



## THE INFLUENCE OF KNOWLEDGE ABOUT ANEMIA, DATES, AND IRON TABLETS ON HEMOGLOBIN LEVELS IN PROSPECTIVE PREGNANT WOMEN AT SOUTH KLATEN COMMUNITY HEALTH CENTER.

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### ABSTRACT

**Background:** Anemia, commonly known as a deficiency in blood, influences individual behavior. Higher knowledge about anemia before conception correlates with a greater awareness of nutritional needs. Preventing anemia in preconception women involves iron tablet consumption, while dates serve as an alternative means to prevent anemia. This study aims to ascertain the influence of anemia knowledge, date consumption, and iron tablet intake on hemoglobin levels among prospective pregnant women at the Klaten Selatan Community Health Center. This research held on January to September 2023 in the operational area of the Klaten Selatan Community Health Center.

**Methods:** This research adopts a pre-experimental design employing a one-group pretest-posttest study. Purposive Random Sampling method is used, encompassing 40 research subjects. The dependent variable is hemoglobin levels, while the independent variables are knowledge about anemia, date consumption, and iron tablets. Data collection involves primary data through questionnaire responses and observation sheets. Research analysis includes univariate analysis, bivariate analysis utilizing the Spearman Rho test for knowledge variables and the Friedman test for date and iron tablet consumption variables.

**Results:** There is a significant impact of knowledge about anemia ( $p = 0.000$ ), date consumption ( $p = 0.0094$ ), and iron tablet intake ( $p = 0.0073$ ) on hemoglobin levels among prospective pregnant women.

**Conclusion:** Knowledge about anemia influences hemoglobin levels, and there is an increase in hemoglobin levels after consuming dates and iron tablets among prospective pregnant women at the Klaten Selatan Community Health Center.

**Keywords:** *Knowledge, Dates, Iron Tablets, Hemoglobin Levels*

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## INTRODUCTION

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The Maternal Mortality Rate (MMR) serves as an indicator of the success of maternal and child health efforts. Nationally, the MMR has shown a decline from 390 in 1991 to 305 per 100,000 live births in 2015. The MMR for the year 2020 recorded 4,627 deaths, primarily attributed to hemorrhage, hypertension, and disorders affecting the blood clotting system.<sup>1</sup>

One of the causes of hemorrhage or blood clotting disorders is anemia. Based on Marantika's research in 2010, it is estimated that approximately 20% of maternal deaths are closely associated with low hemoglobin levels during pregnancy.<sup>2</sup>

The issue of anemia doesn't emerge suddenly during pregnancy. According to Marlapan's research in 2013, nutritional anemia occurring during pregnancy is linked to the pre-pregnancy nutritional status. Maintaining nutritional status during the preconception period or before pregnancy is an opportune time to reduce the risk of nutritional problems and anemia during pregnancy. Therefore, it's crucial to pay attention to health during the preconception period. This aligns with the Life Course Theory, which suggests that birth outcomes can be influenced by the long-term interaction of a woman's biological conditions, knowledge, behaviors, and psychological/environmental factor before pregnancy.<sup>4</sup>

Knowledge significantly influences individual behavior. The higher the knowledge about anemia during the preconception period, the greater the awareness to actively participate in ensuring proper nutrition, thereby meeting nutritional needs. Based on Lestrina's research in 2015, it's indicated that increased knowledge implemented a program for providing iron tablets. However, several obstacles often occur when consuming iron tablets, including forgetfulness or inconsistency,

unpleasant taste, nausea, vomiting, upper abdominal discomfort, diarrhea, and constipation, leading to non-compliance in their consumption.<sup>5</sup> Based on Awalamaroh's research in 2018, individuals who adhere to iron tablet consumption have a lower risk of experiencing anemia compared to those who are non-compliant.<sup>7</sup> Dates contain Riboflavin, Niacin, Pyridoxal, and Folate, where 100 grams of dates fulfill more than 9% of the daily vitamin requirement. Dates are rich in calcium and iron content. Various research findings, such as those by Handri, Onuh, and Pravitasari, demonstrate significant increases in serum iron levels following the consumption of dates.<sup>8</sup>

This study aims to determine the effective influence of knowledge about anemia, date consumption, and iron tablet intake on hemoglobin levels among prospective pregnant women at the Klaten Selatan Community Health Center.

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## METHODS

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This research employed a quantitative approach utilizing a pre-experimental design with a one-group pretest-posttest study. The dependent variable was the hemoglobin levels, while the independent variables included knowledge about anemia, date consumption, and iron tablet intake.

The research was conducted in the operational area of the Klaten Selatan Community Health Center. The population under study comprised all women of childbearing age, specifically aged between 20 and 25 years, residing in that area. Purposive Random Sampling was used to select 40 research subjects. Data collection involved questionnaire sheets and observation sheets.

The research was conducted about anemia research with higher hemoglobin levels.<sup>6</sup> Ho between January and September 2023. The analysis included univariate analysis and bivariate analysis using the Spearman Rho test for knowledge variables and the

Friedman test for date and iron tablet consumption variables. The data analysis was carried out using STATA 17 software

**RESULT**

The following are the results of research is.

**Table 1.** Characteristic of Knowledge and Hemoglobin Levels in Research Subject

Variabel	n	Mean ± SD	Min-Max
Knowledge about anemia	40	77,80 ± 12,84	50 - 96,6
Pretest Hemoglobin Levels	40	12,51 ± 1,16	9,6 - 14,8
Posttest Hemoglob in Levels	40	12,78 ± 0,88	11 - 14,5

Based on table 1, it showed that among all research subjects, the average score for knowledge about anemia was 77.80. The average measurement of hemoglobin levels during the pretest was 12.51 mg/dl, and the average hemoglobin levels during the posttest were 12.78 mg/dl.

**Table 2.** Frequency Distribution of Characteristics of Research Subject

Variable	Category	f	%	
Education	Senior High School	21	52,50	
	Diploma	5	12,50	
	Bachelor Degree	12	30,00	
	Master Degree	2	5,00	

Occupation	Unemployee	7	17,50
	Student	3	7,50
	Staff	16	40,00
	Teacher	2	5,00
	Civil	4	10,00
	Servant	7	17,50
	Enterpriser	1	2,50
	Police		
	Knowledge about anemia	Less than Well Enough Good	5 8 27

**Hemoglobin Levels**

Pretest	Anemia	5	12,50
	Normal	6	15,00
	> normal	29	72,50
Posttest	Normal	9	22,50
	> normal	31	77,50

**Dates Consumptions**

Pretest	Anemia	1	5,00
	Normal	2	10,00
	> normal	17	85,00
Posttest	Normal	1	5,00
	> normal	19	95,00

**Iron Tablet Consumptions**

Pretest	Anemia	4	20,00
	Normal	4	20,00
	> normal	12	60,00
Posttest	Normal	8	40,00
	> normal	12	60,00

Based on table 2, shows the research findings indicating that the majority of the subjects' education level was high school/vocational school with 21 individuals (52.50%). Most subjects were employed, totaling 16 individuals (40%). The majority of the research subjects exhibited good knowledge about anemia, comprising 26 individuals (67.50%). Regarding hemoglobin levels, the majority of research subjects were categorized as above normal during the posttest, accounting for 31 individuals (77.50%).

Regarding the variable of date consumption, the highest number of subjects categorized with above-normal hemoglobin levels during the posttest was 19 individuals (95%). In the variable of iron tablet consumption, the highest number of subjects categorized with

above-normal hemoglobin levels during both the pretest and posttest was 12 individuals (60%).

**Table 3.** The Influence of Knowledge about Anemia on Hemoglobin Levels

Knowledge about Anemia	Hemoglobin						p-Value	Spearman Rho (r)
	Anemia		Normal		More than Normal			
	F	%	F	%	F	%		
Less than	4	80,00	-	-	1	20,00		
Well enough	1	12,50	3	37,50	4	50,00	0,000	0,6082
Good	-	-	3	11,11	24	88,89		

Based on the table 3, it showed the research findings indicating that the majority of research subject with good knowledge about anemia had above-normal hemoglobin levels, totaling 24 individuals (88.89%). The Spearman Rho test resulted in a significance value of  $p=0.000$  ( $<0.05$ ) with a strong correlation value ( $r = 0.6082$ ), thus indicating an influence of knowledge about anemia on hemoglobin levels.

**Table 4.** The Influence of Dates on Hemoglobin Levels

Dates Consumptions	Mean $\pm$ SD	Min. – Maks.	p- Value
Pretest Hb Levels	12,8 $\pm$ 0,95	10,5 – 14,8	0,0094
Posttest Hb Levels	13,14 $\pm$ 0,65	12,0 – 14,5	

Based on the table 4, it showed the results of the Friedman test with a significance level of  $\alpha = 0.05$ . The obtained p-value is 0.0094 ( $<0.05$ ), indicating a difference in hemoglobin levels between the pretest and posttest (the average hemoglobin levels increased from 12.89 mg/dl to 13.14 mg/dl). Thus, it suggests an influence of date consumption on hemoglobin levels.

**Table 5.** The Influence of Iron Tablets on Hemoglobin Levels

Iron Tablet Consumptions	Mean $\pm$ SD	Min- Maks	p- Value
Pretest Hb Levels	12,13 $\pm$ 1,25	9,6 – 14,4	0,0073
Posttest Hb Levels	12,42 $\pm$ 0,96	11,0 – 14	

Pretest Hb Levels	12,13 $\pm$ 1,25	9,6 – 14,4	0,0073
Posttest Hb Levels	12,42 $\pm$ 0,96	11,0 – 14	

Based on table 5 shows the results of the Friedman test with a significance level of  $\alpha = 0.05$ . The obtained p-value is 0.0073 ( $<0.05$ ), indicating a difference in hemoglobin levels between the pretest and posttest (the average hemoglobin levels increased from 12.13 mg/dl to 12.42 mg/dl). Hence, it suggests an influence of iron tablet consumption on hemoglobin levels.

## DISCUSSION

### The Influence of Knowledge about Anemia on Hemoglobin Levels

Knowledge is the result of sensing everything that happens and is experienced based on one's encounters. An individual's or a community's health behavior is determined by one's intentions towards health objects, the presence or absence of support from the surrounding community, the availability or lack of health information, individual freedom to act, and situations that allow for action.<sup>9</sup> This study demonstrates a strong influence between knowledge of anemia and the hemoglobin levels of prospective pregnant women ( $p=0.000$ ;  $r=0.6082$ ). Consistent with previous research by Thamrin (2021), which found a

relationship between knowledge and hemoglobin levels in Midwifery students at the University of Muslim Indonesia ( $p=0.035$ ). Those students with good knowledge predominantly had normal hemoglobin levels (55.3%).<sup>10</sup>

Knowledge about anemia significantly influences adolescent girls' inclination to select high-nutrient foods rich in iron. When possessing substantial knowledge about anemia, individuals tend to avoid foods and beverages that hinder iron absorption. Nutritional knowledge aims to shift societal behavior towards consuming healthy and nutritious foods.<sup>11</sup>

According to Fitria (2016), irregular eating patterns can impact one's work performance negatively. Insufficient meal frequency affects the body's absorption of nutrients. Consequently, this may lead to feelings of fatigue, lack of enthusiasm, and difficulty concentrating. Furthermore, the absorption of nutrients can also be hindered when nutritious foods are consumed with beverages that inhibit the absorption of iron, such as tea and coffee.<sup>12</sup>

Sediaoetama (2006) explains that income is a crucial variable influencing both the quality and quantity of food intake. Income is a determining factor for the quality and quantity of food, thereby establishing a close relationship between income and nutrition. An increase in income will affect improvements in family health and conditions, subsequently correlating with nutritional status.<sup>11</sup> According to the data analysis in this research, the majority of research subjects are employed (82.50%), and the average hemoglobin level is 12.51 mg/dl, categorized as above normal or indicative of anemia.

### **The Influence of Dates on Hemoglobin Levels**

The prevention and management of anemia through date consumption serve as an alternative method. This is evident from the findings of this research, where

the obtained  $p$ -value = 0.0094, signifying an influence of date consumption on the hemoglobin levels of prospective pregnant women. Consistent with previous studies, there is a difference in hemoglobin levels before and after the administration of dates ( $p=0.000$ ).<sup>13,14</sup>

Dates do not have side effects. They contain 13.7 mg of iron, making them a rich source compared to other iron sources, and they are high in vitamin C, which aids in the absorption of iron in the intestines.<sup>15</sup>

The iron present in dates is absorbed by the intestines and transported by the blood for hemopoiesis (the process of blood formation). Iron binds with heme and four globin units, forming a unit known as hemoglobin. Consequently, indirectly, dates can assist in increasing hemoglobin levels to normal for individuals suffering from anemia.<sup>14</sup> Based on the research findings, dates can increase hemoglobin levels, with an average increase of 1.2 g/dL after consuming seven dates daily for one consecutive week.<sup>16</sup>

Aside from being consumed as whole fruits, dates are also processed into date juice. In Umiyah's research (2021), participants were given a dosage of 1 tablespoon twice a day for moderate anemia, considering the high number of adolescents experiencing moderate anemia. After the administration of date juice, all respondents (100%) showed an increase in hemoglobin levels within 2 days.<sup>17</sup>

The researcher's opinion, based on the research findings, indicates that the varied increase in hemoglobin levels among the subjects is due to the diverse nutritional intake each day. Therefore, besides dates, the rise in hemoglobin levels is also attributed to the absorption of nutrients from other foods. Dates can be one of the special food choices used for treatment and maintaining bodily health by increasing hemoglobin levels, particularly beneficial for prospective

pregnant women experiencing anemia as complementary treatment.

### **The Influence of Iron Tablets on Hemoglobin Levels**

According to the Ministry of Health regulation in 2014, pharmacological therapy can be applied as per the decision and regulations. It recommends that adolescents and women of reproductive age should consume iron supplementation in the form of 60 mg ferrous sulfate (FeSO<sub>4</sub>) and 0.400 mg folic acid, taken weekly and daily during menstruation.<sup>18</sup>

Iron tablets are an effective nutritional supplement when taken according to the recommended guidelines. One of the instructions for taking iron tablets is consuming one tablet weekly or as needed, with an additional tablet advised during menstruation. The benefits of iron tablets include replacing lost iron during menstruation in women, aiding pregnant or breastfeeding women whose iron needs are significantly high, necessitating early preparation starting from adolescence. These tablets are also used as treatment for adolescent girls suffering from anemia, enhancing learning abilities, work capacity, and the quality of human resources and future generations. They contribute to improving the nutritional status and health of adolescent girls and women.<sup>19,20,21</sup>

The statistical Friedman test results in this research yielded  $p=0.0073$ , signifying an influence of iron tablet consumption on hemoglobin levels. This outcome aligns with a previous study by Anggraini et al. (2021), which obtained a Fisher exact test result with a value of  $p=0.003$ , indicating a relationship between the two variables.<sup>22</sup>

Riastawaty et al. (2023) explained that the average hemoglobin levels in junior high school girls in the PIR II Bajubang-Muaro Jambi Puskesmas's working area were 11.125 g/dL. After administering iron tablets, all adolescents showed an increase in hemoglobin levels.

The lowest increase observed was 0.2 g/dL, while the highest increase recorded was 2.4 g/dL.<sup>21</sup>

Iron supplementation involves providing iron and folate in tablet form. Each tablet contains 200 mg ferrous sulfate and 0.25 mg folic acid, equivalent to 60 mg elemental iron and 0.25 mg folic acid. Iron absorption is greatly influenced by the availability of vitamin C. The role of vitamin C in the iron absorption process is to aid in reducing ferric iron (Fe<sup>3+</sup>) to ferrous iron (Fe<sup>2+</sup>) in the small intestine, making it easier to absorb. This reduction process intensifies with greater acidity in the stomach. Vitamin C can increase acidity, enhancing iron absorption by up to 30%. Additionally, vitamin A is required for red blood cell production in the bone marrow.<sup>10</sup>

According to the researchers' opinions based on the study findings, the varied increase in hemoglobin levels among the subjects is due to the different daily food intake. Almatsier (2015) states that blood supplement tablet supplementation involves consuming foods rich in iron, folic acid, as well as vitamin B, and consuming types of food that easily absorb iron. For instance, foods abundant in high vitamin C content facilitate iron absorption, while avoiding foods or drinks that hinder iron absorption, such as coffee or tea.<sup>23</sup>

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### **CONCLUSION**

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This study demonstrates that there is an influence of knowledge about anemia ( $p=0.000$ ), dates consumption ( $p=0.0094$ ), and iron tablet intake ( $p=0.0073$ ) on hemoglobin levels among prospective pregnant women at South Klaten Community Health Center. This research could serve as a reference or literature study in the field of health sciences for preventing anemia in women of reproductive age (WUS) before conception. Healthcare institutions, especially clinics, should provide preventive and curative services to the

community to prevent anemia, especially among women of reproductive age. Motivating the community to prevent anemia can be achieved by enhancing knowledge and consuming nutritious foods (including dates) and iron tablets.

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