



## The Effect Of Gelelor (Geblek Lele Kelor) On Hemoglobin Levels In Anemic Pregnant Women

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### ABSTRACT

**Background:** The incidence of pregnancy anemia in Indonesia is still quite high, namely 84.6% of pregnant women aged 15-24 years, 33.7% aged 25-34 years, 33.6% aged 35-44 years and 24% aged 45-54 years. The Purworejo District Health Service noted that in 2020 anemia in pregnant women increased by 23.16% compared to only 17.37% in 2019. The incidence of anemia in pregnant women at the Winong Kemiri Health Center, Purworejo Regency was 55.2%. The government is managing anemia in pregnant women by administering blood supplement tablets of 60 mg/day. Using the local wisdom of cultivating catfish and Moringa leaves, researchers provided fortified food in the form of gelelor.

**Method:** This research was conducted in Purworejo Regency. The type of research used is quantitative with a Quasy Experimental Design with a Two Group Pretest-Posttest Design approach. The sample for this study was 40 anemic pregnant women. The sampling technique uses purposive sampling.

**Results:** The results of the analysis using the Paired Sample T-Test giving Gelelor had an effect on hemoglobin levels in anemic pregnant women at the Winong Kemiri Purworejo Community Health Center with a sign value of 0.000 p value (0.05) based on the results of the posttest score increasing by 1.1 gr/dl compared to the pretest score

**Conclusion:** It is hoped that the results of this research will make it easier for midwives to routinely promote gelelor as a companion to blood supplement tablets for anemic pregnant women to increase hemoglobin levels.

**Keyword :** Gelelor; Pregnant Women With Anemia

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**Background.** One of the health problems that needs attention in developing countries and is worrying the world is anemia. According to (WHO, 2024) 42% of children under 5 years of age and 40% of pregnant women worldwide experience anemia and according to the Chairperson of the Indonesian Medical Nutrition Doctors Association, Prof. Dr. Endang L.Achadi, the cause of anemia is mostly due to reduced iron which functions to form hemoglobin. (Viva, 2018). Pregnancy with anemia in Indonesia is still quite high, namely 84.6% aged 15-24 years, 33.7% aged 25-34 years, 33.6% aged 35-44 years and 24% aged 45-54 years (Risksdas, 2018). Based on data from the Central Statistics Agency of Central Java Province in 2018, the number of pregnant women who received 90 tablets of Iron (Fe3) was 546,657 people. Data in Purworejo

Regency in 2018 was 9,283 people. In Purworejo Regency, anemia is still classified as moderate. In 2020, the Purworejo Regency Health Office (DKK) experienced a 23.16% increase in anemia in pregnant women, which in 2019 was only 17.37%. At the Winong Kemiri Health Center, Purworejo Regency, the incidence of anemia was 55.2%.

The cause of anemia in Indonesia is mostly due to iron deficiency and nutritional intake (Risksdas, 2018) containing iron which is needed for the formation of hemoglobin (Hb) (Kemenkes RI 2015). The need for iron increases during pregnancy to double. This happens because blood volume increases by 50% during pregnancy (Sukarni & Margareth, 2019)

In improving the health of pregnant women, the government provides Antenatal Care (ANC) services with a standard of at least 6

check-ups during pregnancy, namely 1 time in the first trimester (gestational age 0-12 weeks), 2 times in the second trimester (gestational age 12-24 weeks), 3 times in the third trimester (gestational age 24 weeks until delivery) and at least 2 check-ups by a doctor in the first and third trimesters. ANC services are attempted to provide iron tablets (iron tablets) of at least 90 tablets during pregnancy, as well as blood hemoglobin (Hb) test services (Profil Kesehatan Jateng, 2021).

According to (Chalik, 2019), the low compliance of pregnant women in consuming iron tablets is a factor in the occurrence of anemia in pregnant women. Behavior is one of the factors that influences non-compliance of pregnant women in consuming Fe tablets. According to (Notoatmodjo, 2014), predisposing factors that influence health behavior include education, knowledge, attitudes, values and beliefs. Enabling factors such as the availability of facilities and reinforcing factors such as family support, support from health workers and health cadres.

The problem of non-compliance of pregnant women due to the effects of consuming iron tablets must be resolved immediately. Various methods can be used to continue to help pregnant women meet their iron needs, one of which is by adding nutrients consumed by the mother. Inadequate iron intake from food has an impact on 95% of cases of pregnancy anemia. Therefore, by consuming food containing iron, including meat, liver, fish, milk, yogurt, nuts, green vegetables and fruits to overcome anemia.

One of the resources available in the Winong Health Center Working Area is catfish and moringa leaf cultivation. Heme protein from animals, one of which is catfish, the interaction of heme and globin to form hemoglobin. Moringa leaves are one of the types of trees for food sources that grow abundantly in Indonesia. Moringa leaves can be used as complementary therapy for pregnant women, especially those with anemia, or as a prevention against physiological anemia. Important mineral content such as Calcium (Ca), Potassium (K), Sodium (Na), Iron (Fe), Manganese (Mn), Zinc (Zn), P, Magnesium (Mg), and Cu. Iron (Fe) in Moringa leaves is 5x more than spinach (Efendi, 2019). Moringa leaves also contain phytosterols which can increase breast milk production for

breastfeeding women and overcome anemia problems in children and pregnant women.

Research conducted by Puspita Dewi et al., (2022) found that giving catfish nuggets and Fe tablets can significantly increase hemoglobin levels with a p-value <0.05. Catfish nuggets mixed with katuk leaf flour have a high protein and Fe content of 12.77% and 78.08 mg. Furthermore, research conducted by Zumatul Atika (2021) found that there was a significant effect of giving moringa leaves on the hemoglobin levels of pregnant women with a p-value of 0.000. Research by (Rismawati et al., 2021) found that there was an effect of giving moringa leaf capsules to pregnant women on hemoglobin levels at the Sumanda Health Center in 2019 with a p-value of 0.000 <0.05. Another study by Satriawati et al., (2021) showed a difference before being given moringa leaf vegetables and after being given moringa leaves for 2 weeks on the Hb levels of pregnant women with (p = 0.000). In addition to being economical, moringa plants are very easy to obtain. This complementary therapy can be a support for Fe tablets taken by pregnant women.

Researchers conducted a preliminary study in the field on 10 pregnant women, it was found that 6 pregnant women (60%) had anemia, 3 pregnant women said they did not eat animal protein and only ate tofu and tempeh and vegetables that were not green such as young papaya, jackfruit, chayote. This is due to economic limitations and a dislike of animal protein because of the fishy smell. Meanwhile, 3 pregnant women only ate animal protein such as eggs or fish but not green vegetables.

Traditional geblek food from Purworejo which is widely liked by the public because it is delicious, savory and chewy, especially when eaten warm. Geblek is made from tapioca flour, garlic, salt, flavoring and grated coconut mixed into one dough then shaped and fried. The shape of the geblek is like the number eight in pure white. Making geblek itself is also easy and has been widely produced on a household industry scale. The content of 100 grams of moringa leaf catfish geblek is vitamin C 21.8531 mg and Fe 5.99 mg.

The Winong Kemiri Health Center area is an agricultural area where green vegetables can grow well and fish farming is also abundant. Moringa leaves and catfish can be easily found in the home environment.

**Methods.** This study uses a Quasi Experimental research type with a Two Group Pretest-Posttest Design which aims to determine the effect of giving gelelor and iron tablets on hemoglobin levels in pregnant women with anemia. The number of samples in this study was 40 respondents divided into 2, 20 control groups and 20 experimental groups. In this study, respondents were measured for hemoglobin levels before (pretest) and after (posttest) in the control group and experimental group using a digital Hb meter. The control group of respondents was only given iron tablets, the experimental group was given 200 grams of catfish geblek, moringa leaves and iron tablets, each group was given for 14 days. This study was conducted in the working area of the Winong Kemiri Health Center, Purworejo Regency, Central Java Province. The research process took place from March to April 2024 where primary data was collected directly from respondents. The population of this study consisted of 40 pregnant women in the third trimester with anemia in March as a research sample. The analysis used was univariate and bivariate. Analysis using the Paired sample t-test and Independent sample t-test with the provision that if  $p < 0.05$  then  $H_a$  is accepted.

**Result and Discussion.** Based on the research that has been conducted with the title "The Effect of Geblek Lele and Kelor Leaves (Gelelor) on Hemoglobin Levels in Anemic Pregnant Women" at the Winong Health Center, with a sample of 40 anemic pregnant women consisting of 2 groups, the gelelor and iron supplement tablet experimental group consisting of 20 respondents and the iron supplement tablet control group consisting of 20 respondents..

The implementation of the intervention was carried out for 14 consecutive days. By giving gelelor 200 gr / day and 1 blood supplement tablet / day taken at night. Hemoglobin level measurements were carried out before and after the intervention, and will be tested using univariate and bivariate analysis.

Table 1. Hemoglobin levels before and after administration of Gelelor and blood-boosting tablets in pregnant women with anemia.

	N	Mean	Std. Deviation
Hb Pre Eksperiment	20	10.380	.3019
Hb Post Eksperiment	20	11.515	.3329

The results of the study showed that the average hemoglobin level of pregnant women with anemia before consuming gelelor and iron tablets experienced anemia because the average hemoglobin level was 10.3 gr / dl, after being treated it became 11.5 gr / dl.

The most common cause of anemia in pregnancy is iron deficiency. Iron deficiency can occur due to lack of iron intake in food, impaired reabsorption or absorption of iron in the body, impaired use of iron which will result in anemia in pregnant women. During pregnancy, the need for iron increases to two times what it was before pregnancy. This happens because during pregnancy the blood volume increases by 50% (Sukarni & Margareth, 2019). Various methods can be done to continue to help pregnant women meet their iron needs, one of which is with additional nutrition consumed by the mother. 95% of cases of anemia in pregnancy can also be due to iron deficiency due to inadequate food intake. Therefore, to overcome anemia is to consume food sources of iron, including meat, liver, fish, milk, yogurt, nuts, green vegetables and fruits. During pregnancy, the body gets at least 27 mg of iron per day and the body gets vitamins (Proverawati, 2018).

One of the food sources containing iron is moringa leaves and catfish. Processed moringa leaves and catfish become moringa leaf catfish geblek (gelelor) which has a nutritional content per 100 grams in moringa catfish geblek, namely Vitamin C 21.8531mg and Fe 5.99 mg, moringa leaves and catfish are processed into gelelor to make it easier for pregnant women with anemia to consume moringa leaves and catfish.

Table 2. Hemoglobin levels before and after administration of iron tablets to pregnant women with anemia.

	N	Mean	Std. Deviation
Hb Pretest Control	20	10.220	.3156
Hb Posttest Control	20	11.260	.3235

The results of the study showed that the average hemoglobin level of pregnant women with anemia before consuming gelelor and iron tablets experienced anemia because the average hemoglobin level was 10.2 gr/dl, after being given treatment it became 11.2 gr/dl.

ANC services are attempted, among others, to meet the standard for providing iron tablets (iron tablets) of at least 90 tablets during pregnancy, as well as simple laboratory test

services, at least blood hemoglobin (Hb) tests (Central Java Health Office, 2018). Iron tablets are pharmaceutical preparations in the form of tablets containing iron, provided by the government, given to low-income communities. Iron tablets aim to prevent anemia caused by iron deficiency so that the prevalence of anemia decreases (Citrakesumasari, 2012)

Effective blood supplement tablets as a nutritional improvement, if taken according to the rules. The benefits of iron tablets are as follows: replacing iron lost with blood in women who are pregnant, breastfeeding, so that their iron needs are very high which need to be prepared as early as possible since adolescence (Kemenkes, 2015). The results of the analysis after taking iron tablets, it was found that hemoglobin levels increased by an average of 1%. Giving iron during pregnancy is one of the most suitable ways for pregnant women to increase hemoglobin levels to the desired stage, because one iron tablet contains 60 mg of Fe. During pregnancy, at least 90 tablets are given until 42 weeks after giving birth (Wahyuni & Aditia, 2023). Iron absorption is greatly influenced by various factors including diseases that accompany the mother during pregnancy, consumption of vitamin C in food can help absorb iron. Some foods that can reduce iron absorption such as tea, coffee, chocolate and foods containing calcium and other dairy products. If iron absorption occurs properly, there will be an increase in iron in the blood, which will then increase hemoglobin levels in the blood (Wahyuni & Aditia, 2023).

Table 3. The effect of gelelor and blood-boosting tablets on hemoglobin levels in pregnant women with anemia.

Group	Mean	Sig.
Pretest eksperiment	10.3	0,000
Posttest eksperiment	11.5	

Additional nutrition for pregnant women can help meet the iron needs they need, one of which is catfish and moringa leaf geblek (Gelelor) which has basic ingredients of tapioca flour, catfish meat and moringa leaves.

Catfish is one of the foods that is easy to serve and obtain, the nutritional content of catfish is comparable to other fish. Catfish contains higher and better protein than animal meat. The nutritional value of catfish increases if processed properly. The nutritional content of catfish per 100 grams contains 2 mg of iron.

Moringa leaves are plants that are often found in tropical areas. The nutritional content of moringa leaves per 100 grams for fresh moringa leaves contains 0.85 mg of iron while in the form of flour or powder it amounts to 28.2 mg. for the vitamin C content in fresh moringa leaves per 100 grams reaches 220 mg and if the moringa leaves are dry 17.3 mg and the essential amino acid content in the form of isoleucine facilitates iron to carry hemoglobin.

Geblek is one of the typical foods of Purworejo Regency made from cassava starch and onion seasoning with a frying process technique. The sensory characteristics of geblek include white color, shape like the number eight, savory taste, and chewy texture. (Meiyana et al., 2018). The content of 100 grams in catfish and moringa geblek is Vitamin C 21.8531mg and Fe 5.99 mg. Catfish and moringa leaves are given as much as 200 grams per day. Although the Fe content in gelelor is low, this gelelor contains high protein as one of the components of Hemoglobin, and the fairly high levels of vitamin C from moringa leaves can help the absorption of iron, thereby contributing to increasing Hemoglobin levels. Previous studies have shown that catfish and moringa leaves can increase hemoglobin levels. Research conducted by (Dewi DP & Astriana K, 2022) on pregnant women with anemia stated that giving catfish nuggets can increase hemoglobin levels in pregnant women with anemia with analysis obtained a p-value (sig) <0.001.

The data analysis test in this study using the Paired Sample T-Test produced a p-value (sig) of 0.000 <math>\alpha</math> (0.05) so it can be concluded that there is an effect of giving Gelelor and blood-boosting tablets on hemoglobin levels in third trimester pregnant women with anemia at the Winong Kemiri Health Center, Purworejo.

Table 4. The effect of iron supplements on hemoglobin levels in pregnant women with anemia.

Group	Mean	Sig.
Pretest control	10.2	0,000
Posttest control	11.2	

The mechanism of action of iron tablets is that the iron contained in food undergoes a digestion process in the intestines. Ferri dissolves in stomach acid then is bound by gastroferin and reduced to Ferro. In the intestines, ferro is oxidized to ferri. Ferro then binds to apoferritin which is then transformed

into ferritin, and releases ferro into the blood plasma. In the plasma, it is oxidized to ferri, and binds to transferrin. Transferrin transports ferro into the bone marrow to combine to form hemoglobin (Adriani & Wijatmadi, 2016)

Iron in tablet form is a pharmaceutical preparation in the form of tablets containing iron, provided by the government, given to low-income communities. Iron tablets aim to prevent anemia caused by iron deficiency so that the prevalence of anemia decreases (WHO, 2024). For the administration of iron tablets, the preventive dose for pregnant women until the postpartum period is 1 tablet (60 mg) per day in a row for 90 days during pregnancy until 42 days after giving birth. Then for the provision of treatment doses for pregnant women until the postpartum period, namely if the Hemoglobin level is  $<11$  gr/dl, 3 tablets are given a day for 90 days during pregnancy until 42 days after giving birth (Citrikesumasari, 2012; WHO, 2024) The results of this study are in line with research conducted by (Atika Z et al., 2021) stating that blood-boosting tablets affect the Hemoglobin levels of pregnant women based on data analysis tests obtained a p-value (sig) of 0.000.

Based on the results of the analysis test with the Paired Sample T-Test test, it shows that there is an effect of giving blood-boosting tablets on the Hemoglobin levels of pregnant women in the third trimester with anemia at the Winong Kemiri Health Center, Purworejo with a p-value  $(0.00) < \alpha (0.05)$ .

Table 5. The effectiveness of giving Gelelor + iron tablets and iron tablets on hemoglobin levels in pregnant women with anemia.

Group	N	Mean	Standar Deviasi	Sig.(2-tailed)
Eksperiment	20	11.5	0.3329	0,019
Control	20	11.2	0.3235	

Based on the results of the analysis using the Independent T-Test, the p-value (sig) was 0.019 ( $p < 0.05$ ) with a mean difference of 11.5 gr / dl in the experimental group and 11.2 gr / dl in the control group. The mean value in the Gelelor experimental group + blood supplement tablets was greater than the mean value of the blood supplement tablet control group, so giving catfish gelelek and moringa leaves + blood supplement tablets was more effective in increasing hemoglobin levels in pregnant women with anemia at the Winong

Kemiri Health Center which was given for 14 days. Food fortification is an effort made to add important micronutrients, such as vitamins and minerals to food that can improve the nutritional quality of food and benefit the community with minimal risk to health. Gelelor food fortification made from catfish and moringa leaves which are processed into snacks for pregnant women with anemia. The nutritional content of catfish per 100 grams contains 2 mg of iron and 18.7% protein, The nutritional content of moringa leaves per 100 grams for fresh moringa leaves contains 0.85 mg of iron, the vitamin C content in fresh moringa leaves per 100 grams reaches 220 mg and the essential amino acid content in the form of isoleucine facilitates iron to carry hemoglobin (Marhaeni, 2021). The iron requirement of pregnant women in a day requires 20-25 mg of iron (Satriawati et al., 2021). The content of catfish such as iron, heme protein, there is an interaction between heme and globin to form hemoglobin, and the iron content, vitamin C in moringa can increase the hemoglobin levels of pregnant women (Efendi & Sitanggang, 2015; Mubarokah et al., 2021).

Processed catfish and moringa leaf gelelek which has a chewy texture, savory taste so that it makes it easier for pregnant women to consume catfish and moringa leaves. The content of 100 grams in catfish and moringa gelelek based on UGM laboratory tests is Vitamin C 21.8531mg and Fe 5.99 mg. Gelelek catfish and moringa leaves are given as much as 200 grams and 1 iron tablet per day, the amount of iron for mothers per day in consuming gelelelor and iron tablets is 71.98 mg. So that by consuming gelelek catfish, moringa leaves and iron tablets, it has an effect on increasing the hemoglobin levels of pregnant women with anemia more than the increase in hemoglobin levels of pregnant women with anemia who consume iron tablets alone. This is in line with a study conducted by (Atika Z et al., 2021) entitled The Effect of Moringa Leaves (*Moringa Oleifera* Lam) on Hemoglobin Levels of Pregnant Women at PMB Zummatul Atika, the results before and after being given moringa leaves using a paired t-test showed a significance value (p) of 0.000. Thus, the results show that there is a significant effect of giving moringa leaves on the hemoglobin levels of pregnant women.

**Conclusion and Suggestions.** In the group given gelelelor and iron tablets,

hemoglobin increased on average from 10.3 gr/dl to 11.5 gr/dl. Meanwhile, in the group given iron tablets alone, hemoglobin increased on average from 10.2 gr/dl to 11.2 gr/dl. This means that there is a difference in the increase in hemoglobin levels before and after being given gelelor and iron tablets.

The results of the Paired Sample T-Test with a p-value (sig) of 0.000 <0.05, it can be concluded that there is an effect of giving gelelor and iron tablets on hemoglobin levels in pregnant women with anemia. And the results of the Independent Sample T-Test p-value (sig) of 0.019 (p <0.05) which means that geblek catfish with moringa leaves and iron tablets are proven to be effective in increasing hemoglobin levels in pregnant women with anemia. This identifies the importance of consuming geblek catfish and iron leaves (Gelelor) and iron tablets. Geblek catfish and moringa leaves are foods rich in iron and high in protein.

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