

## Compliance with Iron Tablet Consumption Can Affect the Incidence of Anemia During Pregnancy

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**Abstract:** Anemia during pregnancy, defined as hemoglobin levels below 11 g/dL, remains a significant health concern due to its association with postpartum hemorrhage, preterm birth, and low birth weight. One contributing factor is the low adherence to iron tablet (Fe) supplementation, despite widespread distribution programs. This study aimed to analyze the relationship between adherence to iron tablet consumption and the incidence of anemia among third-trimester pregnant women at Jatinangor Public Health Center. A case-control design was employed, involving 82 respondents, 41 anemic (case group) and 41 non-anemics (control group), selected through simple random sampling. Data were analyzed using Chi-Square tests and odds ratio (OR) calculations. The results showed that 56.1% of pregnant women were classified as non-adherent. A significant relationship was found between adherence to iron tablet consumption and anemia incidence ( $p = 0.000$ ), with an OR of 15.909 (95% CI: 5.254–48.169), indicating that non-adherent mothers had a 15.9-fold higher risk of developing anemia. Adherence was influenced not only by quantity but also by timing, method of consumption, and maternal understanding. Barriers such as side effects, incorrect consumption habits, and low family involvement were also identified. These findings highlight the need for enhanced health education, greater family engagement, and continuous monitoring to improve adherence to iron tablet supplementation and support anemia prevention among pregnant women.

**Keywords:** adherence; anemia; iron tablet; pregnant women

**How to Cite:** Puteri, A. S. L., Widayani, W., Resmana, R., & Sriyanti, C. (2026). Compliance with Iron Tablet Consumption Can Affect the Incidence of Anemia During Pregnancy. *Jurnal Kebidanan*. 15(1), 1-7.

**DOI:** <http://dx.doi.org/10.26714/jk.15.1.2026.1-7>

## Introduction

Anemia during pregnancy remains a significant public health problem that continues to affect maternal and fetal outcomes. The World Health Organization (WHO) defines anemia in pregnancy as a condition in which hemoglobin (Hb) levels are below 11 g/dL. This condition is associated with an increased risk of obstetric complications, including postpartum hemorrhage, preterm birth, low birth weight, and maternal mortality. In Indonesia, maternal mortality remains a critical issue, with hemorrhage as one of the leading causes, and anemia is recognized as an important contributing factor (SDKI, 2007; Kementerian Kesehatan RI, 2020).

The prevalence of anemia among pregnant women remains relatively high. WHO estimates indicate that approximately 30% of pregnant women in Indonesia experience anemia, while national data from Riskesdas (2018) reported a higher prevalence of 48.9% in West Java Province. At the local level, Sumedang Regency recorded 1,058 cases of anemia in 2020, and the Jatinangor Public Health Center reported 81 cases in 2022. Although various preventive efforts have been implemented, including nutritional counseling, strengthening antenatal care (ANC) services, and the distribution of iron (Fe) tablets, the effectiveness of these interventions remains limited. Data from the 2023 Indonesia Health Survey (SKI) showed that while 90.7% of pregnant women in West Java received at least 90 Fe tablets, only 19% consumed them according to recommendations.

Iron supplementation plays a crucial role in meeting the increased physiological demands during pregnancy and in preventing iron-deficiency anemia. However, adherence to iron tablet consumption remains a major challenge. Several factors have been identified as influencing adherence, including maternal knowledge, motivation, perceived side effects, family support, the role of healthcare providers, frequency of ANC visits, and sociodemographic characteristics such as age, parity, education level, and nutritional status. From a behavioral perspective, the Health Belief Model explains that individual

perceptions regarding susceptibility, severity, benefits, and barriers influence health-related behaviors, including adherence to iron supplementation.

Previous studies have demonstrated a significant association between adherence to iron tablet consumption and the incidence of anemia. Aryani and Widyawati (2022) reported that non-adherent pregnant women had an 8.6-fold higher risk of developing anemia ( $p = 0.024$ ). Similarly, studies by Izzati (2021) and Dolang (2020) emphasized the importance of consistent iron supplementation and adequate antenatal care in reducing anemia risk. However, most of these studies were conducted in broader or different regional contexts, and evidence at the local level remains limited.

In the context of Jatinangor, preliminary data collected in early 2024 showed that 42% of third-trimester pregnant women were diagnosed with anemia. This finding, combined with the gap between Fe tablet distribution and actual consumption, indicates that adherence behavior remains a critical issue. Despite the availability of supplementation programs, there is still limited empirical evidence that specifically examines the relationship between iron tablet adherence and anemia incidence in the local setting of Sumedang Regency.

Therefore, this study aims to analyze the relationship between adherence to iron tablet consumption and the incidence of anemia among pregnant women in the working area of Jatinangor Public Health Center. The results of this study are expected to provide evidence-based insights to support the development of more effective interventions in improving maternal adherence and reducing the prevalence of anemia.

## Method

This study employed an analytical observational design using a case-control approach to examine the relationship between adherence to iron tablet (Fe) consumption and the incidence of anemia among pregnant women. This design was selected because it is efficient for identifying potential risk factors associated with relatively common outcomes, such as anemia in pregnancy, and allows retrospective comparison between groups with and without the condition.

The study was conducted in the working area of the Jatinangor Public Health Center, Jatinangor Subdistrict, Sumedang Regency, West Java, from February to May 2025. The research process included preparation, data collection, analysis, and validation of findings.

The study population consisted of all third-trimester pregnant women residing in the service area of the Jatinangor Public Health Center. The sample was selected using a simple random sampling technique, resulting in 41 respondents in the case group (anemic) and 41 respondents in the control group (non-anemic), with a total sample size of 82 participants.

Inclusion criteria were third-trimester pregnant women with a gestational age of  $\geq 32$  weeks, who had received iron (Fe) tablets during pregnancy, possessed a Maternal and Child Health (KIA) handbook, and were willing to participate in the study. The criterion related to Fe tablet consumption refers to the receipt of iron supplementation as part of the national antenatal care program, while adherence was assessed separately based on the actual consumption behavior reported by respondents. Exclusion criteria included pregnant women who were unavailable during data collection, declined to provide informed consent, or had a history of chronic conditions such as kidney disease, liver disease, diabetes mellitus, hypothyroidism, heart disease, or autoimmune disorders, as well as those undergoing blood transfusions or other treatments that could influence hemoglobin levels.

The independent variable in this study was adherence to Fe tablet consumption, defined as the extent to which pregnant women consumed iron tablets in accordance with the recommended dosage and method, based on the Indonesian Ministry of Health Regulation No. 88 of 2014. Adherence was measured using a structured questionnaire. The dependent variable was the incidence of anemia, defined as hemoglobin (Hb) levels of  $< 11$  g/dL, measured using the Easy Touch Hb monitoring device.

Data collection instruments included a structured questionnaire to assess adherence to Fe tablet consumption, an observation sheet, and hemoglobin measurement tools. Primary data were obtained through direct interviews and Hb testing, while secondary data were collected from the KIA handbook and medical records. To improve data validity, self-reported adherence was cross-checked with records in the KIA handbook.

The data collection procedure began with screening for eligibility, followed by hemoglobin measurement and interviews to assess adherence to Fe tablet consumption. The collected data were processed through editing, coding, and entry into statistical software.

Data analysis was conducted using univariate analysis to describe respondent characteristics and adherence levels, and bivariate analysis using the Chi-square test to examine the association between adherence to Fe tablet consumption and the incidence of anemia.

This study received ethical approval from the Health Research Ethics Committee of the Bandung Polytechnic of Health, Ministry of Health of Indonesia, with approval number 29/KEPK/EC/III/2025. All procedures were conducted in accordance with ethical principles, including informed consent, confidentiality, and respect for participant autonomy.

## Results and Discussion

The findings of this study indicate that most respondents were within the ideal reproductive age range (20–35 years). Although this age group is generally associated with better physiological readiness for pregnancy, the occurrence of anemia within this group suggests that biological factors alone are not sufficient to prevent anemia without adequate nutritional intake and adherence to iron supplementation. This is consistent with previous studies showing that anemia may still occur in women of optimal reproductive age when iron requirements are not adequately met (Putri, 2021; Marisi & Istianah, 2021).

Educational level also plays an important role in shaping maternal health behavior. In this study, the majority of respondents had a secondary level of education. From the perspective of the Health Belief Model, education may influence perceived benefits and perceived severity, as individuals with higher educational backgrounds are more likely to understand the importance of iron supplementation and the risks associated with anemia. However, the findings suggest that knowledge alone does not necessarily translate into adherence behavior, indicating the presence of other influencing factors.

Employment status may also contribute to differences in adherence behavior. Most respondents in this study were not formally employed. Within the Health Belief Model framework, this condition may be related to perceived barriers, such as limited access to health information, lower socioeconomic status, or competing domestic responsibilities, which may affect the regular consumption of iron tablets.

Parity is another factor that may influence the risk of anemia. The majority of respondents were multiparous, indicating repeated exposure to pregnancy-related physiological demands. Higher parity may increase the risk of iron depletion due to cumulative nutritional demands across multiple pregnancies. However, from a behavioral perspective, previous pregnancy experience may also serve as a cue to action, where mothers who have experienced prior pregnancies may be more aware of the importance of maintaining adequate iron intake.

Overall, these findings suggest that maternal characteristics such as age, education, employment status, and parity interact with behavioral factors in influencing adherence to iron tablet consumption. The Health Belief Model provides a useful framework to understand how perceived benefits, perceived barriers, and cues to action contribute to maternal adherence behavior, which ultimately affects the incidence of anemia during pregnancy.

Table 1. Distribution of Pregnant Women Based on Adherence to Iron Tablet (Fe) Consumption in the Working Area of Jatinangor Public Health Center

Fe Tablet Adherence	Anemic (n = 41)		Non-Anemic (n = 41)	
	f	%	F	%
Non-Adherent	35	85,4	11	26,8
Adherent	6	14,6	30	73,2
Total	41	100	41	100

Table 2. Relationship Between Iron Tablet Adherence and Anemia Incidence

Fe Tablet Adherence	Anemia				Amount		P Value	OR	CI
	Anemia		Non-anemic						
	f	%	f	%	f	%			
Tidak Patuh	35	85,4	11	26,8	46	56,1	0,000	15,909	(5,254-48,169)
Patuh	6	14,6	30	73,2	36	43,9			
Total	41	100	41	100	82	100			

## Level of Adherence to Iron Tablet Consumption

The findings of this study indicate that adherence to iron tablet (Fe) consumption among pregnant women in the working area of the Jatinangor Public Health Center remains relatively low. A total of 56.1% of respondents were classified as non-adherent, while only 43.9% were adherent.

Within the anemic group, a clear pattern was observed. Among pregnant women with anemia, 85.4% were non-adherent, whereas only 14.6% of adherent respondents still experienced anemia. In contrast, 73.2% of adherent mothers did not develop anemia. These findings indicate a strong association between adherence to iron supplementation and the occurrence of anemia.

However, adherence should not be interpreted solely based on the number of tablets consumed, but also on the quality of consumption behavior. Some respondents who were categorized as adherent still experienced anemia, which may be related to inappropriate intake practices, such as consuming iron tablets together with substances that inhibit iron absorption, including tea, coffee, or milk.

From the perspective of the Health Belief Model, these findings can be interpreted through several behavioral components. The presence of improper consumption practices and side effects, such as nausea and constipation, reflects perceived barriers that may hinder optimal adherence. In addition, limited knowledge regarding the correct timing and method of iron tablet consumption indicates that perceived benefits may not be fully understood by the respondents.

Furthermore, the lack of continuous education and supervision from healthcare providers and family members suggests weak cues to action, which are essential in reinforcing consistent health behavior. Low intrinsic motivation observed among some respondents also indicates that individual perception plays a significant role in determining adherence behavior.

These findings suggest that improving adherence to iron tablet consumption requires not only the provision of supplements but also strengthening behavioral interventions. Approaches that address perceived barriers, enhance understanding of benefits, and provide consistent cues to action are essential to improve adherence and reduce the incidence of anemia among pregnant women.

## The Relationship Between Iron Tablet Adherence and the Incidence of Anemia

Bivariate analysis using the Chi-Square test revealed a highly significant relationship between adherence to iron tablet (Fe) consumption and the incidence of anemia among pregnant women ( $p = 0.000$ ). The odds ratio (OR) was calculated at 15.909 with a 95% confidence interval (CI) of 5.254–48.169, indicating that non-adherent mothers had a 15.9 times greater risk of developing anemia compared to those who adhered to Fe tablet consumption guidelines.

These findings are consistent with previous studies, including that of Aryani and Widyawati (2022), who reported that non-adherent pregnant women had an 8.6-fold increased risk of anemia. Similarly, the results of Izzati (2021) and Dolang (2020) also confirmed the significant effect of regular Fe tablet consumption and antenatal care attendance in preventing anemia.

In addition, the effectiveness of iron tablet supplementation is not solely determined by the quantity and frequency of intake but also by the context and behavior surrounding consumption. According to Wibowo and Kartasapoetra (2020), proper Fe intake—both in terms of timing and method—can increase hemoglobin levels by 1–1.6 g/dL per month. Conversely, consumption that involves biological inhibitors (such as concurrent intake with tea or coffee) or behavioral missteps (such as incorrect timing) significantly diminishes the supplement's efficacy.

Moreover, this study identified that the regularity of antenatal care (ANC) visits plays a critical supporting role. As noted by Ismita and Rohmah (2024), irregular ANC attendance increases the risk of anemia ninefold. In practice, regular ANC visits enhance maternal understanding, foster greater motivation for consistent Fe intake, and strengthen healthcare provider supervision.

Overall, the results of this study underscore that improving adherence to iron tablet consumption is not merely a matter of ensuring supplement availability. Rather, it requires a holistic approach involving strengthened educational strategies, active family support, the proactive role of healthcare professionals, and improved quality of communication during ANC visits. These factors work synergistically to reduce the incidence of anemia among pregnant women.

## Clinical Implications and Study Limitations

This study presents several limitations that should be acknowledged. First, the measurement of adherence to iron tablet (Fe) consumption was conducted through interviews using questionnaires rather than direct observation. This methodological choice was based on practical considerations, including time, budgetary constraints, and limited

human resources. Implementing direct daily monitoring over a minimum period of one month would have required additional personnel and intensive supervision, which proved unfeasible given the large number of pregnant women and their dispersed residences in the study area.

As a consequence, the data obtained were self-reported and thus heavily dependent on the honesty and memory of the respondents. This introduces the potential for information bias—both over-reporting and under-reporting of adherence levels. Although the researchers attempted to mitigate this risk by designing simple, clear, and easily comprehensible questions, and by building rapport with respondents, the possibility of inaccurate data affecting the internal validity of the findings cannot be ruled out.

Second, while this study adopted the Health Belief Model (HBM) as its conceptual framework, it did not employ measurement instruments that explicitly assessed the model's components (e.g., perceived susceptibility, perceived benefits, perceived barriers, and self-efficacy). Consequently, the individual influence of each HBM component on Fe tablet adherence could not be quantitatively identified.

Third, the study used a portable hemoglobinometer (Easy Touch GCHb) for measuring hemoglobin levels in the field. Although practical for screening purposes, this device has lower sensitivity compared to standard laboratory methods such as the cyanmethemoglobin method. This raises the possibility of false-negative or false-positive classifications of anemia status, which may have influenced the strength of the reported association between iron tablet adherence and anemia incidence.

Despite these limitations, the findings of this study carry important clinical implications. First, they underscore that the success of Fe supplementation programs does not rely solely on the availability and distribution of tablets, but also on correct consumption behavior and systemic support at the primary healthcare level. Therefore, promotive and preventive antenatal care interventions should prioritize behavior-based educational approaches, improved communication between healthcare providers and pregnant women, and active family involvement.

Second, strategies for monitoring and evaluating Fe supplementation programs should incorporate behavioral indicators (such as knowledge, attitudes, and perceived barriers) in addition to process indicators related to distribution. This is crucial for identifying behavioral barriers to adherence and designing more contextually relevant interventions.

Third, future research should focus on developing more comprehensive and accurate measurement instruments, both for directly assessing HBM components and for objectively evaluating adherence behaviors related to iron tablet intake. The use of mixed-method approaches may also be beneficial for gaining a deeper and more holistic understanding of adherence dynamics within community settings.

## Conclusion

This study indicates that adherence to iron tablet consumption among pregnant women remains suboptimal and is significantly associated with the incidence of anemia. Pregnant women who do not adhere to iron supplementation are more likely to experience anemia compared to those who follow the recommended intake.

These findings highlight the importance of not only providing iron tablets but also ensuring proper consumption behavior among pregnant women. Factors such as knowledge, perceived barriers, and external support play a crucial role in influencing adherence.

Therefore, efforts to improve maternal adherence should emphasize strengthening health education, enhancing the role of healthcare providers, and promoting family involvement, particularly through antenatal care services. Such approaches are essential to support more effective anemia prevention strategies in maternal health programs.

## Authors' Contribution

All authors contributed equally to every aspect of this research, from the initial study design and data collection to the analysis, interpretation, manuscript preparation, and critical revisions. All authors have read and approved the final version for submission.

## Conflict of Interests Statement

The authors declare no conflict of interest.

## Data Availability

The dataset presented in the study is available on request from the corresponding author during submission or after publication.

## Informed Consent

Written informed consent was obtained from the participants.

## References

- Amiruddin, R. (2014). *Determinant Kesehatan Ibu dan Anak*. Jakarta: Trans Info Media.
- Aritonang, I. (2015). *Gizi Ibu dan Anak*. Yogyakarta: LeutikaPrio.
- Badan Kebijakan Pembangunan Kesehatan. (2018). *Survei Kesehatan Indonesia 2023 dalam angka*. Kota Kediri dalam angka.
- Boskey, E. (2019). Health Belief Model. *Rural Health Information Hub*. Retrieved from <https://www.ruralhealthinfo.org>
- Conner, M., & Norman, P. (2003). *Predicting Health Behaviour: Research and Practice with Social Cognition Models* (2nd ed.). Buckingham: Open University Press.
- Ernawati, W., Andarwati, D., Hanung, A., & Dhamayanti, R. (2023). Faktor-faktor yang mempengaruhi anemia pada ibu hamil. *Jurnal Ilmiah Multidisiplin*, 1(7), 231–240.
- Fatimah, F., Hadju, V., Bahar, B., & Abdullah, Z. (2011). Pola konsumsi dan kadar hemoglobin pada ibu hamil di Kabupaten Maros, Sulawesi Selatan. *Makara Kesehatan*, 15.
- Glanz, K., Rimer, B., & Lewis, F. (2002). *Health Behavior and Health Education: Theory, Research and Practice*. San Francisco: Jossey-Bass.
- Hidayah, P. D., & Mardiana. (2021). Faktor risiko yang mempengaruhi kejadian anemia pada ibu hamil di wilayah kerja Puskesmas Nusawungu II Cilacap. *Jurnal Ilmu Kesehatan*, 10, 285–296.
- Hidayat, N., & Sunarti. (2015). Validitas pemeriksaan kadar hemoglobin menggunakan metode Hb Meter pada remaja putri di MAN Wonosari. *Jurnal Biometrika*, 9(1), 11–18.
- Imron, A., Heryyanoor, H., & Syamil, A. (2023). *Metodologi Penelitian Kesehatan*. Martapura: Universitas Lambung Mangkurat.
- Izzati, A. I., Tamtomo, D., & Rahardjo, S. S. (2021). Hubungan tingkat kepatuhan konsumsi tablet Fe dengan kejadian anemia ibu hamil di Puskesmas Margasari. *Jurnal Kesehatan Masyarakat*, 9(2), 105–114.
- Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A decade later. *Health Education Quarterly*, 11(1), 1–47.
- Juandri, D., et al. (2022). Faktor yang mempengaruhi kepatuhan konsumsi tablet Fe pada ibu hamil. *Jurnal Ilmiah Kebidanan*, 12(1), 45–56.
- Kementerian Kesehatan RI. (2018). *Laporan Nasional Rischesdas 2018*. Lembaga Penerbit Balitbangkes.
- Kemendes RI. (2021). *Buku Saku Merencanakan Kehamilan Sehat*. Jakarta.
- Laturake, R., Nurbaya, S., & Hasnita. (2022). Faktor-faktor yang mempengaruhi anemia pada ibu hamil di wilayah kerja Puskesmas Tamalanrea Jaya, Makassar. *JIMPK*, 3(4), 51–61.
- Laila, M., & Fitri, A. (2021). Perbandingan hasil pemeriksaan hemoglobin secara digital terhadap hasil pemeriksaan hemoglobin secara cyanmethemoglobin. *Jurnal Biomedik*, 3(3), 63–68.
- Lestari, N. M. et al. (2025). Hubungan peran tenaga kesehatan dengan kepatuhan konsumsi tablet Fe. *Jurnal Kesehatan Ibu dan Anak*, 7(1), 67–78.
- Mariene, W. D. (2020). Keteraturan kunjungan ANC dan kepatuhan konsumsi tablet Fe. *Jurnal Ilmiah Kebidanan*, 5(2), 32–39.
- Puspita, A. E. D. (2022). Hubungan tingkat pengetahuan anemia, kepatuhan konsumsi tablet Fe, dan status kekurangan energi kronis dengan kejadian anemia pada ibu hamil di Puskesmas Semper Barat, Jakarta Utara. *Jurnal Kesehatan Reproduksi*, 6(3), 221–234.
- Pratiwi, N., & Basuki, H. (2016). Prevalence of maternal care and health facility availability in national health insurance card system in Indonesia. *Jurnal Kebijakan Kesehatan Indonesia*, 5(2), 42–52.
- Pratiwi, R., et al. (2024). Dukungan suami dan kejadian anemia pada ibu hamil. *Jurnal Kesehatan Ibu dan Anak*, 8(1), 15–25.
- Proverawati, A., & Asfuah, S. (2017). *Buku Ajar Gizi untuk Kebidanan*. Yogyakarta: Nuha Medika.
- Putri, G. S. Y., Sulistiawati, S., & Laksana, M. A. C. (2023). Analisis faktor risiko anemia pada ibu hamil di Kabupaten Gresik tahun 2021. *Jurnal Riset Kebidanan Indonesia*, 6(2), 119–129.
- Saifuddin, A. (2012). *Manajemen Pelayanan Kesehatan*. Jakarta: EGC.
- Soeprono, H. (2015). *Anemia pada Wanita Hamil*. Yogyakarta: UGM Press.

- Talimbung, V. (2023). Edukasi pencegahan anemia pada ibu hamil. *Jurnal Inovasi dan Pengabdian Masyarakat Indonesia*, 2(3), 56–60.
- Waryana. (2014). *Gizi Reproduksi*. Yogyakarta: Pustaka Rihama.
- Wibowo, N., Irwinda, R., & Hiksas, R. (2021). *Anemia Defisiensi Besi pada Kehamilan*. Jakarta: UI Publishing.
- World Health Organization. (2021). *Anemia in Pregnancy: Global Prevalence and Implications*. Geneva.
- Yuni, N. E. (2019). *Kelainan Darah*. Yogyakarta: Nuha Medika.
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