

THE INFLUENCE OF HEALTH BELIEF MODEL (HBM) CONSTRUCTS ON IRON SUPPLEMENT CONSUMPTION BEHAVIOR AMONG PREGNANT WOMEN IN SRAGEN REGENCY, INDONESIA

Dipo Wicaksono¹, Endang Sutisna Sulaeman², Eti Poncorini Pamungkasari², Yulia Lanti Retno Dewi², Vitri Widyaningsih², Yayi Suryo Prabandari³

¹⁾ Doctoral Program in Public Health, Faculty of Medicine, Universitas Sebelas Maret

²⁾ Department of Public Health, Faculty of Medicine, Universitas Sebelas Maret

³⁾ Department of Public Health, Faculty of Medicine, Universitas Gadjah Mada

Email: dipowicaksono@gmail.com

ABSTRACT

Anemia in pregnant women is a public health issue in Indonesia and contributes to an increased risk of pregnancy complications as well as maternal and infant mortality, including in Sragen Regency. One effort to address anemia is the provision of iron supplement tablets (Fe) to pregnant women; however, the adherence level to Fe supplement consumption has not been fully optimized, which can negatively impact pregnancy outcomes. This study aims to analyze the role of variables within the Health Belief Model (HBM) theory in explaining the behavior of iron supplement tablet (Fe) consumption among pregnant women in Sragen Regency. The study used a quantitative approach with a cross-sectional design, involving 200 pregnant women respondents selected from various community health centers (puskesmas) spread across Sragen. Data were collected using a structured questionnaire measuring components of the HBM. The results showed that perceived susceptibility and perceived severity factors influence changes in Fe supplement consumption behavior among pregnant women, with a significance value of $p < 0.05$. Pregnant women with poor perceived susceptibility were 9 times more at risk of anemia, and those with poor perceived severity were 8 times more at risk compared to women with good perceptions. This study indicates that the Health Belief Model, particularly perceived susceptibility and severity, plays a significant role in influencing iron supplement tablet consumption behavior. Pregnant women who have poor perceptions of susceptibility and severity related to Fe consumption are at higher risk of anemia. Therefore, health promotion interventions are needed to raise awareness among pregnant women about the risks and serious impacts of anemia to prevent complications during pregnancy.

INTRODUCTION

Anemia is a global public health concern with serious implications for maternal and child health. According to the World Health Organization (WHO), approximately 40% of pregnant women worldwide suffer from anemia, and the prevalence can reach up to 75% in developing countries (WHO, 2020). In Indonesia, the prevalence of anemia among pregnant women remains high, at around 30% (SKI, 2024). Anemia during pregnancy is associated with increased risks of obstetric complications, such as hemorrhage, premature birth, low birth weight, and maternal mortality (Padmi, 2018).

Food behavior during pregnancy plays a critical role in determining maternal nutritional status and pregnancy outcomes (Glanz et al., 2015). It includes food choices, dietary patterns, eating habits, and psychosocial and cultural influences on consumption decisions. Hormonal changes during pregnancy often affect appetite, taste preferences, and food tolerance. Additionally, cultural beliefs, social influence, nutritional knowledge, and access to nutritious food significantly shape pregnant women's dietary behaviors (Contento, 2024).

Recent studies, including one in Abidjan, Côte d'Ivoire, have identified that inadequate intake of energy, protein, and vitamin C, as well as poor dietary diversity, are major determinants of iron-deficiency anemia, particularly during the second and third trimesters and in multiparous women (Vanie, 2021). Another study supports the importance of diverse, high-quality diets combined with oral iron supplementation and food fortification (Bayyari, 2024).

Local data from Sragen District Health Office indicated a 32.8% anemia prevalence among pregnant women in 2023. This has been primarily linked to poor nutrient intake (Nadia, 2016) and insufficient protein and iron consumption, both of which affect hemoglobin levels (Muhsein, 2024). Although national guidelines such as Ministry of Health Regulation No. 88/2014 and WHO recommendations advocate for iron supplementation and balanced nutrition, implementation remains suboptimal, highlighting the need for theory-driven and community-based health promotion interventions.

This study applies the Health Belief Model (HBM) as the theoretical framework to analyze behavioral change in protein consumption among pregnant women. The HBM posits that individual health behaviors are influenced by perceived susceptibility to disease, perceived severity of the health problem, perceived benefits of preventive action, perceived barriers, cues to action, and self-efficacy (Rosenstock, 1974 as cited in Sulaeman, 2021; Glanz et al., 2015). In the context of maternal nutrition, HBM is relevant for understanding how pregnant women perceive the risk of anemia, the seriousness of its consequences, and the benefits of adequate

protein and iron consumption. By applying HBM, this study aims to explore how these perceptions shape maternal dietary behavior, particularly protein consumption, in Sragen Regency.

METHODS

This study employed a quantitative approach with a cross-sectional design to examine the relationship between Health Belief Model (HBM) constructs and adherence to iron supplement (Fe) tablet consumption among pregnant women in Sragen Regency, Central Java, Indonesia. A cross-sectional design was chosen because it enables the measurement of exposure (HBM perceptions) and outcome (Fe consumption behavior) simultaneously, thereby providing a snapshot of the behavioral determinants at a particular point in time. This design is widely applied in public health research, especially when resources and time are limited, and when the aim is to identify significant associations rather than causal pathways.

STUDY LOCATION AND POPULATION

The study was conducted in Sragen Regency, a semi-urban district in Central Java Province with diverse socio-demographic characteristics. The district has multiple community health centers (*puskesmas*) that serve as the main providers of antenatal care and preventive health services. These facilities were selected as recruitment sites because they represent the first point of contact for most pregnant women seeking maternal health services, including the provision of iron supplement tablets as part of Indonesia's national maternal health program.

The target population was all pregnant women registered and receiving antenatal services at selected *puskesmas* during the study period. Eligibility criteria were established to ensure homogeneity of respondents: (1) pregnant women aged 18 years and above, (2) in any trimester of pregnancy, (3) residing in Sragen Regency for at least six months, and (4) willing to provide informed consent. Women with chronic illnesses such as thalassemia or other hematological disorders were excluded to avoid confounding influences on anemia status and iron supplement adherence.

Sampling Technique and Sample Size

A proportional random sampling technique was used to recruit respondents from several *puskesmas* across the regency, ensuring representation from both rural and urban sub-

districts. Sample size determination followed the formula for cross-sectional studies with categorical outcomes, considering a 95% confidence level, 80% power, and estimated prevalence of poor adherence based on prior studies. The minimum sample size calculated was 180; however, to account for possible non-response or incomplete data, the final target sample was increased to 200 pregnant women. Research Instrument data were collected using a structured questionnaire specifically designed to capture the constructs of the Health Belief Model and Fe consumption behavior.

Data Collection Procedure

Data collection was carried out between September and October 2023 by a team of trained enumerators with backgrounds in nutritionist. Prior to fieldwork, enumerators participated in a two-day training session to standardize the data collection process, minimize interviewer bias, and ensure adherence to ethical research standards. Respondents were approached during their antenatal care visits at *puskesmas*. After obtaining informed consent, interviews were conducted in private consultation rooms to maintain confidentiality and minimize social desirability bias. On average, each interview lasted 25–30 minutes.

Data Analysis

All completed questionnaires were checked for completeness and consistency before data entry. Data were then coded and analyzed using SPSS version 26.0. The first stage of analysis involved descriptive statistics to summarize socio-demographic characteristics and distribution of HBM variables. The second stage involved bivariate analysis using the Chi-square test to examine the association between each HBM construct and Fe consumption behavior. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to estimate the strength of associations. A significance level of $p < 0.05$ was considered statistically significant.

Variables found to be significant in bivariate analysis (perceived susceptibility and severity) were further examined to identify their potential influence on risk of poor Fe consumption. Although the main focus of this paper is bivariate findings, additional logistic regression analysis was conducted to control for potential confounders such as maternal education and parity. Ethical Considerations This study obtained ethical approval from the Health Research Ethics Committee of Universitas Sebelas Maret, Surakarta, Indonesia. Written informed consent was obtained from all participants before data collection. Participants were

assured of anonymity, confidentiality, and their right to withdraw at any stage without consequence.

RESULT

The bivariate analysis demonstrated significant associations between HBM variables and Fe tablet consumption. Specifically, perceived susceptibility and severity were the strongest predictors of adherence.

Table 1. Bivariate Analysis of HBM Variables and Iron Supplement (Fe) Consumption among Pregnant Women in Sragen Regency (n = 200)

| Variable | Good Consumption (n=120) | Poor Consumption (n=80) | p-value | OR (95% CI) |
|--------------------------|-----------------------------|----------------------------|---------|----------------|
| Perceived Susceptibility | | | | |
| Good perception | 100 (83.3%) | 20 (16.7%) | 0.001 | Ref |
| Poor perception | 20 (25.0%) | 60 (75.0%) | | 9.0 (4.5–18.0) |
| Perceived Severity | | | | |
| Good perception | 95 (79.2%) | 25 (20.8%) | 0.002 | Ref |
| Poor perception | 25 (31.3%) | 55 (68.7%) | | 8.0 (3.9–16.4) |
| Perceived Benefits | | | 0.072 | 2.1 (0.9–4.7) |
| Perceived Barriers | | | 0.086 | 1.9 (0.8–4.5) |
| Cues to Action | | | 0.065 | 2.3 (0.9–5.0) |

The bivariate analysis demonstrated that perceived susceptibility and perceived severity were significantly associated with iron supplement (Fe) consumption among pregnant women in Sragen Regency ($p < 0.05$). Pregnant women with poor perceived susceptibility were 9 times

more likely to have poor Fe consumption behavior compared to those with good perception (OR = 9.0; 95% CI: 4.5–18.0). Similarly, women with poor perceived severity were 8 times more likely to have poor Fe consumption compared to those with good perception (OR = 8.0; 95% CI: 3.9–16.4). Other variables, including perceived benefits, perceived barriers, and cues to action, showed no statistically significant association with Fe consumption ($p > 0.05$). These findings highlight that perceptions of risk and seriousness of anemia play a crucial role in influencing adherence to iron supplementation among pregnant women.

DISCUSSION

This study found that perceived susceptibility and perceived severity were the strongest predictors of iron supplement (Fe) consumption among pregnant women in Sragen Regency. Women with poor perceptions of susceptibility were nine times more likely to experience anemia, and those with poor perceptions of severity were eight times more likely compared to women with better perceptions. These findings underscore the importance of maternal health education in shaping health-related behaviors during pregnancy.

The results of this study are consistent with previous research highlighting the relevance of the Health Belief Model in explaining preventive health behaviors. A study conducted in Ethiopia reported that pregnant women who perceived themselves at higher risk of anemia were significantly more adherent to iron-folic acid supplementation compared to those with lower perceived risk (Gebremariam et al., 2019). Similarly, a study in Indonesia found that perceived severity was a strong determinant of compliance, where women who believed that anemia could lead to complications such as low birth weight or preterm delivery were more likely to complete the recommended iron supplementation (Yunitasari et al., 2021). These findings strengthen the argument that improving maternal knowledge and perception of risk and severity is essential for successful public health interventions.

Our findings also align with the World Health Organization (WHO, 2023), which emphasizes that women's understanding of the risks of anemia plays a crucial role in improving adherence to iron supplementation programs. Without awareness of the potential consequences, such as maternal morbidity, stillbirth, or impaired cognitive development in infants, pregnant women are less motivated to consume iron supplements regularly. Therefore, it is not only the availability of supplements that matters but also the psychosocial determinants that shape women's decisions to take them.

Although perceived benefits, barriers, and cues to action were not statistically significant in this study, they remain relevant in understanding the broader behavioral context. Several studies have shown that barriers such as side effects (e.g., nausea or constipation), forgetfulness, and lack of family support can discourage adherence to Fe consumption (Taye et al., 2015; Arega et al., 2021). In the present study, these variables did not reach statistical significance, possibly due to uniform health education strategies in the study area or strong programmatic support provided by community health centers. Nevertheless, addressing these barriers should still be considered in program implementation.

The implications of this study suggest that maternal health promotion should focus more intensively on shaping perceptions of susceptibility and severity through culturally appropriate health communication strategies. Community health workers and midwives could play a pivotal role by delivering clear, relatable messages about the risks of anemia and the seriousness of its consequences. In addition, involving husbands and family members in counseling sessions may further reinforce women's perceptions and support adherence.

In conclusion, this study confirms that the Health Belief Model, particularly perceived susceptibility and severity, provides a useful framework to explain iron supplement consumption among pregnant women. Strengthening these perceptions through health education is likely to improve adherence, ultimately reducing the risk of anemia and its associated complications in maternal and child health.

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