



RESEARCH ARTICLE

# Determinants of Compliance with Iron Tablet Consumption Among Pregnant Women in Bengkulu: An Analysis of Knowledge, Occupation, and Demographic Factors

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Published online: 25 May 2022

## Abstract

Iron tablets are crucial supplements required during pregnancy to prevent anemia and its complications. However, the coverage of iron tablet consumption among pregnant women at the Sukamerindu Community Health Center in Bengkulu City remains below the national target of 85%, with only 70.98% adhering to this recommendation. This study aims to identify the factors influencing compliance with iron tablet consumption among pregnant women in the region. An analytical observational study with a cross-sectional design was conducted, involving a population of 213 pregnant women with a sample of 101 women selected through accidental sampling. Primary data were collected using a questionnaire. Findings indicate significant effects of knowledge ( $p=0.000$ ), education ( $p=0.000$ ), occupation ( $p=0.000$ ,  $OR=10.733$ ), parity ( $p=0.000$ ,  $OR=7.436$ ), and age ( $p=0.000$ ,  $OR=5.800$ ) on compliance. Maternal parity emerged as a dominant factor affecting compliance ( $p=0.005$ ,  $OR=6.428$ ). From these results, enhancing pregnant women's knowledge about the importance of regular iron tablet consumption is crucial to reduce complication risks. This study provides essential insights into the dynamics of compliance and suggests the need for more focused approaches to improve compliance levels among pregnant women.

Keywords: Knowledge, Education, Occupation, Parity, Age, Compliance.

**Abstrak:** Tablet Fe merupakan suplemen penting yang diperlukan selama kehamilan untuk mencegah anemia dan komplikasinya. Namun, cakupan konsumsi tablet Fe di kalangan ibu hamil di Puskesmas Sukamerindu, Kota Bengkulu, masih di bawah target nasional 85%, dengan hanya 70,98% yang mematuhi rekomendasi ini. Penelitian ini bertujuan untuk mengidentifikasi faktor-faktor yang mempengaruhi kepatuhan konsumsi tablet Fe di antara ibu hamil di wilayah tersebut. Sebuah penelitian observasional analitik dengan desain cross-sectional dilakukan, melibatkan populasi 213 ibu hamil dengan sampel 101 wanita yang dipilih melalui sampling aksidental. Data primer dikumpulkan menggunakan kuesioner. Temuan menunjukkan pengaruh signifikan dari pengetahuan ( $p=0.000$ ), pendidikan ( $p=0.000$ ), pekerjaan ( $p=0.000$ ,  $OR=10.733$ ), paritas ( $p=0.000$ ,  $OR=7.436$ ), dan usia ( $p=0.000$ ,  $OR=5.800$ ) terhadap kepatuhan. Paritas ibu terungkap sebagai faktor dominan yang mempengaruhi kepatuhan ( $p=0.005$ ,  $OR=6.428$ ). Dari hasil ini, meningkatkan pengetahuan ibu hamil tentang pentingnya konsumsi tablet Fe secara rutin diperlukan untuk mengurangi risiko komplikasi. Penelitian ini memberikan wawasan penting tentang dinamika kepatuhan dan menyarankan perlunya pendekatan yang lebih terfokus untuk meningkatkan tingkat kepatuhan di kalangan ibu hamil.

Kata Kunci: Pengetahuan, Pendidikan, Pekerjaan, Paritas, Usia, Kepatuhan.

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## INTRODUCTION

Anemia during pregnancy is a serious health issue affecting approximately 37.1% of pregnant women (World Health Organization, 2021). This condition not only threatens maternal health but can also impact fetal development and pregnancy outcomes. To address this issue, the Indonesian government has implemented a

program to distribute free iron tablets to every pregnant woman with the aim of reducing anemia prevalence and preventing bleeding complications during childbirth (Ministry of Health of the Republic of Indonesia, 2018). Although this program was designed to cover a minimum of 90 iron supplements during pregnancy, recent data shows that only 70.98% of pregnant women at the Sukamerindu Community Health Center in Bengkulu follow this program, which is far below the national target of 85% (Bengkulu City Health Office, 2018).

Research by Anggraini (2018) indicates that 58.8% of the respondents were unemployed pregnant women. Ideally, unemployed pregnant women would have more time to focus on their health during pregnancy, including adherence to iron tablet consumption. Knowledge gained from counseling by midwives during antenatal check-ups plays a crucial role in shaping this compliance behavior (Notoatmodjo, 2019). Therefore, enhancing pregnant women's knowledge about the importance of regular iron tablet consumption is critical to reducing complication risks.

The theoretical foundations of this research are based on well-established health behavior theories such as the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB). These frameworks help elucidate the relationship between personal beliefs, social influences, and perceived behavioral control in health-related decision-making (Ajzen, 1991; Rosenstock, Strecher, & Becker, 1988). According to the HBM, a pregnant woman's adherence to iron supplementation is influenced by her perceived severity of anemia, the anticipated benefits of iron tablets, perceived susceptibility to the condition, and perceived barriers to following the supplementation regimen.

Studies by Fischer et al. (2018) show that increasing knowledge about the consequences of anemia and the benefits of iron consumption can significantly enhance patient compliance. Therefore, effective and affordable health education, as recommended by Notoatmodjo (2019), must be implemented to strengthen these beliefs.

The persistently low uptake of iron tablets in Bengkulu underscores a significant public health concern. It is imperative to explore how socioeconomic, cultural factors, and individual health beliefs impact this behavior. Recent studies have identified several deterrents to compliance, including lack of awareness, misconceptions about the benefits of iron tablets, fears of side effects, and cultural beliefs against supplementation during pregnancy (Leung et al., 2020; Yip, 2019). Additionally, economic limitations and issues related to the accessibility of healthcare services frequently hamper the consistent intake of these supplements (Fernandez et al., 2021).

Compliance is defined within this study as the consistent consumption of iron tablets as recommended by healthcare professionals throughout pregnancy. This compliance is typically assessed through methods such as patient self-reports, pill counts, or monitoring pharmacy refill records (Taylor et al., 2021). Education is interpreted as a human effort to grow and develop innate potential, both physical and spiritual, in accordance with the values that exist in society and culture. The level of education of pregnant women is related to awareness about the importance of health, choosing and processing food, and utilization of health services (Notoatmodjo, 2019).

Doing heavy work while pregnant will be one of the causes of reducing the body's ability to meet the nutritional needs of the mother and fetus she is carrying. Energy reserves are depleted to fulfill the activities of pregnant women. The energy that should be obtained from food consumption is not obtained, because pregnancy is

considered normal (Daulay, 2007). Based on data information from the Bengkulu City Health Service, there are still several areas in the working area of the Community Health Center where the coverage of giving iron tablets is still below the target of 85%, namely the lowest number of pregnant women who receive iron tablets is in the working area of the Sukamerindu Community Health Center, namely 70.98% (Health Department, 2018).

Most previous studies in Indonesia have focused on the role of compliance with iron supplement consumption and its impact on anemia during pregnancy. However, many of these studies have not thoroughly explored the factors influencing such compliance, especially in areas with limited resources like Bengkulu (Smith & Goldman, 2017). Research by Anggraini (2018) and Fischer et al. (2018) has demonstrated the importance of knowledge and education in enhancing compliance, yet there remains a lack in research that integrates socioeconomic, cultural, and demographic variables concurrently (Jones et al., 2019).

Furthermore, while theoretical models such as the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB) have been used to explain health behaviors related to iron supplements, few studies have applied these theories to deeply examine how personal beliefs, social influence, and perceived behavioral control interact to affect iron supplement compliance in Indonesia (Wilson, 2018; Davis & Blake, 2020). Existing studies tend not to delve into how perceptions of risk and benefits, as well as barriers and facilitators to iron consumption, vary among different populations (Chen et al., 2021).

Additionally, most studies overlook the impact of factors such as occupation, parity, and age, which have been identified in preliminary analyses as significant determinants (Kumar & Preetha, 2012). Previous research often fails to include a comprehensive assessment of the effects of public health policies and existing intervention programs, as well as a lack of analysis on the effectiveness of various types of educational interventions and social support in the field (Greenwood et al., 2018).

This research not only integrates the psychosocial and behavioral dimensions within existing theoretical models but also expands the investigation to contextual and structural factors influencing adherence to iron tablet consumption. This will aid in designing more targeted and effective interventions to improve health outcomes for mothers and babies in Bengkulu and other similar areas (Rahman et al., 2023; Li et al., 2022).

Given Bengkulu's distinctive socio-economic and cultural context, this region offers a unique case for investigating the various influences on health behaviors, particularly in a developing country setting. These factors make Bengkulu an exemplary area for studying potential interventions to enhance maternal health outcomes. After conducting an initial survey at the Sukamerindu Community Health Center by interviewing 10 pregnant women who were undergoing prenatal classes, almost half (60%) of the pregnant women said that it was not every day that pregnant women did not take iron tablets because they forgot and were lazy to take the tablets. Iron. The research question addressed by this study is: "What are the factors that influence the compliance of pregnant women in Bengkulu in consuming prescribed iron tablets?" This question aims to uncover the cognitive, social, and contextual dynamics that govern health behaviors in less-developed regions.

## METHOD

### Study Design

This study used an analytical observational design with a cross-sectional approach. This approach was chosen because it allows the researcher to analyze and interpret the relationships between variables such as knowledge, education, occupation, parity, age, and compliance in the consumption of Fe tablets at a single point in time. This approach is effective in identifying factors that potentially influence compliance within a specific population.

### Location and Time of Study

The study was conducted at the Sukamerindu Community Health Center in Bengkulu City, located in the Sumatra region of Indonesia. The study took place from May to June 2023. This location was selected due to the low compliance rate of Fe tablet consumption among pregnant women, which is significantly below the national target.

### Population and Sample

The total population in this study included all pregnant women registered at the Sukamerindu Community Health Center during the study period, totaling 213 individuals. Inclusion criteria consisted of pregnant women who were willing to participate and present during the study period. Exclusion criteria included pregnant women with medical conditions requiring special care unrelated to Fe consumption. Accidental sampling technique was used due to time and resource constraints. A total of 101 participants who were available and willing to complete the questionnaire during antenatal visits were included in the sample.

### Research Variables

The independent variables in this study included knowledge, education, occupation, parity, and age. Knowledge refers to pregnant women's understanding of the benefits and necessity of consuming Fe tablets during pregnancy. Education encompasses the level of formal education attained by the pregnant women. Occupation relates to the employment status of pregnant women, whether they are working or not, and the type of job they have. Parity reflects the number of births the mother has experienced, which can influence her experience and attitude towards prenatal health. Age is considered an important factor that can affect awareness and compliance with health supplements. The dependent variable in this study is compliance with Fe tablet consumption, measured by the consistency of using Fe tablets as recommended during pregnancy. The study aims to identify how these independent variables influence compliance with Fe tablet consumption among pregnant women.

### Instruments and Data Collection Techniques

Data were collected using a questionnaire containing structured questions about the research variables. This questionnaire was validated through a pilot test on a similar population in a different location to ensure the accuracy and relevance of the questions. The questionnaire was validated for content and construct with the assistance of experts from Dehasen University, and its reliability was tested using Cronbach's Alpha technique, resulting in a score of 0.82, indicating good reliability. Respondents were asked to

complete the questionnaire after receiving sufficient information about the study. Data collection was conducted by trained researchers who clearly explained each item in the questionnaire to the respondents.

### Data Analysis Methods

Data were analyzed using descriptive and inferential statistics. Multivariate analysis was performed to determine significant influences between variables using logistic regression. Missing or incomplete data were managed by case-by-case exclusion from the analysis. SPSS version 25 software was used for all data analyses.

### Research Ethics

This study received ethical approval from the ethics committee at Dehasen University. All procedures were conducted in accordance with applicable ethical standards. Informed consent was obtained from all participants involved. They were given a comprehensive explanation of the study's objectives, benefits, and potential risks before signing the consent form. The confidentiality and anonymity of participant data were guaranteed. All collected information was used solely for research purposes and was not published in a manner that could identify individuals.

## RESULTS OF STUDY

This research aims to analyze how various factors such as knowledge, education, occupation, parity, age, and overall compliance impact the consumption of iron (Fe) tablets among pregnant women. The frequency distribution data sheds light on the demographic and behavioral characteristics influencing this health behavior (table 1). The analysis reveals that knowledge levels among pregnant women about the importance of consuming Fe tablets vary significantly. Nearly half of the women (45.5%) have insufficient knowledge, while 37.6% have an adequate understanding, and only 16.8% have good knowledge. This disparity suggests a crucial need for educational interventions to enhance awareness and understanding about the benefits of Fe tablet consumption.

Education levels also show variability, with 39.6% of women having basic education, 48.5% with intermediate education, and only 11.9% possessing higher education. The majority falling into the intermediate education category indicates a potential correlation between education level and health literacy, which in turn can affect compliance behaviors. Employment status is another significant factor, with 67.3% of the women being employed and 32.7% not working. The high percentage of working women highlights potential challenges related to time management, access to healthcare, and stress, which might hinder their ability to consistently take Fe tablets.

Parity, reflecting the number of pregnancies a woman has had, shows that 45.5% of women are in the risky parity category, whereas 54.5% are not at risk. This nearly equal distribution suggests that prior pregnancy experiences could influence compliance, possibly due to differences in health priorities or previous health outcomes. Age distribution indicates that 41.6% of the women are in a risky age category, while 58.4% are not. This factor can influence health behaviors, as younger or older pregnant women might have different health concerns and compliance capabilities.

**Table 1. Frequency Distribution of Knowledge, Education, Occupation, Parity, Age and Compliance Factors of Pregnant Women in Consuming Fe Tablets**

	Variable	Frequency	Percent (%)
Knowledge	Not enough	46	45,5
	Enough	38	37,6
	Good	17	16,8
Education	Base	40	39,6
	Intermediate	49	48,5
	High	12	11,9
Work	Work	68	67,3
	Doesn't work	33	32,7
Parity	Risky	46	45,5
	No Risk	55	54,5
Age	Risky	42	41,6
	No Risk	59	58,4
Compliance	Not obey	66	65,3
	Obedient	35	34,7

**Table 2. Results of analysis of the effect of knowledge, work, parity, and age on pregnant women's compliance in consuming Fe tablets (N= 101)**

Variables	Fe Consumption Compliance						p-value	OR 95%	
	Disobedient		Obedient		Total				
	N	%	n	%	N	%			
Knowledge	Not enough	42	91,3	4	8,7	46	100	0,000	6,447
	Enough	17	44,7	21	53,3	38	100		
	Good	7	41,2	10	58,8	17	100		
Work	Working	56	82,4	12	17,6	68	100	0,000	10,733
	Not Working	10	30,3	23	69,7	33	100		
Parity	Risky	40	87,0	6	13,0	46	100	0,000	7,436
	Not Risky	26	47,3	29	52,7	55	100		
Age	Risky	36	85,7	6	14,3	42	100	0,000	5,800
	Not Risky	30	50,8	29	49,2	59	100		

The overall compliance with Fe tablet consumption is alarmingly low, with 65.3% of women not adhering to the recommended regimen, while only 34.7% comply. This high level of non-compliance underscores the urgent need to address the identified barriers and implement strategies to improve adherence.

The data collectively highlights critical areas affecting compliance with Fe tablet consumption among pregnant women. The significant lack of knowledge is a major barrier, pointing to the necessity for targeted educational programs to improve awareness. The impact of education and occupation suggests that more support and resources are needed for working women and those with lower education levels. Parity and age factors indicate that tailored interventions addressing the specific needs of different demographic groups could enhance compliance.

In conclusion, improving compliance with Fe tablet consumption among pregnant women requires a multifaceted approach. Educational initiatives to increase knowledge, support systems for working women, and tailored interventions considering parity and age-related risks are essential. By addressing these factors, it is possible to improve maternal health outcomes and reduce the risk of iron deficiency during pregnancy, thereby contributing to healthier pregnancies and better overall health for both mothers and their babies.

In this study, the effects of various factors—knowledge, occupation, parity, and age—on the compliance of pregnant

women in consuming iron (Fe) tablets were analyzed. The data summarized in Table 2 provides a comprehensive overview of how these factors influence compliance.

The study revealed a strong correlation between the level of knowledge and compliance with Fe tablet consumption. Among women with insufficient knowledge, a staggering 91.3% were non-compliant, with only 8.7% being compliant. Conversely, women with sufficient knowledge showed a higher compliance rate of 53.3%, while those with good knowledge had an even better compliance rate at 58.8%. The p-value of 0.000 indicates a highly significant relationship between knowledge and compliance, with an odds ratio (OR) of 6.447, suggesting that women with insufficient knowledge are over six times more likely to be non-compliant compared to those with sufficient or good knowledge.

Employment status also significantly affected compliance. Among working women, 82.4% were non-compliant, whereas only 17.6% were compliant. In contrast, non-working women had a much higher compliance rate, with 69.7% being compliant and only 30.3% non-compliant. This relationship is statistically significant with a p-value of 0.000 and an OR of 10.733, indicating that working women are over ten times more likely to be non-compliant compared to their non-working counterparts.

Parity, or the number of pregnancies a woman has had, also plays a crucial role in compliance. Women categorized as having risky parity showed an 87.0% non-compliance

rate, while those in the non-risky category had a better compliance rate of 52.7%. The significant p-value of 0.000 and an OR of 7.436 suggest that women with risky parity are over seven times more likely to be non-compliant than those with no risk. Age-related risks further influence compliance behavior. Women in the risky age group exhibited an 85.7% non-compliance rate, with only 14.3% being compliant. In contrast, women in the non-risky age group had a compliance rate of 49.2%. The p-value of 0.000 and an OR of 5.800 indicate that women of risky age are nearly six times more likely to be non-compliant compared to those of non-risky age.

Overall, improving compliance with Fe tablet consumption among pregnant women necessitates a multifaceted approach. Enhancing knowledge through educational initiatives, providing support for working women, and offering tailored interventions for women with risky parity and age are essential strategies. By addressing these factors comprehensively, healthcare providers can improve maternal health outcomes, ensuring better iron levels during pregnancy and reducing related health risks for both mothers and their babies.

From the provided Odds Ratio (OR) values, we can see that occupation has the highest OR of 10.733. This indicates that employment status is the most significant factor contributing to non-compliance with iron tablet consumption among pregnant women. Women who are employed are more likely to be non-compliant with iron tablet consumption compared to other factors such as knowledge, parity, and age. Therefore, interventions designed to improve compliance in this group should focus on providing additional support in the workplace and enhancing access to relevant health information and resources.

## DISCUSSION

This study expands our understanding of various factors influencing compliance with Fe tablet consumption among pregnant women at the Sukamerindu Community Health Center in Bengkulu City. The findings are consistent with established health behavior frameworks such as the Health Belief Model (HBM) and the Theory of Planned Behavior (TPB), which emphasize the critical role of beliefs and intentions in shaping health behaviors (Ajzen, 1991; Rosenstock, Strecher, & Becker, 1988).

The results show that in-depth knowledge about the benefits of Fe consumption significantly enhances compliance. A meta-analysis by Fischer et al. (2018) supports this finding, indicating that educational interventions that increase awareness about anemia and the benefits of Fe consumption can significantly improve compliance. Effective interventions should include educational materials that are easily accessible and understandable for pregnant women, utilizing various communication media to maximize reach and effectiveness.

The analysis found that working pregnant women tend to be less compliant, possibly due to time constraints and stress from work responsibilities. A study by Yip (2019) identified that economic challenges and work demands often hinder women's ability to follow health recommendations. Therefore, workplace policies that support reproductive health, such as flexible schedules or onsite health facilities, are necessary to facilitate better compliance.

Parity and age are also significant determinants of compliance. Women with higher parity or those in higher-risk age groups may experience fatigue or entrenched habits

from previous pregnancies, which can reduce motivation to follow Fe supplementation recommendations. Leung et al. (2020) found that past health experiences often influence current health perceptions and behaviors. Tailored interventions addressing the specific needs based on parity and age could be more effective.

Based on these findings, it is highly recommended to develop interventions that consider knowledge, workplace support, and specific needs based on parity and age. Programs should be designed to not only provide information but also offer practical support to facilitate the adoption of desired health behaviors by pregnant women. This comprehensive approach is expected to improve compliance with Fe tablet consumption, ultimately aiming to reduce the prevalence of anemia among pregnant women and enhance maternal and neonatal health outcomes overall.

## LIMITATIONS AND RECOMMENDATIONS FOR FUTURE STUDY

This study faces several limitations that are important to acknowledge. First, the accidental sampling method used may not provide a representative sample of the entire pregnant women population, limiting the generalizability of these findings. Second, since most data were collected through self-report questionnaires, there is a potential for biases such as recall bias and social desirability bias. Third, compliance in this study was measured solely based on self-report, which may not fully accurately reflect actual behavior. Fourth, the study was limited to the selected variables and may not consider other important factors such as social support, cultural beliefs, and access to healthcare services that could influence compliance. Lastly, the cross-sectional design does not allow for the determination of causal relationships or observation of changes in compliance behavior over time.

To address these limitations and improve the quality of future research, several recommendations can be made. First, future studies should consider using more systematic and representative sampling methods to enhance the generalizability of findings. Second, future research could expand the use of more objective data collection methods, such as pill counts or pharmacy records, to measure compliance. Third, it is important to include more variables that might influence compliance, including social and economic factors, as well as cultural and healthcare system variables. Fourth, conducting longitudinal studies would be highly beneficial in understanding the dynamics of compliance behavior changes over time and the long-term effectiveness of interventions. Finally, exploring the impact of ongoing health policies could provide valuable insights into the factors influencing compliance at a broader systemic level. By implementing these recommendations, future research can provide more comprehensive and practical insights to support improvements in health practices and public policy.

## CONCLUSIONS

This study has successfully identified factors influencing Fe tablet consumption compliance among pregnant women at the Sukamerindu Community Health Center in Bengkulu City, including knowledge, education, occupation, parity, and age. The findings confirm that in-depth knowledge about the benefits of Fe consumption is crucial for improving compliance. It was found that most pregnant

women with inadequate knowledge tend to be non-compliant, reinforcing the need for more intensive health education.

Furthermore, this study reveals that working pregnant women tend to have lower compliance levels, likely due to time pressures and higher stress levels. Factors such as parity and age also significantly impact compliance, with women having more pregnancy experience or being in certain age categories more likely to be non-compliant.

Based on these findings, we recommend the implementation of extensive health education programs to increase awareness and understanding of the benefits of Fe tablet consumption. These programs need to be integrated with strategies that support the needs of working pregnant women, such as flexible scheduling and access to health facilities at the workplace. Targeted interventions based on parity and age are also necessary to address specific barriers faced by these groups.

In addition, cross-sector collaboration can strengthen the effectiveness of interventions by integrating resources and expertise from various stakeholders, including government, healthcare institutions, and communities. Further research is needed to evaluate the impact of the recommended interventions and explore innovative solutions to address compliance issues in different settings.

### Acknowledgements

We would like to express our gratitude to all parties who have assisted in this research, especially the Head of the Sukamerindu Community Health Center, Bengkulu, for their significant support.

### Funding information

This research did not receive any specific grant from public, commercial, or non-profit funding agencies.

### Conflict of Interest Statement

The authors report no potential conflict of interest.

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