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THE EFFECT OF DATE JUICE ADMINISTRATION ON CHANGES IN HAEMOGLOBIN LEVELS

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Abstract

Iron insufficiency, primarily caused by insufficient dietary intake, accounts for approximately 95% of anemia cases during pregnancy. To address anemia, pregnant individuals typically resort to consuming iron supplements (Fe) provided by healthcare professionals. The consumption of date juice as a preventative measure for anemia in pregnancy has not been previously observed. This research was undertaken to ascertain the impact of date juice consumption on the hemoglobin (Hb) levels of pregnant women.

This study was conducted between October and December 2024. A pre-experimental design, specifically a one-group pretest-posttest approach, was employed. The study involved a sample of 32 pregnant women from a Pregnant Women Class, selected through purposive sampling. Data collection was performed using observation sheets. The analysis of the collected data was carried out using the t-test.

The study's findings indicated that pregnant women exhibited an average hemoglobin (Hb) level of 10.3125 gr% prior to consuming date juice, classifying them with mild anemia. Following the consumption of date juice, their average Hb level rose to 12.6406 gr%, falling within the normal range. Statistical analysis, specifically a t-test, demonstrated a P Value of 0.000, which is less than 0.05, thereby indicating a statistically significant effect of date juice on the changes in Hb levels among anemic pregnant women.

The nutritional richness of dates contributes to an accelerated increase in hemoglobin levels, as they are readily assimilated by the body. The protein, carbohydrate, and fat components present in dates are instrumental in supporting the synthesis of hemoglobin.

Keywords: *Date Juice, Hb Rate, Pregnant Women*

INTRODUCTION

Anemia is characterized by a reduction in the quantity of red blood cells or hemoglobin below established normal parameters. Typically, these normal hemoglobin thresholds vary between genders. For adult males, anemia is commonly diagnosed when hemoglobin levels fall below 13.5 grams per 100 milliliters, whereas for adult females, the threshold is generally considered to be less than 12 grams per 100 milliliters. Data indicates that iron deficiency accounts for approximately 95% of anemia cases observed during pregnancy, with insufficient dietary intake being the prevalent underlying factor (Fitri et al., 2023).

For individuals who are not pregnant, typical hemoglobin levels range from 12 to 15 grams per deciliter, with hematocrit values between 35% and 54%. These reference ranges are also applicable to pregnant individuals, particularly those undergoing regular prenatal care. Consequently, assessing hematocrit and hemoglobin should be an integral part of routine blood examinations during antenatal monitoring. It is advisable to conduct these tests on a quarterly

basis, or at a minimum, once during the initial examination in the first trimester and again in the third trimester (Rustam, 2015: 23).

According to the criteria established by the World Health Organization and the Ministry of Health's 2020 guidelines, the prevalence of anemia among pregnant individuals is 37.1%. This rate is nearly identical for pregnant women residing in urban areas (36.4%) and rural areas (37.8%). This statistic indicates a situation that is approaching a critical *public health concern*, given that an anemia prevalence exceeding 40% is considered severe (Wulan et al., 2021).

Data from Riskesdes (2020) indicates that in 2020, there was a rise in the prevalence of anemia among pregnant women in Indonesia, correlating with advancing gestational age. Specifically, anemia rates were observed at 8% during the first trimester, 12% during the second trimester, and 29% during the third trimester of pregnancy. Pregnant women constitute a demographic with a high susceptibility to anemia; however, the anemia they typically experience is often considered relative, stemming from the physiological adaptations inherent to pregnancy.

In East Java, the observed rate of anemia was 24.11% in 2020 and subsequently rose to 32.39% in 2021. Despite these figures, the incidence of anemia continues to escalate in various districts and cities across East Java Province. For example, Malang Regency documented an increase in its anemia prevalence rate, rising by 8.05% from its 2021 level (East Java Health Office, 2020).

According to information from the Tulungagung District Health Office for the year 2020, the rate of anemia among pregnant women was 28.91%. By 2021, the anemia incidence rate for pregnant women at the Boyolangu Health Center was recorded at 5.37%. This rate experienced a significant escalation in 2022, reaching 18.85% (Tulungagung Health Office, 2020).

The preceding preliminary investigation indicated that out of 33 mothers who underwent antenatal check-ups between March and June 2024, 16 individuals (48%) presented with anemia. Among the anemic participants, 6 (18%) reported taking iron (Fe) tablets as prescribed by midwives, 7 (21%) consumed green vegetables instead of iron tablets, and 4 (12%) neither took iron tablets nor consumed green vegetables.

Current approaches to address anemia in pregnant women primarily involve vitamin supplementation, specifically iron tablets (Fe) provided by healthcare professionals. However, adherence to iron supplementation is inconsistent due to common adverse effects, such as nausea. Therefore, it can be inferred that no pregnant women in this cohort utilized date juice as a preventative measure against anemia during pregnancy.

Most cases of anemia during pregnancy arise from poor nutrition, insufficient iron intake, absorption issues, and previous blood loss from childbirth (Nugraheny, 2015:69). The effects of anemia on pregnancy, delivery, and the time after giving birth can lead to excessive bleeding, early labor, prolonged labor, uterine weakness resulting in bleeding, shock, and infections during delivery if severe anemia occurs (with hemoglobin levels below 4 grams%) and heart complications, which not only make pregnancy and delivery more difficult but may also be life-threatening (Rustam, 2015). A common approach to prevent anemia is to eat foods like red meat, liver, fish, egg yolks, and various fruits and green vegetables, including bananas, spinach, nuts, and broccoli.

LITERATURE REVIEW

Date Juice

Dates (Phoenix dactylifera) are members of the palm family and are commonly referred to as date palms. They are rich in nutrients and can be used as remedies. Carbohydrates, tryptophan, omega-3 fatty acids, vitamin C, vitamin B6, Ca2+, zinc, and magnesium are all present in dates, which have a perfect composition and high energy content. In addition to having a high fiber content, dates are a good source of potassium, manganese, phosphorus, iron, sulfur, calcium, and magnesium. The body's levels of hemoglobin may rise due to its iron concentration. so that pregnant women and women of reproductive age are adequately prepared. You can eat dates raw or cooked. Compared to dried dates, fresh dates (ruthab) have a lower ready-to-use energy content but a higher water and nutrient content. Tamr is elevated in (Gibney. M.J, 2009).

Hemoglobin Up

Red blood cells contain a protein called hemoglobin (Hb), which is responsible for carrying oxygen throughout the body. Iron deficiency is frequently the cause of low hemoglobin levels, or anemia. The following mechanisms are how date juice can help treat this condition: 1) Iron Source: Iron, which is necessary for the body to make enough hemoglobin and red blood cells, is found in date juice. Sufficient consumption of iron contributes to the efficient functioning of the blood cell production process.2) Vitamin C's function: Dates also have vitamin C, which greatly improves the body's absorption of non-heme iron, or iron derived from plants.

Iron absorption from diet is less effective when vitamin C levels are low.3) Additional Nutrients: Copper and magnesium, which are necessary for the production of healthy red blood cells, are also present in date juice. Date juice administration has been established in numerous scientific investigations and case studies to be beneficial in raising hemoglobin levels, particularly in sensitive populations like pregnant women and teenage girls with iron deficiency anemia. The study's findings demonstrate that date juice consumption is a viable non-pharmacological treatment option for anemia (Bakta, 2017).

RESEARCH METHOD

The study took place from October to December 2024 at the Pregnant Women's Class in Tanjungsari Village, Boyolangu, Tulungagung. A pre-experimental design was employed for the research, specifically utilizing a one-group pretest posttest design approach. The target group consisted of all anemic pregnant women participating in the Pregnant Women's Class of Tanjungsari Village, Boyolangu, Tulungagung. A purposive sampling method was used to select 32 anemic pregnant women as the sample. The study's independent variable was the administration of date juice to the anemic pregnant women, while the dependent variable was the increase in hemoglobin (Hb) levels among them. Data collection involved providing 3x2 tablespoons of date juice daily for 14 days. Hb levels were assessed using a digital Hb meter. For data analysis, the t-test was utilized, concluding that if the p value is greater than 0. 05, then H1 is rejected, indicating no significant effect of date juice on Hb level changes among

anemic pregnant women in the Pregnant Women's Class of Tanjungsari Boyolangu Tulungagung Village. Conversely, if the p value is 0. 05 or less, H1 is accepted, suggesting that date juice does have a significant effect on Hb level changes in the same population.

RESULT AND DISCUSSION

The findings of the research included both overall information and detailed information. Overall information comprises demographic details about the traits of the respondents, which can be found in the table below:

Table 1. Distribution of Respondent Characteristics

Age	Frequency (f)	Percent (%)
< 20 years old	5	15,6
20-35 years old	26	81,3
> 35 years old	1	3,1
Education	Frequency (f)	Percent (%)
SMP	8	25
SMA	23	71,9
PT	1	3,1
Work	Frequency (f)	Percent (%)
IRT	28	87,5
PNS	4	12,5

Source: Primary Data

Based on table 1.1 above, it was found that out of a total of 32 respondents, almost all of the respondents, namely 26 respondents (81.3%) aged 20-35 years, most of the respondents, namely as many as 23 respondents (71.9%) had a high school education and almost all respondents, namely as many as 28 respondents (87.5%) worked as housewives.

Table 2. Distribution of Hb levels of pregnant women before consuming Date Juice

Statistics	Value
Mean	10.3125
Median	10.3500
Std. Deviation	.55634
Minimum	8.90
Maximum	11.00

Source: Primary Data

The results of the study in table 1.2 above show that the Hb level of pregnant women before consuming Date Juice in the Pregnant Women's Class of Tanjungsari Boyolangu Tulungagung Village was obtained with a mean of 10.3125, a median of 10.35000, a standard deviation of 0.55634, a minimum value of 8.90 and a maximum value of 11.

Haemoglobin is an iron-rich protein, has an affinity (combined power) to oxygen and with oxygen it forms *oxyhaemoglobin* in red darash cells. Through this function, oxygen is carried from the lungs to the tissues (Evelyn, 2015:32). Haemoglobin in the blood carries oxygen from the lungs to all tissues of the body, and carries carbon dioxide back from all cells to the lungs to be excreted from the body. Anemia during pregnancy refers to a situation where there is a reduction in red blood cells or hemoglobin levels, leading to a diminished ability to carry oxygen to meet the requirements of both the mother and the fetus's essential organs. A

sign of anemia in pregnant women is when the hemoglobin level falls below 10. 50 to 11. 00 grams per deciliter (Varney, 2017:49).

Based on the results table, the average Hb level of pregnant women before consuming date juice is 10.3125 gr%. The lowest Hb was 8.9 gr% or included in the category of mild anemia. While the highest Hb is 11 gr%, it is in the non-anemia category.

Pregnant women need more nutritional intake than non-pregnant women because nutrition plays an important role in supporting maternal health as well as fetal growth and development. This nutritional need increases during the third trimester of pregnancy, which is when the fetus experiences very rapid growth, both in terms of weight, organ maturation, and tissue development. In this phase, generally the appetite of pregnant women increases so that mothers often feel hungry faster. This condition is normal, but it still needs to be balanced with the selection of healthy, nutritionally balanced foods, and a regular diet.

Even though appetite increases, pregnant women are still advised not to overeat, especially foods high in simple carbohydrates and uncontrolled proteins, as they can lead to excessive weight gain. Weight gain that is not recommended risks causing various complications, such as bleeding during childbirth, increased blood pressure as an early indication of pregnancy poisoning (preeclampsia), and the risk of gestational diabetes. Therefore, setting the right diet, balanced, and according to needs is very important to maintain the health of the mother and ensure the safety and growth and development of the fetus until the time of delivery.

Table 3 Distribution of Hb levels of pregnant women after consuming Date

Statistics	Value
Mean	12.6406
Median	12.6000
Std. Deviation	.94420
Minimum	11.00
Maximum	14.60

Source: Primary Data

The results of the study in table 3 above show that the Hb level of pregnant women after consuming Date Juice in the Pregnant Women's Class of Tanjungsari Boyolangu Tulungagung Village was obtained with a mean of 12.6406, a median of 12,600 with a standard deviation of 0.94420, a minimum value of 11.00 and a maximum value of 14.60.

Date juice is a processed form of dates, where dates are squeezed and then extracted so that the juice is liquid in form. Date juice sold in the international market is very large. In each date-producing country, it has its own name and product, even in one country the name of date production is different, some are up to five. This usually happens for date-producing countries in the Middle East, because it is there that the center of this plant originates and is widely cultivated (Agus, 2014:51). Dates have nutritional content that is useful for the body. At least, sugar (glucose) is the main component with a composition that reaches 50% of the total fruit content, he also said, the sugar content in dates is greater than other fruits which only reach 20-30 percent.

Based on the results of the study, the average Hb level of pregnant women after consuming date juice is 12.6406 gr%. The lowest Hb is 11 gr% while the highest Hb is 14.6 gr% which all fall into the non-anemia category.

The iron requirement in pregnant women is 20-48 mg every day. Dates can help increase iron for pregnant women. However, if pregnant women consume excessive dates, it will cause excess pregnancy weight, high blood sugar, the risk of gestational diabetes, and tooth decay or affect dental hygiene. In this study, the researcher will use tamr dates (dried dates) of the type

of Khalasah dates or kholas dates. The researcher chose this type of date because Kholas dates are widely sold in stores or markets, besides that the price of these dates is very affordable. Kholas dates can also help increase blood sugar levels in pregnant women. This is because the content of dates includes Vitamin B complex consisting of thiamine (0.090 mg), riboflavin (0.100 mg), niacin (2,200 mg), vitamin B6 (0.780 mg), and pantothenic acid (0.192 mg) (Sugita, 2020). In this study, the administration of dates to pregnant women was 7 pieces per day or 100 grams for 14 days. Pregnant women can consume 100 grams of dried dates if they rely on dates as the only source of iron, or consume liquid date juice 3x2 tablespoons per day (Agus, 2014:21).

Iron needs in pregnant women range from 20–48 mg daily and are very important to support the formation of red blood cells, prevent anemia, and support fetal growth and development. During pregnancy, the mother's blood volume increases so that the need for iron also increases. One of the natural sources of iron that is good for pregnant women is dates. Dates contain iron, vitamins, and other minerals that are useful for increasing energy and helping to meet the daily nutritional needs of pregnant women. In addition, dates are also known to help maintain stamina and reduce the risk of fatigue that is often experienced during pregnancy. However, even though dates have many benefits, their consumption still needs to be limited so as not to overdo it. Excessive consumption of dates can lead to uncontrolled weight gain because the natural sugar content is quite high. This condition also risks increasing blood sugar levels and triggering gestational diabetes in pregnant women. In addition, the high sugar content in dates can also affect dental health, such as causing tooth decay if oral hygiene is not maintained properly. Therefore, pregnant women are advised to consume dates in reasonable amounts, accompanied by a balanced diet and the habit of maintaining dental hygiene in order to maintain optimal maternal and fetal health.

Table 4 The effect of date juice administration on changes in Hb levels of pregnant women with anemia

Statistics	Before	After
Mean	10.3125	12.6406
Median	10.3500	12.6000
Std. Deviation	.55634	.94420
Minimum	8.90	11.00
Maximum	11.00	14.60
Uji t	-12.017	
P Value	0,000	
Signifikasi	0,05	

Source: Primary Data

The findings displayed in table 4 indicate that prior to drinking Date Juice, the average Hb levels among pregnant women in the Pregnant Women's Class of Tanjungsari Boyolangu Tulungagung Village were recorded at 10. 3125, with a median of 10. 35000, a standard deviation of 0. 55634, a lowest value of 8. 90, and a highest value of 11. After they started consuming date juice, the average rose to 12. 6406, with a median of 12. 600, a standard deviation of 0. 94420, a minimum of 11. 00, and a maximum of 14. 60. The average increase in Hb levels for these pregnant women amounts to 2. 3281.

The results of quantitative data analysis with a significant *t-test* of 0.05 obtained *P Value* = 0.000 smaller than the value $\alpha = 0.05$ ($0.000 < 0.05$) so that H0 was rejected and H1 was accepted, which means that there was an effect of giving date juice on changes in Hb levels of pregnant women with anemia in the Pregnant Women's Class of Tanjungsari Village, Boyolangu Tulungagung.

According to Nugraheny (2014), several elements influence the prevalence of anemia among expectant mothers. Consequently, if these women do not consistently take iron supplements, the outcomes from statistical data evaluation with a significant t-test at 0. 05 reveal a P Value of 0. 000, which is less than the alpha level of 0. 05 (0. 000).

Dates consist of sugary components, including a blend of glucose, sucrose, and fructose, along with protein, fats, fiber, vitamins A, B1, B2, B12, C, potassium, calcium, iron, chlorine, copper, magnesium, sulfur, phosphorus, and various enzymes. These nutrients are quite comprehensive and help boost hemoglobin levels, making them easy for the body to utilize. The combination of protein, carbohydrates, and fats found in dates aids in the creation of hemoglobin (Sotolu et al. , 2011). Carbs and fats contribute to the production of succinyl CoA, which, in combination with glycine, leads to the formation of protoporphyrin through a chain of porphyrin-related reactions. The resulting protoporphyrins then combine with the heme molecule and globin protein to create hemoglobin (Murray et al. , 2003).

Pregnant women are encouraged to eat foods that can help the formation of red blood cells, such as liver, anchovies, red meat, nuts, green vegetables, egg yolks, and fruits such as dates. These foods are rich in iron, folic acid, and vitamin C which are needed during pregnancy. Iron plays an important role in the formation of hemoglobin, folic acid functions in the formation of blood cells as well as prevents neural tube defects in the fetus, while vitamin C helps increase iron absorption in the body. By fulfilling these nutrients, pregnant women can avoid blood deficiency or anemia that often occurs during pregnancy.

In addition to being useful during pregnancy, the consumption of these nutritious foods is also very good for the health of the mother after childbirth. Sufficient iron fulfillment can help speed up the recovery of body condition, replace blood lost during childbirth, and maintain immunity so that mothers do not get tired and sick easily. Dates, as one example of recommended fruit, are also believed to help increase stamina and facilitate the recovery process after childbirth. Therefore, the implementation of a balanced healthy and nutritious diet rich in iron, folic acid, and vitamin C is essential to support the health of the mother and baby, as well as an effort to prevent and treat anemia naturally.

The findings of this research hold significance in relation to the study conducted by Wiulin Setiowati and Setiowati in 2019, where it was found that there were variations in hemoglobin levels before and after the consumption of date juice. As a result, the null hypothesis (H0) was not supported while the alternative hypothesis (H1) was supported, indicating that date juice (phoenix dactylifera) does influence the elevation of hemoglobin levels in pregnant women during their third trimester. Additionally, this study is also connected to the research undertaken by Irmawati S. and Rosdiana R. in 2020, which reported that the T-Test yielded a p-value of 0. 000.

CONCLUSION

Based on the findings from the research regarding the impact of date juice on the hemoglobin (Hb) levels of pregnant women experiencing anemia in the Pregnant Women's Class of Tanjungsari Boyolangu Tulungagung Village, the following conclusions can be made: Before consuming date juice, the average Hb level of pregnant women in the Tanjungsari Village's class was recorded at 10. 3125 grams per deciliter, which falls under the mild anemia classification. In contrast, after they started drinking date juice, their average Hb level increased to 12. 6406 grams, placing them within the normal range. It was observed that date juice positively influenced the changes in Hb levels among pregnant women with anemia in the Pregnant Women's Class of Tanjungsari Village, Boyolangu Tulungagung, as evidenced by a t-test statistical analysis showing a P Value of 0. 000.

It is anticipated that the Pregnant Women's Class will keep addressing the requirements of expectant mothers, including monitoring the Hb levels of these women and offering ways to boost their Hb levels, one of which is through the consumption of date juice. Midwives are expected to consistently deliver information to pregnant women and their families concerning the dietary needs of expectant mothers, particularly aimed at enhancing the Hb levels of pregnant women, which can be achieved in part by providing date juice.

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