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PREGNANCY ANEMIA EDUCATION AND MONITORING PROGRAM IN BANDUNGREJOSARI URBAN VILLAGE

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ABSTRACT

Introduction: Anaemia in pregnancy is a major public health issue linked to adverse maternal and neonatal outcomes, particularly in developing countries. In Bandungrejosari Village, Malang City, anaemia affects about 35% of pregnant women. This program aimed to implement community-based education and monitoring programme in improving knowledge, adherence to iron supplementation, and haemoglobin levels.

Methods: Community service was conducted with 20 pregnant women purposively selected from Puskesmas Janti. Eligible participants had a gestational age of ≥ 12 weeks and no haematological disorders. Data were collected using validated questionnaires on knowledge and adherence, and haemoglobin levels were measured using a portable hemoglobinometer. Statistical analysis employed paired t-tests and chi-square tests with a significance level of $p < 0.05$.

Results: The program significantly improved knowledge levels, with mean increases ranging from 38% to 42% ($p < 0.001$). Adherence to iron supplementation rose from 57% to 90%, while the prevalence of anaemia decreased from 35% to 18%. The mean haemoglobin concentration increased from 10.5 ± 0.8 g/dL to 12.2 ± 0.7 g/dL ($p < 0.001$).

Conclusion: The findings demonstrate that a community-based anaemia education and monitoring programme can effectively enhance knowledge, adherence to supplementation, and haemoglobin status among pregnant women. The authors declare no potential conflict of interest in conducting this study.

KEYWORDS

anemia; adherence; hemoglobin level; health education; pregnancy.

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1. INTRODUCTION

The prevalence of anaemia during pregnancy is a notable health issue that impacts several developing nations, Indonesia included. Anaemia in pregnant women is characterised by haemoglobin (Hb) levels below the established threshold, leading to severe consequences, including preterm birth, low birth weight, and a heightened risk of maternal death. Pregnancy anaemia is a significant concern in Indonesia, with recent statistics indicating a

frequency of 48% among pregnant women (Bizuneh & Azeze, 2022). The prevalence of anaemia among pregnant women in Bandungrejosari Village, Sukun District, Malang City, is estimated to reach approximately 35%, based on Puskesmas Janti records in 2023, which is consistent with the national prevalence of 48.9% reported in Indonesia (Riskasdas, 2018). Key contributing causes include insufficient understanding of anaemia, poor adherence to iron supplement intake, and an

inadequate diet. Frequently, this limited comprehension results in pregnant women being unaware of the significance of preventing anaemia by ensuring sufficient food intake and taking the appropriate iron supplements (Nahrisah et al., 2020).

This programme aims to address the relatively high prevalence of anaemia among pregnant women in the targeted group. Anaemia occurring during pregnancy can have distinct adverse effects on both the expectant mother and the developing foetus, including an elevated susceptibility to premature labour, low birth weight, and other health issues. This issue is attributed to three main factors: A considerable number of pregnant women residing in the urban village of Bandungrejosari lack sufficient understanding regarding the significance of nutrition during pregnancy, particularly in regard to the prevention and management of anaemia (Berhane & Belachew, 2022). The dissemination of knowledge regarding the consumption of iron-rich foods and other vital minerals still needs to be more adequately facilitated. There exist certain conventional attitudes and practices that provide less support for the health of pregnant women (Bahati et al., 2021). Certain women may choose to forgo specific meals that are crucial for preventing anaemia based on cultural or local belief systems. Furthermore, the poor economic conditions in these communities exacerbate the elevated incidence of anaemia during pregnancy. Many households face financial constraints that hinder their ability to afford nourishing and iron-rich meals (Tsegai et al., 2023).

The presence of anaemia in pregnant women has significant implications not just for maternal health but also for foetal development and the health of newborns. Profound consequences linked to anaemia encompass the potential for compromised foetal development, heightened occurrence of preterm labour, and diminished birth weight (Daghash et al., 2024). Hence, it is imperative to implement efficient intervention measures to tackle these problems at the

community level. The anaemia education and monitoring programme, implemented at the community level, aimed to tackle this issue by enhancing pregnant women's understanding of anaemia, promoting compliance with iron supplementation, and enhancing their iron status. The initiative encompasses systematic health education, dissemination of instructional resources, and consistent supervision by local health professionals (R. Ramachandran et al., 2023).

By adopting this method, it is anticipated that pregnant women would acquire a more comprehensive knowledge about anaemia and the significance of consuming iron supplements. Consequently, this will enhance their compliance and decrease the occurrence of anaemia in the community (Njiru et al., 2022). Anaemia in pregnant women has substantial consequences not only for the well-being of the mother but also for the growth and health of the prenatal and neonatal infants. The profound ramifications associated with anaemia include the possibility of impaired foetal development, increased incidence of preterm labour, and reduced birth weight (Wahyuni & Dewi, 2022). Therefore, it is crucial to adopt effective intervention strategies to address these issues at the community level. A community-level anaemia education and monitoring system was established to address this problem by improving pregnant women's knowledge of anaemia, encouraging adherence to iron supplementation, and improving their iron levels (Bizuneh & Azeze, 2022). The effort involves implementing structured health education, distributing instructional materials, and regular oversight by local health experts. This approach is expected to help pregnant women gain a more thorough understanding of anaemia and the importance of maintaining iron supplement intake. Therefore, this will improve their adherence and reduce the incidence of anaemia in the population.

2. MATERIAL AND METHODS

This program was a community-based intervention design using a pre-test and post-test approach to evaluate the effectiveness of an anaemia education and monitoring programme among pregnant women residing in Bandungrejosari Village, Sukun District, Malang City. The six month intervention aimed to improve participants knowledge of anaemia, enhance adherence to iron supplement intake, and strengthen anaemia control through continuous education and monitoring by local health cadres.

A total of 20 pregnant women registered at Puskesmas Janti, Bandungrejosari Village, were recruited using a purposive sampling technique. The inclusion criteria included pregnant women with a minimum gestational age of 12 weeks, residing in the study area, and willing to participate in all sessions for the six month duration of the programme. The exclusion criteria comprised pregnant women with known haematological disorders or other medical conditions requiring special treatment, which could interfere with the intervention outcomes.

The community service consists of two main components: Group sessions held at posyandu and puskesmas, which offer comprehensive counselling on anaemia, including its diagnosis, causes, symptoms, effects, and prevention. Accredited healthcare practitioners conduct these seminars on a monthly basis. Educational materials: The volunteers were given brochures and posters that contained precise information regarding anaemia and the need for iron supplementation. The publications also suggest regimens that promote iron absorption and those that should be avoided on a monthly basis. Analysis of haemoglobin levels is conducted at the beginning and end of the programme to evaluate any changes in anaemia status. Medical staff at the health facility measure the amount of supplements consumed. In addition, health cadres provided support and emphasised to participants the importance of complying rigorously with the

recommended supplement consumption, at the initiation and termination of the programme.

The data-gathering methods that were used included administering a questionnaire to pregnant women both before and after the program's completion in order to evaluate their degree of awareness about anaemia. The survey included questions about the exact definition of anaemia, its symptoms, adverse effects, and methods for its prevention and treatment. A monthly adherence questionnaire was distributed to evaluate adherence to iron supplement consumption. Questionnaire items focused on the frequency of consumption, adherence to the recommended dosage, and awareness of avoiding foods that impede iron absorption. Haemoglobin Level Assessment: The blood haemoglobin levels were measured using a hemoglobinometer at the health facility at the beginning and end of the programme.

The collected data were analyzed using paired t-test statistics to evaluate differences in knowledge and haemoglobin levels prior to and during the intervention. Changes in adherence rates and anaemia prevalence were analyzed using the chi-square test. A study of the data was conducted using statistical methods to determine the accuracy and consistency of the results.

3. RESULTS

The following table presents the results of improving pregnant women's knowledge of anaemia, the level of adherence to iron supplementation, and quantitative information on anaemia monitoring before and after the intervention.

Table 1 presents the improvement in pregnant women's knowledge of anaemia before and after the educational intervention. The assessment covered five key domains: definition and causes of anaemia, symptoms, impact on pregnancy, importance of iron supplementation, and preventive strategies. Before the intervention, participants demonstrated a limited understanding of anaemia, with correct responses

Table 1. Improvement of Pregnant Women's Knowledge about Anemia

Knowledge Aspect	Pre-Test (%)	Post-Test (%)	Mean Improvement (%)	p-value
Definition and causes of anaemia	45	85	+40	< 0,001
Symptoms of anaemia	50	88	+38	
Impact of anaemia on pregnancy	42	84	+42	
Importance of iron supplementation	48	90	+42	
Prevention of anaemia	46	87	+41	
Mean improvement ($\pm$ SD)			+40,6 $\pm$ 1,6	

Table 2. Adherence Level of Pregnant Women to iron Supplement Consumption (n=20)

Compliance Indicator	Pre-Intervention (%)	Post-Intervention (%)	Improvement (%)	p-value
Taking iron Supplements daily	60	92	+32	< 0,001
Following the Recommended Dosage	55	89	+34	
Complying with the Recommended Consumption Time	58	90	+32	
Avoiding Foods that Inhibit iron absorption (e.g., tea, coffee, calcium-rich foods)	53	86	+33	
Mean adherence improvement ($\pm$ SD)			+32,8 $\pm$ 0,9	

Table 3. Changes in Anaemia Status Among Pregnant Women Before and After the Programme (n=20)

Indicator	Pre-Intervention	Post-Intervention	Change	p-value
Mean Hemoglobin Level (g/dL)	10,5 $\pm$ 0,8	12,2 $\pm$ 0,7	+1,7	< 0,001
Pregnant Women with anaemia (%)	35	18	-17	< 0,05
Pregnant women without anaemia (%)	65	82	+17	< 0,05
Pregnant Women with Severe Anemia (%)	10	4	-6	< 0,05

ranging from 42% to 50% across all domains. After six months of community-based education and monitoring, knowledge levels increased substantially to 84–90%, with an average improvement of 40.6% $\pm$ 1.6 ($p < 0.001$). The most significant improvement was observed in understanding the impact of anaemia on pregnancy and the importance of iron supplementation, each showing a 42% increase. Knowledge of prevention strategies and the causes of anaemia also rose by approximately 40%. These results indicate that the educational programme was highly effective in enhancing pregnant women's awareness and understanding of anaemia. Improved knowledge in these domains is expected to positively influence compliance with iron supplementation and anaemia prevention behaviours during pregnancy.

Table 2 illustrates the improvement in adherence to iron supplement consumption among pregnant women before and after the educational intervention. Four key adherence indicators were assessed: daily

intake of iron supplements, compliance with the recommended dosage, adherence to the appropriate consumption time, and avoidance of foods that inhibit iron absorption. Before the intervention, adherence rates were relatively low, ranging from 53% to 60% across all indicators. Following the six-month education and monitoring programme, adherence levels increased significantly to 86–92%, with an average improvement of 32.8% $\pm$ 0.9 ($p < 0.001$). The largest improvement was observed in following the recommended dosage (+34%), while awareness of avoiding inhibitory foods and compliance with daily intake each improved by approximately +32–33%. These findings demonstrate that the community-based anaemia education programme effectively enhanced pregnant women's compliance with iron supplement consumption. Improved adherence reflects not only increased knowledge but also behavioural change, which is expected to contribute

to better haemoglobin outcomes and a reduction in anaemia prevalence among participants.

Table 3 summarises the changes in anaemia status among pregnant women before and after the six-month education and monitoring programme. The indicators assessed included mean haemoglobin (Hb) concentration, the proportion of women with anaemia, those without anaemia, and those with severe anaemia. Before the intervention, the mean Hb level was 10.5 ± 0.8 g/dL, below the normal threshold for pregnancy. After the programme, the mean Hb increased significantly to 12.2 ± 0.7 g/dL ($p < 0.001$), reflecting an average gain of 1.7 g/dL. The proportion of women diagnosed with anaemia decreased from 35% to 18% ($p < 0.05$), while the proportion of women without anaemia rose from 65% to 82% ($p < 0.05$). Additionally, severe anaemia cases declined from 10% to 4% ($p < 0.05$), indicating a reduction in the risk of adverse pregnancy outcomes. These results confirm that the community-based anaemia education and monitoring programme effectively improved the haemoglobin status and reduced the prevalence of anaemia among pregnant women. The overall improvement suggests that sustained education, supplement monitoring, and health-cadre involvement contribute to better maternal iron status and the prevention of anaemia-related complications during pregnancy.

4. DISCUSSION

Based on the data shown in Table 1, the educational programme successfully improved pregnant women's understanding of anaemia, including its causes, symptoms, outcomes, and preventative strategies. Prior to the program's adoption, pregnant women had a relatively restricted understanding of anaemia, with just 45-50% grasping the critical aspects of the disease. Post-session, their level of knowledge significantly increased, reaching a range of 84-90% in specific domains. This improvement is consistent with research supporting the notion that structured, community-focused health education can

significantly improve pregnant women's comprehension and consciousness of anaemia (Gomes et al., 2021). The attainment of this information is essential, as current research suggests that pregnant women who possess a comprehensive knowledge of anaemia are more likely to follow the iron supplementation regimen and attend regular prenatal assessments (Shi et al., 2022).

The figures shown in Table 2 demonstrate a significant increase in the adherence of pregnant women to the consumption of iron supplements. Prior to the program's inception, adherence was somewhat low, with just 55-60% of pregnant women persistently following the recommended supplement regimen. Following the implementation of the programme, the compliance rate increased to 86-92%, highlighting the significance. Optimised adherence is essential as iron supplements serve as a fundamental intervention for the prevention and treatment of anaemia in pregnant women (P. Ramachandran, 2021). Moreover, other studies have shown that educational programmes that emphasise the benefit of iron supplement consumption can significantly improve adherence among pregnant women (Abd El Rahman et al., 2022). Empirical evidence has demonstrated that educational campaigns highlighting the need to avoid substances that may hinder iron absorption, such as tea and coffee, prompt pregnant women to not only acknowledge the need for supplements but also understand how to improve iron absorption (Nahrisah et al., 2020).

Table 3 displays statistically significant data, showing that just 4% of individuals still suffer from severe anaemia. Moreover, the average haemoglobin concentration increased from 10.5 g/dL to 12.2 g/dL, approaching or reaching the desirable range for normal levels. The decrease in the incidence of anaemia and the increase in haemoglobin levels correspond to findings from studies suggesting that community-based initiatives, including education and

the dissemination of iron supplements, can significantly improve the treatment of anaemia (Mildon et al., 2023). Hence, it is imperative to reduce the incidence of severe anaemia in pregnant women as it is associated with a substantial proportion of pregnancy complications, including preterm birth and low birth weight (Wulandari et al., 2023).

5. CONCLUSION

The implementation of the anaemia education and monitoring programme in Bandungrejosari Village led to substantial improvements in pregnant women's knowledge, adherence to iron supplement consumption, and haemoglobin status. These findings demonstrate that a community-based approach integrating education and regular monitoring can effectively reduce the prevalence of anaemia in high-risk populations. This programme was conducted independently as part of a community development without any external funding or institutional influence. Therefore, the authors declare no potential conflict of interest related to the design, implementation, or outcomes of this study.

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