



The Effectiveness of Nutrition Education on Dates (*Phoenix dactylifera*) Consumption in Improving Anemia Prevention Knowledge Among Preconception Women

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Abstract

Background: Anemia remains a major global public health issue, particularly among women of reproductive age, including those in the preconception period.

Literature Review: The World Health Organization estimates that more than 500 million women worldwide are affected. In Indonesia, anemia prevalence reaches 22.7% among women of reproductive age and increases to 48.9% during pregnancy, indicating that anemia often begins before conception. Preconception anemia is associated with adverse outcomes such as low birth weight, preterm birth, and maternal complications. One of the main causes is inadequate intake of iron-rich foods. Therefore, improving dietary habits through accessible food sources is essential. Dates (*Phoenix dactylifera*) are rich in iron, folate, vitamin C, and antioxidants that support hemoglobin synthesis. Nutrition education has been shown to improve knowledge and dietary behavior. Preliminary data in Rejosari showed 6% anemia prevalence, highlighting the need for intervention. This study evaluates the effectiveness of nutrition education on date consumption in improving anemia prevention knowledge.

Methods: A pre-experimental one-group pretest-posttest design was used involving 25 preconception women in Pringsewu, Indonesia. Participants received nutrition education on date consumption through lectures, discussions, and leaflets. Knowledge was measured using a validated questionnaire before and after the intervention. Data were analyzed using the Wilcoxon test ($p < 0.05$).

Results: The findings showed a significant improvement in participants' knowledge following the intervention. Before the education session, 68% of participants had moderate knowledge and 32% had good knowledge. After the intervention, 80% of participants demonstrated good knowledge, while only 20% remained in the moderate category. Statistical analysis showed a significant difference between pretest and posttest scores ($p = 0.001$), indicating that nutrition education on date consumption was effective in improving knowledge of anemia prevention.

Keywords: nutrition education; dates (*Phoenix dactylifera*); anemia; preconception women

INTRODUCTION

Anemia is a significant global public health problem, particularly among preconception women. The World Health Organization (Wu et al., 2024) states that more than 500 million women worldwide suffer from anemia, with the highest prevalence found in women of childbearing age and pregnant women. In Indonesia, Riskesdas data shows that the prevalence of anemia in women of childbearing age reaches 22.7%, even increasing sharply to 48.9% in pregnant women (Ministry of Health, 2023). This indicates that anemia is not only a problem during pregnancy, but can also appear from the preconception period, which, if left untreated, increases the risk of complications during pregnancy and childbirth (Iskandar et al., 2022).

Anemia in preconception women is often caused by insufficient iron intake in the daily diet. Research (Rahmawati & Nurhajjah, 2021) revealed that low consumption of iron-rich foods such as meat, green vegetables, and iron-rich fruits contributes to the high incidence of anemia. One fruit with a relatively high iron content is the date palm (*Phoenix dactylifera*), which has traditionally been used as a source of energy and for health recovery. Dates not only contain iron, but also folate, vitamin C, and natural antioxidants that can help in the process of hemoglobin formation and increase iron absorption in the body (*Probiotic Bacteria as Mucosal Immune System Adjuvants*, 2013). Thus, regular consumption of dates has great potential in supporting women's nutritional status, especially in preventing anemia before pregnancy occurs. The results of research (Maryani, Himalaya, et al., 2022) support this by showing that consuming dates for 14 days can significantly increase hemoglobin levels in women of childbearing age.

In the context of preconception, nutrition education plays a strategic role. (World Health Organization, 2013) emphasizes the importance of nutritional interventions during the preconception period as a form of primary prevention against anemia and various other obstetric complications. Nutritional status before pregnancy significantly determines the health of the mother and the unborn baby. Research (Adjei-Banuah et al., 2021) found that good nutritional knowledge is positively correlated with healthy eating behaviors and optimal hemoglobin status in premarital women. Preconception women who experience anemia or have poor nutritional knowledge are at high risk of various complications, both before and during pregnancy. Research shows that preconception anemia can cause ovulation disorders, poor ovum quality, and implantation problems. Furthermore, mild to moderate anemia before pregnancy has been associated with an increased risk of low birth weight (LBW), preterm birth, preeclampsia, postpartum hemorrhage, and maternal and infant mortality (Liu et al., 2022). Lack of nutritional knowledge leads to low consumption of foods rich in iron and folate, as well as underutilization of supplements, which exacerbates these risks. Therefore, appropriate nutritional education during the preconception phase is crucial as a strategic preventive measure (Iskandar et al., 2022).

Based on the results of the pre-survey, the number of prospective brides and grooms recorded for the period August–December 2024 and 2025 was 50 people with an average age of 26.44 years, most of whom were in the productive age group (20–35 years). Respondents' education levels varied, but the majority had a high school education (18%), followed by a bachelor's degree (16%), and the remainder had a junior high school, elementary school, or diploma. Respondents' occupations also varied, with the most common professions being teachers, private employees, laborers, and self-employed.

The results of the hemoglobin (Hb) level examination showed that the average Hb level of respondents was 13.16 g/dL. However, 6% of respondents still had Hb levels <12 g/dL (categorized as anemia). This condition indicates that anemia remains a health problem among prospective mothers. The World Health Organization (2021) reported that anemia in preconception women increases the risk of obstetric complications such as premature birth, low birth weight (LBW), preeclampsia, and even maternal and neonatal death. Research by Liu et al. (2022) also showed that anemia before pregnancy is closely related to ovulation disorders, poor ovum quality, and the risk of embryo implantation disorders. Anemia prevention efforts from the preconception period are essential, one of which is through nutrition education. According to Sitawati & Amanda (2023), nutrition education based on local foods can increase nutritional knowledge of women of childbearing age by up to 35% and encourage changes in behavior toward consuming iron-rich foods. One potential local food is the date palm (*Phoenix dactylifera*), which contains iron, folate, vitamin C, and antioxidants that play a role in hemoglobin formation and increase iron absorption (Patonah et al., 2024).

Research by Maryani et al. (2022) demonstrated that consuming dates for 14 days can significantly increase hemoglobin levels in women of childbearing age with mild anemia. This finding is supported by Aisyah et al. (2022), who stated that dates are an affordable, readily available, and culturally accepted nutritional intervention in Indonesia. Therefore, providing nutritional education based on date consumption is expected to increase knowledge and awareness of the importance of anemia prevention before pregnancy, thereby reducing the risk of complications and improving reproductive health.

METHODS

This study is a quantitative study with a *pre-experimental one group pretest-posttest design*. The study was conducted in the working area of Rejosari Community Health Center, Pringsewu Regency, in 2025. The study population was all preconception women in the area. Sampling was carried out using a *total sampling technique*, so that the entire population that met the inclusion criteria was used as a research sample. The number of samples in this study was 25 respondents. The inclusion criteria included preconception women who were willing to be respondents and participate

in the entire series of studies.

The independent variable in this study was nutritional education about date consumption, while the dependent variable was the level of knowledge about anemia prevention. Nutrition education was provided through lectures and discussions using leaflets containing information about anemia, its causes, impacts, and the benefits of date consumption in preventing anemia. Data collection was carried out using a questionnaire on anemia prevention knowledge that had been tested for validity and reliability, which was administered before and after the intervention. Data analysis was carried out univariately to describe the characteristics of respondents and their level of knowledge, and bivariate analysis to determine differences in knowledge levels before and after the intervention. The statistical test used was *the Wilcoxon Signed Rank Test* with a significance level of 0.05. This study was conducted with due regard to the ethical principles of health research, including respondent consent and data confidentiality.

RESULTS AND DISCUSSION

A. RESULTS

This research was conducted at the Rejosari Community Health Center in November 2025 with a sample of 25 respondents. The results are presented in the following four tables, which include respondent characteristics, knowledge levels before and after being given nutrition education about date consumption, and the results of the Wilcoxon Signed Rank Test.

Table 1 . Characteristics of Respondents at Rejosari Community Health Center

Respondent Characteristics	Amount (Person)	Percentage (%)
Mother's Age		
< 20 Years	5	20
20 - 35 Years	13	52
> 35 Years	7	28
Education		
Elementary School	2	8
JUNIOR HIGH SCHOOL	5	20
SENIOR HIGH SCHOOL	13	52
College	5	20
Work		
Housewife	16	64
Self-employed/business	4	16
civil servant	5	20
Total	25	100

Based on table 1 At the Rejosari Health Center, it was concluded that most of the preconception women were aged 20-35 years, as many as 13 preconception women (52%), most of the preconception women had a high school education level, as many as 16 respondents (52%) and most of the preconception women worked as housewives, as many as 16 preconception women (64%).

Table 2 . Frequency Distribution of Respondents' Knowledge Level Regarding Prevention Anemia Before Nutrition Education About Date Consumption

Knowledge	Number of people)	Percentage (%)
Good	8	32
Enough	17	68
Not enough	0	0
Total	25	100

Based on table 2, it is known that most preconception women before education had a sufficient level of knowledge, as many as 17 preconception women (68%) and good knowledge as many as 8 preconception women (32%).

Table 3. Frequency Distribution of Respondents' Knowledge Levels Regarding Anemia Prevention After Being Given Nutritional Education Regarding Date Consumption

Knowledge	Number of people)	Percentage (%)
Good	20	80
Enough	5	20
Not enough	0	0
Total	25	100

Based on table 3, it is known that the majority of preconception women after education had a good level of knowledge, as many as 20 respondents (80%) and sufficient knowledge as many as 5 respondents (20%).

Table 4

Wilcoxon Signed Rank Test .

Variables	Asymp. Sig (2-tailed)
Knowledge Posttest - Pretest	0 .001

Based on Table 4, the results of ***the Wilcoxon Signed Rank Test*** show a Sig. (2-tailed) value of 0.001, meaning H_0 is rejected and H_a is accepted, which means there is a difference in the level of knowledge before and after being given nutritional education about consuming dates . It is concluded that there is effectiveness of nutritional education about consuming dates on knowledge of anemia prevention in preconception women in the Rejosari Community Health Center Working Area, Pringsewu Regency in 2025.

Discussion

A. Age

Based on the analysis at the Rejosari Community Health Center, it was concluded that the majority of preconception female respondents (13 respondents) were aged 20-35 years. This finding indicates that the majority of respondents fall within the optimal reproductive age group, where biological conditions are generally at a higher level of readiness for pregnancy. This age range is also associated with a more stable level of physical and psychosocial maturity, which can influence overall preconception readiness.

Age is a unit of time used to measure the existence of objects or living things. or death (Purnamasari, 2021) . Age at the time of pregnancy is one of the factors that can cause various pregnancy complications. If the age is still too young, namely 18 years, then the uterus and pelvis have not developed optimally, thus increasing the risk of pain and deaths during pregnancy, childbirth, and postpartum. Meanwhile, at the age of > 35 years, the age reproduction has decreased in childbirth due to age factors so it is more vulnerable to experiencing anemia (Widiyanto & Lismawati, 2019) .

Researchers assume that preconception women aged 20–35 remain at risk of anemia even though they are in the optimal reproductive age group. This is due to various factors, including increased nutritional needs in preparation for pregnancy, the influence of the menstrual cycle, and other biological and social factors that can influence hemoglobin status. This increases the susceptibility to anemia in this age group.

B. Education

Based on analysis at the Rejosari Community Health Center , the majority of preconception female respondents , 13 respondents (52%), had a high school education. This indicates that the majority of respondents had a secondary education, which generally provides a sufficient foundation of knowledge about reproductive health, although not necessarily in-depth. High school education also potentially influences respondents' ability to receive, understand, and apply information related to anemia in preconception women.

Researchers assume that high school students have limited understanding of nutritional needs and reproductive health risk factors, potentially increasing the incidence of anemia. Lower education levels can impact knowledge about balanced diets, iron supplementation, and anemia prevention efforts during the preconception period, making this a crucial factor to consider in efforts to improve women's nutritional status and reproductive health.

C. Work

Based on the results of the analysis at the Rejosari Community Health Center , the majority of pre-conception female respondents worked as housewives, as many as 16 respondents (64%). This condition indicates that the majority of respondents have full domestic responsibilities, which can affect activity patterns, nutritional intake, and access to health information, thus potentially impacting preconception readiness and reproductive health risks, including anemia.

The researchers assumed that housewives have full domestic responsibilities, potentially affecting nutritional intake, eating patterns, and access to health information. This condition can increase the risk of anemia, as the time- and energy-consuming burden of household chores often results in a lack of attention to nutritional needs and iron supplementation, which are necessary for maintaining reproductive health and preventing anemia.

D. Knowledge Before Education

Based on the analysis, it was found that before the education, most mothers had sufficient knowledge (17 respondents (68%) and good knowledge (8 respondents (32%). This indicates that although some mothers already have a basic understanding of the research material, the majority still fall within the sufficient category, thus providing an opportunity to improve their knowledge through appropriate educational interventions. These findings provide an important basis for planning health education strategies to optimally improve mothers' understanding.

Thus, providing nutritional education regarding date consumption as an effort to prevent anemia in preconception women is expected to increase knowledge and encourage changes in healthier food consumption behavior, so that pregnancy readiness can be optimally increased.

E. Knowledge After Education

Based on the analysis, it was found that after education about dates as a preventative measure, the majority of mothers had good knowledge (20 respondents (80%) and fair knowledge (5 respondents (20%). This indicates that the education provided was effective in improving mothers' understanding of the material presented, thus educational interventions play a significant role in improving mothers' knowledge and potential health behaviors.

Researchers believe that appropriate nutrition education, particularly based on the consumption of readily available foods like dates, can improve preconception mothers' knowledge and awareness regarding anemia prevention. This increased knowledge will encourage behavioral changes in the consumption of foods rich in iron, folate, and vitamin C, thereby increasing hemoglobin levels and reducing the risk of future pregnancy complications.

F. The Effectiveness of Nutrition Education About Date Consumption on Knowledge of Anemia Prevention in Preconception Women in the Rejosari Community Health Center Work Area

Based on the analysis results of *the Wilcoxon Signed Rank Test*, the Sig. (2-tailed) value was obtained = 0.001, meaning H_0 was rejected and H_a was accepted, which means there was a difference in the level of knowledge before and after being given nutritional education about consuming dates . It was concluded that there was effectiveness of nutritional education about consuming dates on knowledge of anemia prevention

in preconception women in the Rejosari Community Health Center Working Area, Pringsewu Regency in 2025.

One way to increase knowledge is through health education. Education has been proven effective in improving public health knowledge, attitudes, and behavior (Notoatmodjo, 2018) . Health education can play a role in changing the behavior of individuals, groups, and communities in accordance with health values. The expected behavioral changes include maintaining and improving health, preventing the risk of illness, protecting oneself from disease threats, and actively participating in community health movements. Therefore, behavioral changes are a result of health education (Pancawati & Santi, 2016; Ulya, 2024) .

Health education methods can also be an influence in increasing maternal knowledge because the ability to capture information provided by health workers is greatly influenced by the effectiveness of a person's sensory function to capture the stimulus provided so that it is properly digested into information that can be deepened, the more the number of senses involved in a process of receiving food information, the heavier the ability to capture the stimulation (Andriani & Utami, 2022) .

Anemia prevention efforts from the preconception period are essential, one of which is through nutritional education. According to Sitawati & Amanda (2023) , readily available food-based nutrition education can increase nutritional knowledge among women of childbearing age by up to 35% and encourage changes in the consumption of iron-rich foods. One readily available food and a potential Sunnah (traditional food of the Prophet) is the date palm (*Phoenix dactylifera*), which contains iron, folate, vitamin C, and antioxidants that play a role in hemoglobin formation and increase iron absorption (Patonah et al., 2024) .

Research by Maryani et al. (2022) demonstrated that consuming dates for 14 days significantly increased hemoglobin levels in women of childbearing age with mild anemia. This finding is further supported by Aisyah et al. (2022) who stated that dates are an affordable, readily available, and culturally accepted nutritional intervention in Indonesia. Furthermore, for Muslims, dates are considered a healthy fruit and are also considered a source of reward, as they are a Sunnah food of the Prophet, thus providing both physical and spiritual benefits. Therefore, providing nutritional education based on date consumption is expected to increase preconception knowledge and awareness of the importance of preventing anemia before pregnancy, thereby reducing the risk of complications and improving reproductive health.

Researchers believe that effective nutrition education, particularly based on the consumption of readily available foods like dates, can improve preconceptional women's knowledge and awareness regarding anemia prevention. This increased knowledge will encourage behavioral changes in the consumption of foods rich in iron, folate, and vitamin C, thereby increasing hemoglobin levels and reducing the risk of complications during pregnancy. Furthermore, educational methods that engage the senses and effectively convey information will maximize mothers' comprehension and understanding, making nutrition education interventions play a significant role in improving reproductive health and the quality of life of expectant mothers.

CONCLUSION

Nutrition education on date consumption has been proven effective in improving knowledge of anemia prevention among preconception women in the Rejosari Community Health Center, Pringsewu Regency. Prior to education, most respondents had a fair level of knowledge, while after the intervention, the level of knowledge increased to a good level for the majority of respondents. Statistical analysis showed a significant difference between the level of knowledge before and after the nutrition education, confirming that natural food-based nutrition education interventions can be an effective promotive and preventive strategy in preventing anemia from the preconception period. This increased knowledge is expected to encourage awareness and readiness of preconception women in maintaining nutritional status before entering pregnancy.

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