International Journal of Health Administration Law and Government Policies
Volume. 2, Number. 1, March 2026
e-ISSN : 3090-4560; dan p-ISSN : 3090-4579; Page. 24-34
Available online at: https://journal.univummibogor.ac.id/index.php/IJHALGP

The Effect of Honey Administration as Complementary Therapy on the Incidence of Anemia in Pregnant Women

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Abstract. This study examines the influence of reproductive health education based on a complementary approach on cervical cancer prevention among women with a history of early marriage. The study highlights the importance of integrating conventional health education with complementary methods to improve knowledge, attitudes, and preventive behaviors. Using a structured analytical framework, this study synthesizes findings from relevant literature to evaluate how educational interventions contribute to awareness of risk factors, early detection practices, and health-seeking behaviors. The findings indicate that complementary approaches can improve understanding and encourage proactive participation in cervical cancer prevention, including screening and healthy lifestyle changes. In addition, sociocultural factors significantly influence the effectiveness of reproductive health education interventions. Cultural values, family support, access to health information, and perceptions of reproductive health may shape women's willingness to participate in prevention programs and screening services. This study provides practical insights for healthcare providers and policymakers in developing effective and culturally sensitive reproductive health programs. Such programs should prioritize women with a history of early marriage by strengthening health literacy, promoting regular screening, and addressing sociocultural barriers to preventive healthcare. These efforts may contribute to improved cervical cancer prevention and reproductive health outcomes.

Keywords: Cervical Cancer Prevention; Complementary Approach; Early Marriage; Reproductive Health Education; Women's Health.

1. INTRODUCTION

Anemia in pregnancy remains a significant global public health problem, particularly in developing countries, due to its impact on both maternal and fetal health outcomes. Low hemoglobin (Hb) levels during pregnancy can lead to complications such as preterm birth, low birth weight, and increased maternal mortality. The condition is commonly caused by iron deficiency, inadequate nutritional intake, and poor adherence to iron supplementation programs. In many cases, pregnant women experience barriers in consuming iron tablets, such as nausea and gastrointestinal discomfort, which further exacerbate the risk of anemia (Sianturi et al., 2022; Asrida et al., 2022).

Efforts to overcome anemia in pregnant women have been widely implemented, including pharmacological approaches through iron supplementation and non-pharmacological strategies through nutritional interventions. However, the effectiveness of iron supplementation alone is often limited by low compliance among pregnant women. Therefore, alternative and complementary therapies have gained attention as supportive interventions to improve hemoglobin levels. One such approach is the use of natural products, including honey, which is known to contain essential nutrients such as iron, vitamin C, and antioxidants that

Received: January 31, 2026; Revised: February 18, 2026; Accepted: March 18, 2026; Published: March 31, 2026

may enhance erythropoiesis and improve iron absorption (Asrida et al., 2022; Carolin et al., 2023).

Several previous studies have demonstrated the potential benefits of honey as a complementary therapy in increasing hemoglobin levels among pregnant women with anemia. Research by Sianturi et al. (2022) found that honey administration significantly increased hemoglobin levels in second-trimester pregnant women. Similarly, Asrida et al. (2022) reported that honey not only improved hemoglobin levels but also reduced oxidative stress markers, indicating broader health benefits. In addition, combining honey with other nutrient-rich foods such as avocado has also shown a positive effect on hemoglobin improvement in anemic pregnant women (Carolin et al., 2023).

Further evidence highlights that the combination of honey with other natural ingredients can enhance its effectiveness. Studies involving dates and honey have consistently shown significant increases in hemoglobin levels among pregnant women (Rahmawati et al., 2022; Erika et al., 2024; Nurseha et al., 2024). Likewise, combinations such as beetroot and honey have been proven to significantly improve hemoglobin levels due to their synergistic nutritional content (Siwi et al., 2025). These findings suggest that honey can serve as an effective complementary therapy, either alone or in combination with other nutrient sources, to address anemia in pregnancy.

In addition, specific types of honey, such as acacia honey, have been reported to have a significant impact on increasing hemoglobin levels in pregnant women with anemia, further strengthening the evidence of honey's therapeutic potential (Widowati et al., 2024). Despite these promising findings, there is still a need for further research to explore the effectiveness of honey as a complementary intervention in different populations and settings, particularly in primary healthcare contexts.

Based on the above background, this study aims to analyze the effect of honey administration as a complementary therapy on hemoglobin levels in pregnant women with anemia. This research is expected to contribute to the development of alternative and practical interventions that can improve maternal health outcomes and reduce the incidence of anemia during pregnancy.

2. LITERATURE REVIEW

Anemia in Pregnancy and Its Health Impacts

Anemia in pregnancy is a major public health concern characterized by a decrease in hemoglobin (Hb) levels, primarily due to iron deficiency and inadequate nutritional intake. This condition is highly prevalent in developing countries and significantly contributes to maternal morbidity and mortality. Physiological changes during pregnancy, such as increased blood volume, further exacerbate the risk of anemia if nutritional demands are not met. As a result, pregnant women require higher iron intake to support both maternal health and fetal development (Sianturi et al., 2022).

The consequences of anemia during pregnancy extend beyond maternal health, affecting fetal outcomes as well. Studies have shown that anemia is associated with an increased risk of preterm birth, low birth weight, and impaired fetal growth. Additionally, low compliance with iron supplementation programs remains a persistent issue, often due to side effects like nausea and constipation. This highlights the need for alternative or complementary approaches to improve hemoglobin levels in pregnant women (Asrida et al., 2022).

Complementary Therapy as an Alternative Approach

Complementary therapy has emerged as an alternative strategy to address anemia in pregnancy, particularly when conventional treatments are insufficient or poorly tolerated. These approaches emphasize the use of natural, food-based interventions that are safer and more acceptable for long-term consumption. Complementary therapies are increasingly integrated into maternal healthcare due to their potential to enhance treatment outcomes while minimizing adverse effects (Fitriani et al., 2024).

Moreover, complementary interventions can improve patient adherence, as they are often perceived as more natural and culturally acceptable. Nutritional-based therapies, in particular, play a crucial role in improving hemoglobin levels by providing essential micronutrients required for erythropoiesis. Therefore, combining conventional iron supplementation with complementary dietary interventions may offer a more holistic and effective approach to managing anemia in pregnant women (Sianturi et al., 2022).

Effectiveness of Beetroot Juice in Increasing Hemoglobin Levels

Beetroot (Beta vulgaris) is widely recognized as a nutrient-rich food containing iron, folic acid, vitamin C, and antioxidants that are essential for red blood cell formation. The consumption of beetroot juice has been shown to significantly increase hemoglobin levels due to its ability to enhance iron absorption and stimulate erythropoiesis. This makes beetroot an effective complementary therapy for preventing and managing anemia (Fitriani et al., 2024).

In addition, beetroot juice is relatively easy to prepare and consume, making it a practical intervention for pregnant women. Its natural composition reduces the likelihood of side effects commonly associated with iron supplements, thereby improving adherence. Regular consumption of beetroot juice has been associated with measurable improvements in hemoglobin levels, indicating its potential as a safe and effective non-pharmacological intervention (Asrida et al., 2022).

Role of Dates in Improving Hemoglobin Levels

Dates (Phoenix dactylifera) are another natural food source rich in iron, fiber, and essential vitamins that contribute to improved hemoglobin levels. The high nutritional value of dates supports red blood cell production and helps address iron deficiency in pregnant women. Studies suggest that regular consumption of dates can significantly improve hemoglobin levels and overall maternal health (Sianturi et al., 2022).

Furthermore, dates are widely accepted across different cultures and are easy to incorporate into daily diets. Their natural sweetness and nutritional benefits make them an ideal complementary therapy for pregnant women who may have difficulty consuming iron tablets. The use of dates as a dietary intervention not only supports anemia management but also enhances overall nutritional intake during pregnancy (Fitriani et al., 2024).

Synergistic Effects of Beetroot and Dates Combination

The combination of beetroot juice and dates provides a complementary nutritional effect in improving hemoglobin levels among pregnant women. Beetroot contains iron, folic acid, and vitamin C, which play an important role in enhancing iron absorption and supporting red blood cell formation. Meanwhile, dates contribute additional iron, natural sugars, and essential nutrients that help maintain energy levels and support overall maternal health (Asrida et al., 2022).

Along with that, combining these two natural food sources can lead to more effective outcomes compared to single dietary interventions. The presence of multiple nutrients that support erythropoiesis allows for a more comprehensive approach to anemia management. This combination not only helps increase hemoglobin levels but also improves the overall nutritional status of pregnant women, making it a practical and holistic complementary therapy (Sianturi et al., 2022).

Importance of Nutritional Education and Compliance

Nutritional education plays a critical role in improving the effectiveness of anemia prevention programs among pregnant women. Lack of awareness about the importance of iron intake and proper nutrition often leads to poor dietary habits and low adherence to

supplementation. Educational interventions can empower pregnant women to make informed dietary choices and adopt healthier lifestyles (Fitriani et al., 2024).

Additionally, improving compliance with both pharmacological and non-pharmacological interventions is essential for achieving optimal outcomes. Combining education with accessible and acceptable dietary solutions, such as beetroot juice and dates, can significantly enhance adherence. This integrated approach not only addresses the physiological aspects of anemia but also considers behavioral and social factors influencing maternal health (Asrida et al., 2022).

3. RESEARCH METHOD

This study employed a quantitative approach with a quasi-experimental design aimed at analyzing the effect of honey administration as complementary therapy on the incidence of anemia in pregnant women (Widowati et al., 2024; Sandy & Sulistyorini, 2024). The study was conducted at Puskesmas Kubur Jawa, where a preliminary study revealed that 33% of pregnant women experienced anemia with Hb levels < 11 g/dL, attributed to irregular consumption of iron tablets, low-iron dietary patterns, and nausea-related disturbances. The primary focus of this study was to measure changes in hemoglobin levels before (pre-test) and after (post-test) the honey intervention.

The population and sample in this study consisted of all mothers with children aged 6–24 months in Tungkap Village, totaling 30 individuals. Sample size determination (n) was conducted using the Isaac & Michael formula as follows:

$$n = \frac{X^2 \cdot N \cdot P(1-P)}{d^2(N-1)+X^2 \cdot P(1-P)} \quad \text{.....(i)}$$

n = sample size.

N = population size.

P = proportion in the population.

d = margin of error.

$\chi 2$ = Chi-square table value for a specific α.

In this formula, n represents the desired sample size, N is the population size of 16, P is the proportion in the population of 0.25, d is the predetermined margin of error of 0.05, and $\chi 2$ is the Chi-square table value for a specific α of 3.841. Based on the calculation:

$$n = \frac{3{,}841 \cdot 16 \cdot 0{,}25}{(0{,}05)^2(16-1) + 3{,}841 \cdot 0{,}25} = \frac{15{,}364}{0{,}0375 + 0{,}96025} = 15{,}40$$

Data analysis was carried out using SPSS statistical software through two levels of analysis:

Univariate analysis was used to describe the characteristics of respondents, including age, education level, and gravida status, as well as the distribution of hemoglobin levels before and after the intervention (Gole & Desai, 2024).

Bivariate analysis was conducted to test the significance of the intervention effect. Prior to hypothesis testing, a normality test was performed using the Kolmogorov-Smirnov and Shapiro-Wilk tests (Felix et al., 2025; Takkavatakarn et al., 2023). The normality test results showed a significance value of 0.000 ($p<0.05$), indicating that the data were not normally distributed. Therefore, statistical testing was continued using the non-parametric Mann-Whitney Test to compare differences in Hb levels before and after the intervention (Butayeva et al., 2023). The test result was considered statistically significant if the Asymp. Sig. (2-tailed) value was less than $\alpha=0.05$.

4. RESULT AND DISCUSSION

Data analysis is a systematic process of processing and interpreting data to answer the research objectives. In this study, analysis serves to scientifically demonstrate whether honey intervention can significantly increase hemoglobin levels in pregnant women (Widowati et al., 2024). This is crucial for validating honey as a complementary solution for pregnant women who experience barriers to iron tablet consumption due to nausea or poor dietary habits.

Results of Data Analysis

Analisis Univariat

Univariate analysis was used to describe the characteristics of respondents as well as the frequency distribution of each research variable independently.

Table 1. Distribution of Demographic Characteristics of Respondents (n=32).

Characteristics	Frequency (n)	Percentage (%)	Cumulative (%)
Age			
20–35 years	26	81.2	81.2
>35 years	6	18.8	100.0
Total	32	100.0	—
Education Level			
Elementary School	4	12.5	12.5
Junior High School	10	31.2	43.8
Senior High School	13	40.6	84.4
Higher Education	5	15.6	100.0
Total	32	100.0	—
Gravida			
Primigravida	9	28.1	28.1
Multigravida	14	43.8	71.9
Grandemultigravida	9	28.1	100.0

Total	32	100.0	—

Based on Table 1, the majority of respondents were in the healthy reproductive age group, consisting of 26 individuals (81.2%), while the remainder were in the at-risk age group of over 35 years (18.8%). In terms of educational background, respondents were predominantly senior high school graduates, totaling 13 individuals (40.6%), followed by junior high school (31.2%) and higher education (15.6%). Clinically, the majority of respondents belonged to the multigravida group (having been pregnant more than once), consisting of 14 individuals (43.8%), while the primigravida and grandemultigravida groups had equal proportions of 28.1% each.

These demographic data provide an overview that respondents were generally of productive age, yet exhibited variation in education level and pregnancy history, both of which may influence health behavior and physical condition during pregnancy.

Table 2. Distribution of Hemoglobin (Hb) Levels Before Intervention (n=32).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Mild Anemia (10–10.9 g/dL)	12	37.5	37.5	37.5
	Moderate Anemia (7–9.9 g/dL)	20	62.5	62.5	100.0
	Total	32	100.0	100.0	

Prior to the honey intervention, all respondents experienced anemia, with the majority in the Moderate Anemia category (62.5%) and the remainder in the Mild Anemia category (37.5%).

Tabel 3. Gambaran Kadar Hemoglobin (Hb) Sesudah Intervensi.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal (≥11 g/dL)	11	34.4	34.4	34.4
	Mild Anemia (10–10.9 g/dL)	21	65.6	65.6	100.0
	Total	32	100.0	100.0	

Following honey therapy, an increase in Hb levels was observed, with 34.4% of respondents reaching Normal Hb levels (≥11 g/dL) and the remainder (65.6%) categorized as Mild Anemia.

Analisis Biavariat

Bivariate analysis was conducted to test the effectiveness of the intervention by comparing the groups under study. Since the normality test results indicated that the data were not normally distributed (Sig. 0.000), the non-parametric Mann-Whitney Test was applied.

Table 4. Mann-Whitney Test Results.

z	Kadar Hb Ssdh
Mann-Whitney U	55.500
Wilcoxon W	226.500
Z	-2.700
Asymp. Sig. (2-tailed)	.007
Exact Sig. [2*(1-tailed Sig.)]	.006[a]
a. Not corrected for ties.	
b. Grouping Variable: Kelompok	

The statistical test results showed an Asymp. Sig. (2-tailed) value of 0.007. Since the significance value (0.007) < 0.05, it can be concluded that there is a significant effect of honey administration as complementary therapy on hemoglobin levels in pregnant women at Puskesmas Kubur Jawa.

Discussion

The findings of this study indicate that honey is effective in increasing hemoglobin levels in pregnant women experiencing anemia. This finding is highly relevant to the problems identified in the preliminary study, where 33% of pregnant women at Puskesmas Kubur Jawa were recorded as experiencing anemia. The primary triggering factors of anemia in the area include irregular consumption of iron tablets (43.75%), low-iron dietary patterns (31.25%), and nausea-related disturbances that reduce appetite (25%).

The administration of honey as complementary therapy helps compensate for these nutritional deficiencies. Statistically, the shift from a condition where 62.5% of respondents experienced moderate anemia to 34.4% reaching normal Hb levels following the intervention demonstrates the positive impact of honey on hemoglobin formation.

A significance value of 0.007 further strengthens the evidence that honey can serve as an additional solution for pregnant women who struggle to consume iron tablets regularly due to nausea. Therefore, the integration of honey therapy into midwifery care at Puskesmas Kubur Jawa is expected to help reduce the incidence of anemia and prevent further complication risks for both mother and fetus.

5. CONCLUSION AND RECOMMENDATIONS

Conclusion

The findings of this study highlight the complex interplay between reproductive health education, social influences, and behavioral outcomes among women with a history of early marriage. Rather than functioning as a single-factor solution, education based on a complementary approach appears to shape awareness through a combination of knowledge

acquisition, social reinforcement, and cultural adaptation. This indicates that preventive health behavior is not merely driven by information exposure, but also by how that information is contextualized within the individual's environment and lived experience. As such, the effectiveness of health interventions depends heavily on their ability to align with the socio-cultural realities of the target population.

Furthermore, the study underscores the importance of accessibility and continuity in health education programs. Women in vulnerable groups, particularly those with early marriage backgrounds, often face structural barriers such as limited healthcare access, low educational attainment, and restricted autonomy in decision-making. These conditions can reduce the long-term impact of one-time educational interventions. Therefore, sustained engagement, community involvement, and reinforcement mechanisms are essential to ensure that knowledge is translated into consistent preventive practices, particularly in relation to cervical cancer prevention.

In a broader perspective, this study contributes to the growing recognition that public health strategies must move beyond conventional approaches that rely solely on information dissemination. A more integrative model one that combines education, social support, and culturally sensitive communication offers a more effective pathway to behavioral change. This reinforces the idea that health promotion efforts should not only aim to inform, but also to empower individuals within their social context, enabling them to make informed and sustainable health decisions.

Recommendations

Based on the findings, it is recommended that healthcare providers and policymakers adopt a more holistic and community-based approach in delivering reproductive health education. Programs should be designed to incorporate not only medical information but also culturally relevant communication strategies that resonate with the target population. Engaging community leaders, family members, and local health workers can enhance trust and acceptance, thereby increasing the effectiveness of educational interventions. Additionally, integrating digital platforms such as social media and mobile health services may help expand outreach and accessibility, especially for younger populations.

It is also important to ensure the sustainability of educational initiatives through continuous monitoring and evaluation. Rather than relying on short-term programs, stakeholders should implement long-term strategies that include follow-up sessions, reinforcement activities, and accessible health services such as regular screening programs. Providing practical support such as affordable or free cervical cancer screening can bridge the

gap between knowledge and action. This approach will help ensure that the benefits of education are not temporary but lead to lasting behavioral change.

Finally, future research should explore additional variables that may influence the effectiveness of reproductive health education, including psychological readiness, family dynamics, and the role of digital information exposure. Expanding the scope of research to include diverse populations and geographic settings will provide a more comprehensive understanding of how different factors interact in shaping preventive health behaviors. Such insights are crucial for developing more adaptive, inclusive, and impactful health promotion strategies in the future.

ACKNOWLEDGEMENTS

The completion of this study would not have been possible without the valuable support and contributions of many individuals and institutions. The author would like to express sincere appreciation to the academic supervisors and lecturers who provided continuous guidance, constructive feedback, and insightful suggestions throughout the research process. Their expertise and encouragement greatly contributed to the development and refinement of this work. Appreciation is also extended to the institution for providing access to academic resources, journals, and research facilities that supported the completion of this study.

The author is also grateful to all respondents and participants who willingly contributed their time and information, making this research possible. In addition, heartfelt thanks are given to family members and close peers for their moral support, understanding, and motivation during the entire process of completing this study. Their encouragement played an essential role in maintaining consistency and dedication in finishing this research successfully.

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