocrit levels, knowledge, dietary iron intake, frequency of nutritious food consumption, iron–folic acid (IFA) intake, and infant birth weight. The intervention

No	Title, Author	Method	Intervention	Result
	Indonesia: A Quasi-Experimental Study Putri Nahrisah, Ratana Somrongthong, Napaphan Viriyautsahakul, Pramon Viwattanakulvanid,Sa mlee Plianbangchang (2020)		guidebook, while the second visit involved individualized counseling. All information and activities were designed in accordance with the assumptions and constructs of the Health Belief Model (HBM).	demonstrated a large effect on dietary frequency and IFA adherence, and a moderate effect on increasing hemoglobin and hematocrit levels among anemic third- trimester pregnant women.
7	The effectiveness of theory-based intervention to improve haemoglobin levels among women with anaemia in pregnancy Hasneezah Hassan, Rosliza Abdul Manaf, Salmiah Md Said, Geeta Appannah (2020)	Design: Quasy Experiment Sample: 81 respondents intervention group 81 respondent control group	The Health Belief Model (HBM)-based educational intervention was delivered using health talks and small group discussions, supported by educational media such as illustrated books, brochures, and pamphlets. The health education program was implemented over a 12-week period. Post- intervention evaluation was conducted at 35– 37 weeks of gestation (third trimester) to assess changes in outcomes following the implementation of the program.	The HBM-based health education program was proven to be effective in improving hemoglobin levels, knowledge, perceived severity of anemia, and adherence to supplementation among pregnant women. Participants in the intervention group demonstrated a significantly higher likelihood of achieving high adherence compared to those in the control group.

The findings of this systematic review indicate that Health Belief Model (HBM)–based interventions consistently have a positive effect on anemia prevention among pregnant women. The majority of the reviewed studies reported significant increases in hemoglobin levels and reductions in anemia prevalence following the implementation of HBM-based educational interventions. These findings are consistent with the theoretical foundation of the HBM, in which perceptions of susceptibility, severity, benefits, and barriers, along with reinforcement through cues to action and self-efficacy, play a crucial role in promoting anemia prevention behaviors during pregnancy (Aidah et al., 2023).

The Health Belief Model (HBM) serves as a foundational framework in health behavior research and was developed in the 1950s by social psychologists working within the United States Public Health Service (USPHS). The model was originally designed to explain preventive health behaviors, particularly in response to the widespread failure of individuals to adopt disease prevention measures or to participate in early disease detection despite the availability of services. The HBM emphasizes how individuals perceive health threats and make decisions to take action based on the value they place on health-related outcomes and their beliefs regarding the likelihood that specific actions will successfully reduce those threats. The Health Belief Model comprises six core cognitive constructs that influence behavior: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action (Alyafei & Easton-Carr, 2024).

This model has been applied across a wide range of contexts, including chronic disease prevention, health education and promotion, and the evaluation of community-based interventions. However, critics argue that the Health Belief Model (HBM) places excessive emphasis on cognitive factors while underestimating emotional and social influences on health behavior. The model is often criticized for insufficiently accounting for cultural and social environmental factors and for assuming that individuals consistently make rational decisions, thereby overlooking the complexity of emotional processes involved in health-related behaviors (Cynthia et al., 2022).

Several studies reviewed also indicate that HBM-based interventions do not rely solely on verbal education but incorporate educational media such as videos and illustrated modules to deliver health messages more effectively. Educational media in the form of HBM-based videos and illustrated booklets have been shown to be effective tools for enhancing anemia prevention during pregnancy (Beressa et al., 2024). The use of engaging visuals and simple narratives in videos helps pregnant women better understand their risk of anemia (*perceived susceptibility*) and its potential consequences for both maternal and fetal

health (*perceived severity*) in a more accessible and emotionally resonant manner (Rahman et al., 2022). Meanwhile, illustrated booklets provide structured information and visual representations of recommended behaviors, thereby strengthening perceived benefits (*perceived benefits*) and reducing perceived barriers (*perceived barriers*), particularly regarding iron supplementation adherence and the selection of iron-rich foods (Nahrisah et al., 2020; Wakwoya et al., 2023).

The presentation of health messages through these media also enhances *cues to action*, as images, illustrations, and everyday scenarios serve as concrete reminders that encourage pregnant women to adopt preventive behaviors (Anato & Reshid, 2025; Hassan et al., 2020). Ultimately, the combined use of HBM-based videos and illustrated materials not only improves knowledge but also fosters positive attitudes, strengthens motivation, and promotes sustained preventive actions against anemia during pregnancy.

Given the effectiveness of theory-driven approaches in improving maternal health outcomes, it is essential to examine how HBM-based interventions make tangible contributions to anemia prevention among pregnant women. By systematically mapping perceptions of risk, benefits, barriers, and self-efficacy, the Health Belief Model provides a comprehensive framework capable of guiding structured and sustainable behavior change.

Increase in Hemoglobin Levels

The reported increases in hemoglobin and hematocrit levels following Health Belief Model (HBM)-based interventions indicate that behavior-oriented educational approaches influence not only cognitive and affective domains but also physiological outcomes. The reduction in anemia prevalence from 27.8% to 7.2% in intervention groups suggests that appropriate health information delivery, enhanced perceived susceptibility, and increased perceived benefits contribute to improved adherence to anemia prevention practices, including iron supplementation, increased intake of nutritious foods, and healthier lifestyle management (Wakwoya et al., 2023).

The finding of a statistically significant increase in hemoglobin levels ($\beta = 0.50$; $p < 0.01$) further strengthens the evidence that behavior change mediated through theory-based education can lead to meaningful long-term health outcomes (Wakwoya et al., 2023). Behavioral theory–based interventions, including those grounded in HBM, have been shown to effectively address internal and external barriers while enhancing individual motivation to engage in consistent preventive actions (Beressa et al., 2025). Recent studies also demonstrate that structured health education programs improve adherence to iron supplementation, ultimately contributing to better

hematological status among pregnant women (Rahman et al., 2022).

Adherence to Iron Supplementation and Nutritional Behaviors

The improvement in adherence to iron and folic acid supplementation reported across nearly all reviewed studies highlights the strong effectiveness of HBM-based interventions in modifying health behaviors among pregnant women. Increases in adherence odds ratios by two to four times in intervention groups indicate that strategies targeting perceived susceptibility, perceived benefits, perceived barriers, and self- efficacy significantly influence women's decisions to consistently consume iron supplements (Anato & Reshid, 2025). These findings align with recent evidence showing that theory-based educational interventions enhance supplementation adherence by increasing perceived benefits and reducing perceived barriers, such as nausea, forgetfulness, or lack of family support (Rahman et al., 2022).

Beyond supplementation adherence, positive changes in maternal dietary patterns further demonstrate the role of HBM in shaping healthier nutritional behaviors (Nahrisah et al., 2020). Increased intake of iron-rich foods and vitamin C, along with reduced consumption of iron absorption inhibitors such as tea and coffee containing tannins, reflects successful modification of perceived barriers and strengthening of cues to action through targeted education. Interventions combining knowledge enhancement, motivational reinforcement, and environmental support have proven more effective in changing behavior than conventional health education approaches (Reshid & Anato, 2024).

Overall, these findings reinforce the evidence that HBM provides a comprehensive framework for enabling pregnant women to adopt anemia prevention behaviors more consistently. By addressing psychological and cognitive determinants of decision-making, HBM-based interventions produce behavioral changes that directly translate into improved maternal health outcomes.

Knowledge, Attitudes, and Perceptions

Consistent improvements in knowledge, positive attitudes, and perceptions of anemia severity across multiple studies indicate that HBM-based interventions effectively influence the cognitive and affective foundations of health behavior change. Increases in knowledge scores of up to 35 percentage points and significant improvements in attitudes supporting adherence to iron supplementation ($p < 0.001$) demonstrate that structured education can successfully modify pregnant women's understanding of anemia-related risks and consequences (Anato & Reshid, 2025).

From an HBM perspective, these findings reflect the strengthening of two key constructs: perceived susceptibility and perceived severity. As pregnant women gain a clearer understanding of their risk of anemia and its potential impact on both maternal and fetal health, motivation to engage in preventive behaviors increases substantially (Irawati et al., 2024). Effective education not only expands factual knowledge but also internalizes health risks, thereby encouraging concrete actions such as regular iron supplementation and dietary improvement. HBM-based interventions thus provide a strong psychological foundation for more sustained behavioral change (Hassan et al., 2020).

HBM-based interventions can be effectively integrated into maternal health programs, particularly antenatal education services. Healthcare providers should adopt approaches that extend beyond information delivery to include exploration of maternal perceptions, reduction of perceived barriers, provision of reminders, and strengthening of self-efficacy. Despite consistent positive findings, several limitations should be acknowledged. Intervention durations were also relatively short (6-12 weeks), restricting evaluation of long-term effects. In addition, adherence to iron supplementation was often measured through self-report, which may introduce reporting bias.

Future research is recommended to not only further develop HBM-based educational interventions but also expand exploration of innovative educational media. While the Health Belief Model has proven effective in improving knowledge, attitudes, and perceptions among pregnant women, the mode of information delivery plays a critical role in reinforcing understanding and promoting behavior change. The use of video-based education and illustrated modules is strongly recommended for further investigation, given their ability to deliver health messages in an engaging, accessible manner and to strengthen cues to action. Future studies should compare the effectiveness of various HBM-based educational media and evaluate their long-term impact on anemia prevention adherence and maternal health outcomes. Multi-center trials with larger sample sizes and extended follow-up periods are also recommended to assess the sustainability of intervention effects

CONCLUSION

This systematic review of ten research articles demonstrates that Health Belief Model (HBM)-based interventions are effective in preventing anemia among pregnant women. The majority of studies reported significant increases in hemoglobin levels, reductions in anemia prevalence, and improved adherence to iron supplementation among intervention groups compared to control groups. In addition, HBM-based interventions were shown to enhance pregnant women's knowledge, attitudes, and preventive behaviors through the strengthening of perceived susceptibility, perceived severity, perceived benefits, reduction of perceived barriers, and increased self-efficacy.

From a practical perspective, the findings of this systematic literature review recommend the integration of Health Belief Model–based education into antenatal care services as part of anemia prevention programs. Such integration can be implemented through face-to-face counseling as well as digital approaches using educational media such as videos and printed materials, while actively involving family members and support from healthcare providers to reinforce preventive behaviors.

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