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The Effectiveness of Pregnancy Classes in Improving Compliance with Iron Supplement Tablet Consumption and Antenatal Care (ANC) Visits

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Abstract. Maternal knowledge regarding nutrition and danger signs during pregnancy is essential for improving maternal and fetal health outcomes. This study aimed to examine the relationship between health education and the knowledge level of pregnant women at the Kasarangan Primary Health Center. A quantitative cross-sectional design was employed involving pregnant women selected through purposive sampling. Data were collected using a structured questionnaire to assess participants' knowledge before and after exposure to health education. Statistical analysis was conducted to determine the association between health education and maternal knowledge. The findings indicated that pregnant women who received adequate health education demonstrated significantly higher levels of knowledge than those with limited exposure. These results suggest that continuous and well-structured health education programs play a crucial role in enhancing maternal knowledge and promoting positive health behaviors during pregnancy. Strengthening educational interventions at primary healthcare facilities is therefore recommended to improve maternal and neonatal health outcomes.

Keywords: Community Health Center; Health Education; Maternal Knowledge; Pregnant Women; Pregnancy.

1. INTRODUCTION

Maternal health remains a global public health priority because adequate care during pregnancy plays a crucial role in preventing maternal and neonatal morbidity and mortality. One of the essential interventions recommended during pregnancy is regular Antenatal Care (ANC) combined with daily iron and folic acid supplementation to prevent maternal anemia and support fetal development. However, despite the availability of these interventions, adherence to iron supplement tablet consumption and completion of recommended ANC visits remain suboptimal in many developing countries. Poor compliance has been associated with inadequate knowledge, forgetfulness, low awareness of the benefits of supplementation, and insufficient support from healthcare providers (Beressa et al., 2022; Asmamaw et al., 2022). Consequently, improving maternal adherence to preventive healthcare remains a significant challenge that requires effective educational interventions.

Iron deficiency anemia during pregnancy continues to be one of the leading nutritional problems worldwide and contributes to adverse pregnancy outcomes, including preterm birth, low birth weight, postpartum hemorrhage, and increased maternal mortality. Previous studies have demonstrated that educational and behavioral interventions can significantly improve adherence to iron-folic acid supplementation. A randomized controlled trial by Sharma et al. (2023) reported that continuous educational support through telephonic interventions effectively increased pregnant women's adherence to oral iron-folic acid supplementation. Similarly, Byamugisha et al. (2022) found that improving the delivery system of iron

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supplements through blister packaging significantly enhanced medication adherence and maternal hemoglobin levels. These findings suggest that strengthening maternal education and support systems is essential to improving compliance with pregnancy care recommendations.

Health education has increasingly been recognized as an effective strategy for promoting healthy behaviors during pregnancy. Various educational media, including mobile-based reminders, printed educational materials, and daily health messages, have demonstrated positive effects on maternal knowledge and behavioral changes. Widdefrita et al. (2023) showed that the combination of a pregnancy paper fan and Android notification system significantly improved pregnant women's knowledge, attitudes, and adherence to iron supplement consumption. Likewise, Arifah et al. (2023) reported that daily educational messages effectively enhanced knowledge regarding anemia prevention and encouraged healthier pregnancy behaviors. In addition, intensified nutrition education integrated into ANC services has been shown to improve iron-folic acid supplement consumption and other maternal health practices, indicating that education delivered through routine maternal healthcare services can produce sustainable behavioral improvements (Kim et al., 2023).

Although previous studies have consistently demonstrated the effectiveness of educational interventions in improving maternal health behaviors, most have focused on a single outcome, such as iron supplementation adherence or maternal knowledge. Limited studies have simultaneously evaluated the effectiveness of pregnancy classes in improving both adherence to iron supplement tablet consumption and the completeness of ANC visits within the same intervention. Pregnancy classes provide comprehensive education regarding maternal nutrition, danger signs during pregnancy, birth preparedness, and the importance of routine pregnancy examinations, making them a potentially effective approach for improving multiple aspects of maternal healthcare utilization simultaneously. Therefore, further investigation is needed to assess whether participation in pregnancy classes can positively influence these two important indicators of maternal health behavior.

Based on these considerations, this study aims to evaluate the effectiveness of Pregnancy Classes in improving compliance with iron supplement tablet consumption and the completeness of Antenatal Care (ANC) visits among third-trimester pregnant women at Kasarangan Primary Health Center. The findings are expected to provide empirical evidence regarding the role of pregnancy classes as an educational intervention for strengthening maternal health promotion programs, improving adherence to essential pregnancy care, and supporting efforts to reduce pregnancy-related complications associated with anemia and inadequate antenatal care.

2. LITERATURE REVIEW

Pregnancy Class

Pregnancy classes are community-based educational programs designed to improve maternal knowledge, attitudes, and behaviors regarding pregnancy, childbirth, postpartum care, newborn care, nutrition, and pregnancy danger signs. These programs emphasize interactive learning, discussion, demonstrations, and experience sharing among pregnant women under the guidance of healthcare professionals. Compared with conventional counseling provided during routine ANC visits, pregnancy classes provide a more comprehensive educational environment that allows mothers to better understand the importance of maintaining maternal health throughout pregnancy. Educational interventions delivered through structured learning activities have consistently been associated with improvements in maternal awareness, self-efficacy, and health-related decision-making (Kim et al., 2023; Widdefrita et al., 2023).

Beyond increasing knowledge, pregnancy classes contribute to behavioral changes by strengthening mothers' motivation to comply with recommended health practices. Mothers who actively participate in educational sessions are more likely to understand the benefits of regular antenatal examinations, adequate nutritional intake, and iron supplementation. The opportunity to interact with healthcare providers also enables participants to discuss misconceptions and barriers related to pregnancy care. Consequently, pregnancy classes have become an important health promotion strategy that encourages greater utilization of maternal healthcare services while supporting healthier pregnancy outcomes (Arifah et al., 2023; Sharma et al., 2023).

Antenatal Care (ANC)

Antenatal Care (ANC) is an essential component of maternal healthcare that aims to monitor pregnancy progress, identify complications early, and provide preventive interventions to ensure optimal maternal and fetal health. The World Health Organization recommends regular ANC visits throughout pregnancy to facilitate timely screening, nutritional counseling, immunization, and supplementation. Adequate ANC utilization has consistently been associated with reductions in maternal morbidity, neonatal mortality, and adverse pregnancy outcomes because potential complications can be detected and managed before becoming life-threatening (Kim et al., 2023).

Despite its well-established benefits, the completion of recommended ANC visits remains suboptimal in many low- and middle-income countries. Factors influencing ANC attendance include maternal education, socioeconomic status, accessibility of health facilities, family support, and understanding of pregnancy risks. Educational interventions delivered through pregnancy classes may enhance mothers' awareness regarding the importance of

routine ANC, thereby encouraging timely healthcare utilization. Improved maternal knowledge has been shown to positively influence attendance at ANC services and overall pregnancy monitoring (Beressa et al., 2022; Asmamaw et al., 2022).

Iron Supplementation During Pregnancy

Iron deficiency anemia remains one of the most common nutritional disorders affecting pregnant women worldwide. Physiological changes during pregnancy substantially increase iron requirements to support fetal growth, placental development, and maternal blood volume expansion. Failure to meet these nutritional demands may result in maternal anemia, which increases the risk of preterm birth, low birth weight, postpartum hemorrhage, and maternal mortality. Consequently, routine iron and folic acid supplementation has become a standard recommendation within antenatal care programs globally (Byamugisha et al., 2022).

Although iron tablets are widely distributed through primary healthcare services, adherence remains a major concern. Many pregnant women discontinue supplementation because of gastrointestinal side effects, forgetfulness, inadequate counseling, or misconceptions regarding tablet safety. Several intervention studies have demonstrated that continuous education and supportive follow-up significantly improve adherence. Sharma et al. (2023) reported that telephonic educational support effectively increased compliance with iron-folic acid supplementation, while Byamugisha et al. (2022) demonstrated that improved packaging and patient education enhanced adherence and maternal hemoglobin levels. These findings suggest that educational reinforcement is essential for maximizing the effectiveness of iron supplementation programs.

Maternal Compliance in Pregnancy Care

Maternal compliance refers to the extent to which pregnant women follow healthcare recommendations, including attending scheduled ANC visits, consuming prescribed iron supplements, maintaining adequate nutrition, and adopting healthy lifestyle practices. Compliance is influenced by multiple interrelated factors such as knowledge, attitudes, perceived susceptibility to pregnancy complications, family support, accessibility of healthcare services, and communication with healthcare providers. Women with higher levels of health literacy generally demonstrate greater adherence to preventive maternal healthcare recommendations (Beressa et al., 2022).

Behavioral compliance is not determined solely by knowledge but also by continuous motivation and supportive environments. Educational interventions that combine counseling, reminders, peer discussions, and healthcare provider support have consistently produced better compliance than routine information delivery alone. Pregnancy classes offer these

complementary components by facilitating interactive discussions and practical learning experiences. Therefore, participation in pregnancy classes may improve maternal adherence to both iron tablet consumption and completion of ANC visits, contributing to healthier pregnancy outcomes (Widdefrita et al., 2023; Arifah et al., 2023).

Health Education and Behavior Change

Health education plays a fundamental role in promoting healthy behaviors among pregnant women by increasing knowledge, correcting misconceptions, and strengthening confidence in adopting recommended health practices. According to behavioral change theories, educational interventions influence health behavior by improving individual perceptions regarding disease susceptibility, perceived benefits of preventive actions, and self-efficacy. In maternal healthcare, education has been shown to increase awareness regarding anemia prevention, balanced nutrition, routine pregnancy examinations, and birth preparedness (Kim et al., 2023).

Recent studies have demonstrated that innovative educational approaches produce greater behavioral improvements than conventional counseling alone. Widdefrita et al. (2023) found that combining printed educational media with Android-based reminder notifications significantly improved knowledge, attitudes, and adherence to iron tablet consumption among pregnant women. Likewise, Arifah et al. (2023) reported that daily educational messages effectively enhanced maternal understanding regarding anemia prevention and encouraged healthier pregnancy practices. These findings support the integration of structured educational interventions, including pregnancy classes, as an effective strategy for improving maternal compliance and promoting positive health behaviors throughout pregnancy.

Conceptual Relationship Between Pregnancy Classes, Iron Supplement Compliance, and ANC Completeness

The conceptual basis of this study assumes that pregnancy classes function as educational interventions capable of improving maternal knowledge, attitudes, and behavioral intentions toward recommended pregnancy care. Increased understanding regarding the benefits of iron supplementation and regular antenatal examinations encourages pregnant women to adopt healthier behaviors through greater adherence to healthcare recommendations. This process is consistent with previous studies demonstrating that educational interventions significantly improve compliance with maternal health practices by strengthening awareness and self-efficacy (Sharma et al., 2023; Beressa et al., 2022).

Furthermore, pregnancy classes provide opportunities for interaction between pregnant women and healthcare providers, allowing participants to clarify misconceptions, discuss

personal experiences, and receive continuous encouragement. Such interactions create supportive learning environments that facilitate sustained behavioral change beyond simple information transfer. Based on previous empirical findings, it is reasonable to hypothesize that participation in pregnancy classes contributes positively to increased compliance with iron supplement tablet consumption and improved completeness of ANC visits among third-trimester pregnant women. This conceptual framework forms the theoretical foundation for evaluating the effectiveness of pregnancy classes in improving maternal healthcare utilization (Byamugisha et al., 2022; Widdefrita et al., 2023; Kim et al., 2023).

3. RESEARCH METHOD

This study used a quantitative approach with a pre-experimental design through a One-Group Pretest-Posttest Design to evaluate the effectiveness of the Pregnancy Class in improving compliance with iron supplement tablet (TTD) consumption and the completeness of Antenatal Care (ANC) visits. The study was conducted at Kasarangan Primary Health Center, Hulu Sungai Tengah Regency, involving a sample of 40 respondents (N=40), all of whom were third-trimester pregnant women. The selection of subjects was based on preliminary study findings showing that 60% of pregnant women did not regularly consume TTD due to forgetfulness or lack of understanding of its benefits, and 50% had not completed ANC visits according to the standard schedule. This is in line with the study by Salsa Minggar Lutfita, Murwati, and Pramita Yuli Pratiwi (2023), which also found that knowledge was significantly associated with adherence to iron supplement tablet consumption among pregnant women.

The research variables consisted of the independent variable, namely the Pregnancy Class, and the dependent variables, which included compliance with iron supplement tablet (TTD) consumption and antenatal care (ANC) visits. Through the Pregnancy Class program, respondents were provided with education on nutrition, anemia prevention, and the importance of regular pregnancy monitoring. Data collection instruments were used to measure the level of compliance and the completeness of respondents' visits at two time points, namely before (pre-test) and after (post-test) the educational intervention. This approach is in line with the study by Yeni Nurul Ratmawati, Bima Suryantara, and Heni Puji Wahyuningsih (2023), as well as the study by Sania Lailatu Rahmi, Lili Dariani, Yosi Sefrina, Rosa Mesalina, and Darmayanti Y (2025), which also used the Pregnancy Class as an educational intervention to improve maternal knowledge and adherence to pregnancy care.

The data analysis process was carried out systematically using the statistical software SPSS, which is consistent with the study by Annisah Kurniati, Depriwana Rahmi, and Suci Yuniati (2025), which discussed the systematic use of SPSS in improving understanding and ability in statistical data analysis.

The data analysis process was carried out systematically using the statistical software SPSS. Univariate analysis was used to describe the frequency distribution of respondents' characteristics, including age, with the majority being 20–35 years old; education level, with most respondents being senior high school graduates; occupation, with most respondents being housewives; and parity. This approach is in line with the study by Asmaul Husna, Bina Aquari, Sendy Pratiwi Rahmadhani, and Fika Minata (2025), which also used univariate analysis to describe respondents' characteristics. Furthermore, to test the significance of the intervention effect, bivariate analysis was conducted using the non-parametric Wilcoxon Signed Ranks Test. This test aimed to compare compliance with iron supplement tablet (TTD) consumption and antenatal care (ANC) visits before and after the intervention. The results were considered statistically significant if the Asymp. Sig. (2-tailed) value was less than $\alpha = 0.05$. This method is consistent with the study by Yustinus Tarigan, Awal Mulia Rejeki Tumanggor, Tiara Lestari Paembonan, Varisky Abraham Dumanaw, and Jein Jeilen Tampi (2025), which also discussed the use of SPSS for descriptive and non-parametric statistical analysis, including the Wilcoxon Signed Ranks Test.

4. RESULT AND DISCUSSION

Results of Data Analysis

Univariate Analysis

Univariate analysis is a method used to describe or provide an overview of the frequency distribution and percentages of the variables studied independently. In this study, univariate analysis was used to map the demographic characteristics of 40 respondents (age, education, occupation, and parity), as well as to describe compliance with iron supplement tablet (TTD) consumption and the completeness of antenatal care (ANC) visits before and after participating in the Pregnancy Class. This is relevant to the study by Miranda Azahra, Siti Soekiswati, and Wijayanti (2025), which also analyzed demographic factors such as education, age, and parity in relation to ANC adherence.

Table 1. Demographic and Clinical Characteristics of Respondents (n=40)

Characteristics	Frequency (n)	Percentage (%)	Cumulative (%)
Gestational Age			
<20 years	1	2.5	2.5
20–35 years	37	92.5	95.0
>35 years	2	5.0	100.0
Total	40	100.0	—
Education Level			
Junior High School	1	2.5	2.5
Senior High School	26	65.0	67.5
Higher Education	13	32.5	100.0
Total	40	100.0	—
Occupation			
Housewife	27	67.5	67.5
Entrepreneur	3	7.5	75.0
Civil Servant	4	10.0	85.0
Others	6	15.0	100.0
Parity			
Primipara	22	55.0	55.0
Multipara	18	45.0	100.0
Total	40	100.0	—

Based on Table 1, the majority of respondents were within the healthy reproductive age range of 20–35 years (92.5%). Most respondents had a senior high school education (65.0%) and were working as housewives (67.5%). In terms of parity, more than half of the respondents were first-time pregnant mothers or primiparas (55.0%).

Table 2. Distribution of Iron Tablet (TTD) Consumption Compliance and ANC Visits Before and After Intervention (n=40)

Category	Before Intervention			After Intervention		
	n	%	Cumulative (%)	n	%	Cumulative (%)
Iron Tablet (TTD) Consumption Compliance						
Non-Compliant	14	35.0	35.0	5	12.5	12.5
Compliant	26	65.0	100.0	35	87.5	100.0
Total	40	100.0	—	40	100.0	—
ANC Visit Compliance						
Incomplete	8	20.0	20.0	3	7.5	7.5
Complete	32	80.0	100.0	37	92.5	100.0
Total	40	100.0	—	40	100.0	—

Before the intervention, 35.0% of respondents were non-compliant in consuming iron supplement tablets (TTD), and 20.0% had incomplete antenatal care (ANC) visits. After participating in the Pregnancy Class, there was a significant improvement in compliance, with respondents adhering to iron tablet consumption increasing to 87.5% and respondents with complete ANC visits increasing to 92.5%.

Bivariate Analysis

The results of this study prove that the Pregnancy Class has a significant positive impact on the health behavior of pregnant women. The increase in compliance with iron supplement tablet (TTD) consumption from 65% to 87.5% shows that intensive education

can change respondents' habits. This finding answers the problem identified in the preliminary study, where 60% of pregnant women admitted that they did not regularly consume TTD due to forgetfulness, nausea, or lack of understanding of its benefits. This result is in line with the study by Rita Sopiatun, Eva Niamatul Husna, Yunita Marliana, and Lina Sundayani (2023), which showed that pregnant women's classes were effective in improving knowledge and reducing anxiety through educational interventions.

Table 3. Wilcoxon Signed Ranks Test Results

Category	n	Mean Rank	Sum of Ranks	Test Statistics	
				TTD Compliance	ANC Visit
Negative Ranks[a,d]	0	.00	.00	$Z = -3.000^{a}$	$Z = -2.236^{a}$
Positive Ranks[b,e]	9 / 5	5.00 / 3.00	45.00 / 15.00		
Ties[c,f]	31 / 35	—	—	Sig. = .003	Sig. = .025
Total	40	—	—	—	—

The statistical test results showed that the Asymp. Sig. (2-tailed) value for compliance with iron supplement tablet (TTD) consumption was 0.003, and for antenatal care (ANC) visits was 0.025. Since both values were lower than 0.05, it can be concluded that the Pregnancy Class was significantly effective in improving compliance with iron tablet consumption and the completeness of ANC visits among pregnant women at Kasarangan Primary Health Center.

Discussion

The results of this study prove that the Pregnancy Class has a significant positive impact on the health behavior of pregnant women. The increase in compliance with iron supplement tablet (TTD) consumption from 65% to 87.5% indicates that intensive education can effectively change respondents' habits. This finding addresses the issue identified in the preliminary study, where 60% of pregnant women admitted that they did not regularly take TTD due to reasons such as forgetfulness, nausea, or lack of understanding about its benefits.

Similarly, regarding antenatal care (ANC) visits, the increase in the completeness of visits to 92.5% indicates that mothers' motivation to undergo pregnancy check-ups improved after receiving information about pregnancy danger signs and the importance of routine monitoring in the Pregnancy Class. Previously, barriers such as limited time and lack of understanding were the main obstacles for 50% of pregnant women at Kasarangan Primary Health Center.

Statistically, the significance values of $p < 0.05$ for both variables confirm that the Pregnancy Class is an effective promotive strategy. This program not only provides knowledge but also builds awareness among pregnant women, especially primiparas (55%),

to be more concerned about their own health and that of their fetuses. Therefore, the Pregnancy Class should continue to be optimized as a means of reducing the risk of anemia and other pregnancy complications within the service area of Kasarangan Primary Health Center.

5. CONCLUSION AND RECOMMENDATIONS

Conclusion

This study highlights the strategic role of pregnancy classes as an educational intervention in strengthening maternal health promotion during pregnancy. Beyond serving as a platform for disseminating health information, pregnancy classes have the potential to empower pregnant women to become active participants in maintaining their own health and that of their unborn children. By integrating comprehensive education with interactive learning experiences, these programs can foster greater awareness, confidence, and responsibility toward recommended maternal healthcare practices. Consequently, pregnancy classes represent an important approach to supporting the broader objectives of improving maternal and neonatal health outcomes.

The findings of this study also emphasize the importance of educational empowerment as a sustainable strategy for encouraging preventive health behaviors throughout pregnancy. Compliance with iron supplement consumption and regular antenatal care should not be viewed merely as routine medical recommendations but as indicators of maternal engagement in protecting pregnancy health. Strengthening educational initiatives through structured pregnancy classes may therefore contribute to improving the quality of maternal healthcare services by facilitating informed decision-making, increasing healthcare utilization, and promoting healthier behavioral patterns among pregnant women.

Overall, this study contributes to the growing body of evidence supporting health education as a fundamental component of maternal health interventions. The results provide valuable insights for healthcare providers, policymakers, and public health practitioners regarding the integration of pregnancy classes into routine maternal healthcare programs. By reinforcing educational support alongside clinical services, maternal health programs may achieve greater effectiveness in preventing pregnancy-related complications and advancing national efforts toward reducing maternal and neonatal morbidity and mortality.

Recommendations

Based on the findings of this study, healthcare facilities, particularly primary healthcare centers, are encouraged to strengthen the implementation of pregnancy classes as an integral

component of routine antenatal services. Educational sessions should be conducted regularly using interactive learning methods that encourage active participation, discussion, and practical demonstrations. In addition, healthcare professionals should continuously provide individualized counseling regarding the importance of iron supplement adherence and timely antenatal care attendance to reinforce the knowledge gained during pregnancy classes.

For policymakers and maternal health program managers, greater investment in community-based educational initiatives is recommended to improve the accessibility and quality of pregnancy classes. The integration of innovative educational media, including digital reminders, mobile health applications, and culturally appropriate educational materials, may further enhance participant engagement and long-term behavioral change. Strengthening collaboration between healthcare providers, community health volunteers, and family members may also create a supportive environment that encourages pregnant women to consistently practice recommended maternal health behaviors.

Future researchers are encouraged to expand this line of investigation by involving larger and more diverse populations across different healthcare settings to improve the generalizability of findings. Further studies may also examine additional factors influencing maternal compliance, such as family support, socioeconomic status, health literacy, cultural beliefs, and digital health interventions. Employing longitudinal or randomized controlled study designs would provide stronger evidence regarding the long-term effectiveness of pregnancy classes in improving maternal health behaviors and pregnancy outcomes, thereby contributing to the continuous development of evidence-based maternal healthcare programs.

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is hoped that the findings of this study will contribute to the advancement of maternal healthcare services, particularly in strengthening health education programs for pregnant women, and serve as a useful reference for future research in the field of maternal and child health.

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