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Provision of coconut haustorium as an alternative to increase hemoglobin and ferritin levels among women of childbearing age

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ABSTRACT

Background

Anemia is a nutritional problem. Women of childbearing age can experience anemia, one of the causes is due to menstruation and also pregnancy and childbirth periods. Iron nutrition needs that cannot be met during this period will cause anemia. Coconut haustorium is an alternative to increase hemoglobin level because of its iron content.

Objective

To determine the effect of Coconut haustorium as an alternative to increase hemoglobin and ferritin levels among women of childbearing age in the Work Area of Bergas Community Health Center, Semarang District in 2018.

Study Methods

This study method used here was quasy experiment. The study design used was pretest and post test control group design. The samples were 30 women of childbearing age, who were assigned into 2 groups: 60 mg Fe with 800 mg coconut haustorium and 60 mg Fe groups. The analysis of this study was conducted with univariate and bivariate using t-test, and the data that were not normally distributed used Wilcoxon.

Results

After the intervention it was obtained p value = 0.002 (<0.005) which showed that there was a difference in the hemoglobin level after intervention in both groups. The mean of ferritin level in the intervention group was higher than the control group (43.07 ng/dl > 18.42 ng/dl), p value = 0.000 (<0.005) which showed that there was a difference in ferritin level after intervention in both groups.

Conclusion

Coconut haustorium had an effect on increasing Hb and ferritin hormone levels.

Recommendation

Coconut haustorium can be an alternative therapy to increase Hb and ferritin hormone levels

Keywords: Coconut Haustorium, Women of Childbearing Age, Ferritin, Hemoglobin

BACKGROUND

Anemia is a nutritional problem. [1] Children and women of childbearing age are the most at-risk groups, with an estimated prevalence of anemia in infants by 47 percent, in pregnant women by 42 percent, and in non-pregnant women aged 15-49 years by 30 percent. [2]

World Health Organization (WHO) targets a decrease in the prevalence of anemia among women of childbearing age by 50 percent in 2025. [3] Anemia can increase the risk of maternal mortality during childbirth, delivering low birth weight babies, the fetus and mother who are susceptible to infection, miscarriage, and increase the risk of premature babies. [4]

Groups that have high anemia prevalence are pregnant and elderly (50%), infants and children aged <2 years (48%), school children (40%), non-pregnant women (35%) and preschool children (25%). [5] Normal hemoglobin requirement for women of childbearing age is 12gr /% and for pregnant women is 11 gr%. Government policy in dealing with anemia is by giving Fe tablets to pregnant women as many as 90 tablets at a dose of 60 mg/day, women of childbearing who consume Fe tablets 60 mg/day can increase hemoglobin level by 1 gr% per month. [6]

Side effects of Fe supplementation consist of two categories: a) side effects that affect the upper gastrointestinal tract include nausea, xiphoid process pain and vomiting, b) side effects that affect the lower gastrointestinal tract include diarrhea, constipation and black stools. [7] The side effects cause Fe tablets are not desirable and there is a need for other alternatives as a supplementation to Fe consumption.

Coconut haustorium or also known as *Kentos*, is an embryo from a coconut shoot. [8] Its form is round, and is located inside the coconut meat. Coconut haustorium plays a role in maintaining a complete hematology of blood in the values of hemoglobin, erythrocytes, hematocrit.

Coconut haustorium contains nutrients in the form of proteins that play a role in the composition of blood that is rich in iron, and flavonoid compounds that can maintain blood vessel health. [9]

According to a study conducted by Sumiati Aiba, Coconut haustorium is effective in influencing immune and improving the health of female mice due to nutrients and compounds that work to provide a pharmacological response to the body's physical function.

OBJECTIVE

To prove that coconut haustorium can be an alternative to increase hemoglobin and ferritin levels among women of childbearing age in the work area of Bergas Community Health Center Semarang District.

METHODS

This study was a Quasy experiment study with pretest and posttest control group design. The number of samples was 30 which was assigned into 2 groups: 15 samples in the control group and 15 samples in the intervention group.

Inclusion criteria were women of childbearing aged 20-35 years and initial hemoglobin levels of 9-11 gr/dl. The variables studied were ferritin hormone level and blood hemoglobin level before and after treatment.

Coconut haustorium was given for 1 month. The measuring instruments used were questionnaire, Digital Hb meter, Hormone Examination performed at the GAKY Laboratory of Undip Tembalang. Data analysis was carried out with Univariate Analysis to analyse the study variables descriptively by testing the normality of the data.

Descriptive analysis was conducted to describe each variable observed separately by creating a table consisted of mean, median, standard deviation of each variable. Bivariate analysis was conducted to test each variable between the control group and the intervention group. Data used in this study were not normally distributed, so the test used was non-parametric test with Mann Whitney test on the paired variables of hemoglobin and ferritin levels, while the unpaired variables were tested using the Wilcoxon test. One way ANOVA test was conducted to test the difference in the hemoglobin levels and ferritin levels in each week.

RESULTS

Univariate Analysis on the Caracteristics of Respondents

Table 4.1 Analysis on the Age and Education Characteristics of Respondents at Bergas CHC Semarang District in 2018

Characteristics	Interventiin Group		Control Group		P
	(n=15)	%	(n=15)	%	
Age					
<20 years	0	0	0	0	0.559
21-30	14	93.3	13	86.7	
>30 years	1	6.7	2	13.3	
Education					
JHS	1	6.7	2	13.3	1.000
SHS	12	80	12	80	
Higher Education	2	13.3	1	6.7	
Menstruation					
Yes	11	73.3	7	46.7	0.067
No	4	26.7	8	53.3	

** homogeneity test results*

Table 4.1 showed that the mean of respondents' age was 21-30 years with a p value of 0.559 (>0.05) and the mean of respondent's education was senior high school with a p value of 1.000 (>0.05), which meant that there was no significant difference in the age and education of the respondents both in the control and intervention groups. 11 women in the intervention group experienced menstruation and 8 women in the control group did not experience menstruation with a p value of >0.05.

Description of the Hemoglobin Levels (Hb)

Table 4.2 Description of the Hemoglobin levels (Hb) of respondents in the Work Area of Bergas CHC Semarang District in 2018

Hempglobin Assessment	Mean±SD	
	Intervention	Control
Before	10.64±0.37	10.51±0.42
After 14 days	11.08±0.39	10.67±0.46
After 30 days	11.15±0.40	10.66±0.37

Based on table 4.2, the results of hemoglobin (Hb) assessment were as follows: There was an increase in the intervention group in 14 days after treatment and 30 days after treatment and there was a decrease in the control group in 30 days after treatment.

Description of Ferritin Hormone

Table 4.3 Description of Ferritin hormone levels of respondents in the Work Area of Bergas CHC Semarang District in 2018

Feritin Assessment	Mean ± SD	
	Intervention	Control
Before	25.86±8.41	29.68±11.46
After 30 days	43.07±12.33	18.42±4.57

Based on table 4.3 the description of the results of ferritin hormone assessment is follows:
Ferritin hormone before intervention in the intervention group was lower than after 30 days of intervention. There was a decrease after 30 days of intervention in the control group.

Bivariate Test Results for Hemoglobin (Hb) Level Variable

Table 4.4 Analysis results of Hemoglobin (Hb) level in the control group and intervention group at Bergas CHC in 2018 (N = 15)

Hemoglobin Variable		Mean Difference	95% Confidence Interval of the Difference		P value*
			Lower	Upper	
After 14 Days	Intervention	0.51	0.34	0.67	0.001
	Control	0.16	0.07	0.24	0.006
After 30 Days	Intervention	0.44	0.34	0.53	0.001
	Control	0.18	0.04	0.24	0.010

Based on table 4.4 after 14 and 30 days of treatment the p value was <0.05, which meant that there were significant differences between the intervention group and the control group.

Bivariate Test Results for Ferritin Level Variable

Tabel 4.5 Analysis results of Ferritin level in the control group and intervention group at Bergas CHC in 2018 (N=15).

Ferritin Hormone Variable		Mean Difference	95% Confidence Interval of the Difference		P value*
			Lower	Upper	
After 30 Days	Intervention	17.22	8.37	26.05	0.003*
	Control	-11.3	-18.43	-4.08	0.003*

Based on table 4.5 after 30 days of treatment the value of the mean difference of the intervention group was higher compared to the control group.

Bivariate Test Results for Hemoglobin (Hb) Level Variable

Tabel 4.6 Analysis results of Hemoglobin (Hb) level in the control group and intervention group (N=30)

Hb Assessment	Mean Difference	95% Confidence Interval of the Difference		P value*
		Lower	Upper	
Before	-0.12	-0.42	0.17	*0.148*
After 14 days	-0.40	-0.73	-0.08	0.016
After 30 days	-0.49	-0.78	-0.20	0.002
Difference after 14 days	-0.28	-0.40	-0.15	0.000
Difference after 30 days	-0.36	-0.55	-0.18	0.001

Based on table 4.6, the results of bivariate analysis were as follows:

There were significant differences at 14 and 30 days of treatment with p <0.05 and there were significant differences in differences after 14 and 30 days of treatment with p <0.05.

Bivariate Test Results for Ferritin Level Variable

Tabel 4.7 Analysis results of Ferritin level in the control group and intervention group (N=30)

Ferritin Hormone	Mean Difference	95% Confidence Interval of the Difference		P value
		Lower	Upper	
Before	3.82	-3.69	11.34	0.161**
After 30 days	-24.65	-31.60	-17.69	0.000**

Based on table 4.7, the results of bivariate analysis were as follows:

There was no significant difference in the level of ferritin hormone before treatment between the intervention group and the control group with p value >0.05

DISCUSSION

Age

Characteristics of groups based on women age showed that the majority of samples in the control group were 27 years with the lowest age of 25 years and the highest age of 32 years. The majority of samples in the intervention group were 26.6 years with the lowest age of 25 years and the highest age of 30 years.

Common limits used by women of chilbearing age is 19-49 years, both for women who are married, widowed and unmarried. This age is the reproductive age of a woman associated with pregnancy, birth and the health of reproductive organs. [10] In the life cycle, women's health is affected by biological, cultural, behavioral and social factors. Biological factors are the most influential factor.

Adequate nutrition, a fundamental basis for the health of each individual, is very important for women because inadequate nutrition leads to chaos not only for women's health but also for the health of their children later. [11]

Education

The educational characteristic of the respondents in the control group and the intervention group showed that high school (SHS) education level was dominant, with the lowest education of junior high school (JHS) and the highest education was higher education.

Education is one of the factors that can support the ease of a person to receive information and she can be motivated better, so that it is expected that the higher the level of education of a woman, the better motivation to make decisions for her nutritional needs.

One's education affects her nutritional condition because it is expected that with a higher level of education, the knowledge or nutritional information owned will be better. Nutritional problems often arise due to ignorance or lack of information about adequate nutrition. A person with low education is not necessarily less able to prepare foods that meet nutritional requirements compared to other people with higher education. If the person is diligent in listening or searching information on nutrition, it is not impossible that her nutritional knowledge will be better.

It should be considered that the level of education also determines whether or not someone to easily gain and understand the knowledge on nutrition obtained. In the interests of family nutrition, education is needed so that a person is more responsive to nutritional problems within the family and can take quick action. [11]

Education distribution of anemic women in the work area of Bergas CHC between the intervention group and the control group showed the same value between secondary Senior High School and higher education.

Menstruation

Menstruation is a natural cycle that occurs in a woman's body. This cycle will generally appear every about 4 weeks, starting from the first day of menstruation until the first day of the next menstrual period. [12]

However, not all women experience the same cycle. The menstrual cycle can sometimes come faster or slower with differences ranging from 21 to 35 days. During menstruation, women will experience bleeding from the vagina for about 2 days to one week with an average blood volume of 30-70 milliliters. But there are some women who bleed more. The highest volume of bleeding during menstruation usually occurs on the first and second days. [12]

Chronic blood loss can also lead to anemia. In women, there is a natural blood loss every month. If the blood that comes out during menstruation is very much there will be iron deficiency anemia. Women do not have sufficient iron supplies and low iron absorption into the body so they cannot replace iron lost during menstruation. [12]

The Effect of Coconut Haustorium Powder on the Hemoglobin Level among Women of Childbearing Age

The study results on Hemoglobin levels using the Mann Whitney test showed the value before treatment of 0.148 (p >0.05) which meant that there was no significant difference in Hb levels before treatment between the intervention group and the control group. P value after being given 14 days treatment was 0.016 (p <0.05) and p value after 30 days of treatment was 0.002 (p <0.05), it can be concluded that there were significant differences in Hb levels after 14 and 30 days of treatment between the intervention group and the control group. During the 30 days there was an increase of 0.52 gr% in the intervention group and 0.15gr% in the control group.

This study is not in accordance with the study conducted by Sumiati Aiba (2016) that coconut haustorium in the treatment group had no effect on increasing hemoglobin in the first, second, third and fourth weeks with p = >0.05, but providinf coconut haustorium it did not lead to blood deficiency symptoms until anemia. [9]

The formation of hemoglobin in the blood is affected by the availability of other nutrients such as protein and iron. The consumption of nutrients from food is expected to have a balanced nutritional content, so that the metabolic process in the body will work optimally. Women of chilbearing age who have less nutritional status are likely to experience anemia. A person who has a good nutritional status will also have a good food reserves in the body. Nutrition among women of chilbearing age must be considered, given their function and role as housewives who will naturally experience pregnancy, delivery and labor and lactation.

Therefore women of chilbearing must have sufficient food reserves in the body so that they can carry out their role both as housewives and workers well.

The increase in hemoglobin levels among women of chilbearing is not only affected by Fe supplement alone but is also supported by consumption of foods containing substances needed in hemoglobin synthesis.

Coconut haustorium is one alternative to meet iron requirement as a nonheme iron source, it contains iron as much as 1.01 mg/100 grams. Adding iron content from Coconut haustorium plays a role for the formation of hemoglobin. Coconut haustorium contains nutrients in the form of proteins that play a role in the composition blood that is rich in iron, and flavonoid compounds that can maintain blood vessel health. [9]

A healthy human body contains ±3.5 grams of Fe which is almost entirely in the form of complex bonds with proteins. Approximately 70% of Fe in the body is functional or essential, and 30% is non-essential which in the form of 66% hemoglobin and 3% myoglobin and the rest is in the form of certain enzymes. Non-essential iron is available as a reserve in the forms of ferritin and hemosiderin as much as 25% and in the tissue perenchyma of approximately 5%. If these needs are not met, the Fe reserved in the body will be used and the reserve site will eventually be empty. As a result, Fe deficiency anemia will occur. [13]

Iron is a useful part for oxygen binding in erythrocytes. This substance is needed by the body 15-30 mg per day. Adult women have about 2.1 g of Fe, with 1.6 grams of hemoglobin. Hemoglobin consists of four units, each unit contains one heme group and one protein chain. Iron is found in the liver, meat, eggs, nuts, cheese, fish, green vegetables, cereals, and fruits. [14]

Anemia is the largest public health problem in the world, especially for women of chilbearing group. High risk group for anemia is women of chilbearing group because they do not have sufficient iron intake or reserves for Fe need and loss. Anemia among women of chilbearing can cause fatigue, weak body, and decreased work productivity. For pregnant women, anemia contributes to an increase in the prevalence of maternal mortality and morbidity, and for infants it can increase the risk of infant morbidity and mortality, and low birth weight. [15]

Anemia is a clinical symptom where hemoglobin levels in red blood are less than normal. Decrease in hemoglobin concentration is due to disruption of the formation of red blood cells

caused by reduced levels of iron in the blood. So, the blood cannot carry oxygen in the amount needed by the body, and this will cause anemia. [33]

Iron deficiency anemia is an anemia that occurs due to lack of iron (Fe) that the body needs in the formation of red blood cells. In addition, in the process of forming hemoglobin, iron plays a role in the storage and transport of oxygen. Iron deficiency in the body characterize that the body lacks hemoglobin and oxygen which will inhibit the formation of red blood cells. The occurrence of iron deficiency anemia is largely determined by the ability of iron absorption, iron-containing diets, increased iron requirements, amount of iron lost in the body, loss of blood during labor, menstruation, and chronic diseases such as tuberculosis and malaria. [28]

Iron deficiency generally causes symptoms such as pallor, dizziness, headache, nail epithelial changes, lethargy, shortness of breath, weakness, drowsiness, fatigue, decreased fitness, decreased work ability and wound healing disorders. [66]

The process of iron absorption in the intestine consists of three phases, namely the luminal phase, mucosal phase, and systemic or corporeal phase. during the luminal phase the iron bond from food ingredients is released/converted into dissolved form, then iron in the form of ferric (Fe +++) is reduced to ferro (Fe ++) so it is readily absorbed by the intestine. In this process, the gastric secretionand gastric acid play an important role.

The best absorption occurs in the duodenum and proximal jejunum. This is associated with the number of receptors on the intestinal surface and intestinal pH. [19] Factors that inhibit iron absorption are influenced by substances mostly found in foods derived from plants. The strongest inhibitors are polyphenol compounds such as tannin in tea. Tea can reduce absorption up to 80% as a result of the formation of iron-tannate complex. [18]

The Effect of Coconut Haustorium Powder on the Ferritin Level among Women of Childbearing Age

The results showed that there was no significant correlation between ferritin hormone levels in the intervention group and the control group before being treated with p >0.05. Ferritin level in the intervention group after 30 days of treatment was 17.22 ng/ml and p value = 0.003 (p <0.05) which meant that there was a significant difference in ferritin hormone level in the intervention group after 30 days of treatment. Ferritin level in the control group after 30 days of treatment was -11.3 ng/ml and p value = 0.003 (p <0.05), which meant that there was a significant difference in ferritin hormone level in the control group after 30 days of treatment.

In this study it can be seen that ferritin levels before treatment in the two groups were at normal levels, in the intervention group the initial ferritin level was 25.86 ng/ml while in the control group was 29.68 ng/ml. After being given treatment it can be seen that there were changes in ferritin levels in both groups. In the control group there was a decrease in ferritin levels to 18.42 ng/ml while in the intervention group there was an increase in ferritin level to 43.07 ng/ml.

The study results showed that ferritin levels between two groups were different and there was a decrease in ferritin level in the control group, this might be due to the fact that this study did not take into account other variables that could affect ferritin levels in women of childbearing age. Further studies with multivariate analysis to observe other causes are needed.

From the data above, the addition of coconut haustorium powder to Fe tablets would increase the ferritin level of the body. Changes in ferritin levels before and after the tested with *paired t-test* showed significant result in the intervention group.

This study used ferritin parameter which was measured to determine the ferritin level of respondents. Ferritin serum in addition to describes iron reserves in the body, is also an acute phase reactant which will increase not only when the body's iron reserves increase but also in acute or chronic inflammation, liver disease, alcoholic, hemolytic anemia, hemochromatosis and malignancy. Meanwwhile low serum ferritin levels usually show iron deficiency anemia, menstruation with heavy bleeding or chronic gastrointestinal bleeding. Normal serum ferritin level is about 10-120 ng/ml. [20]

This study proved that consuming coconut haustorium at a dose of 800 mg three times/day together with Fe 60 mg tablets per day could routinely increase ferritin level and hemoglobin level among women of childbearing age. This study used the same dose (providing Coconut

haustorium) to each respondent, the time period of hemoglobin examination was performed 3 times, the first day was before the intervention, day 14, and the day 30 after intervention and the assessment of ferritin level was conducted before intervention and after 30 days of treatment.

Study Limitations

The authors did not examine the levels of substances, other Coconut haustorium vitamins and side effects that might affect the changes in hemoglobin and ferritin levels. The authors did not monitor other factors that could affect iron absorption in the body, for example the way respondents drink coconut haustorium powder and Fe tablets by using tea or drinks that could inhibit the absorption of Fe and did not monitor the daily dietary patterns consumed by respondents. This study was conducted by providing coconut haustorium powder to the respondents, the authors did not perform a preference test on the coconut haustorium powder to be given to the respondents.

CONCLUSION

The addition of coconut haustorium powder on Fe tablets could increase hemoglobin and ferritin levels of women of childbearing age aged 20-35 years compared to Fe tablets only. Coconut haustorium powder has been shown to increase hemoglobin and ferritin hormone levels among womenb of childbearing age in the work area of Bergas Community Health Center in Semarang District.

RECOMMENDATION

For CHCs, in order to socialize to all health care providers about coconut haustorium powder containing iron as an important factor for increasing iron levels in the body. For women of childbearing age, to increase knowledge on anemia and pay attention to their food intake so that nutritional needs are still met, and to consume a variety of foods that are highly nutritious as a habit. For future researchers, to continue the study on the levels of substances and vitamins in coconut haustorium and the factors that can affect the increase in the hemoglobin and ferritin levels. For educational institutions, to provide input for the development of science as learning material to improve the soft skills of health care providers.

REFERENCES

[1]. Organization WH. The World Health Report 2002: Reducing Risks, Promoting Healthy Life: World Health Organization; 2002.
[2]. Mclean E, Cogswell M, Egli I, Wojdyla D, De Benoist B. Worldwide Prevalence Of Anaemia, WHO Vitamin And Mineral Nutrition Information System, 1993–2005. Public Health Nutrition. 12(4), 2009, 444-54.
[3]. Organization WH, Targets WGN. 2025: Anaemia Policy Brief. Geneva: World Health Organization. 2014.
[4]. Indonesia KK. Profil Kesehatan Indonesia Tahun 2011. 2015.
[5]. Kesehatan D. Laporan Nasional Riset Kesehatan Dasar (Riskesdas) Tahun 2007 Badan Penelitian Dan Pengembangan Kesehatan Departemen Kesehatan RI. Jakarta; 2009.
[6]. Permaesih D, S Herman. Faktor-faktor yang mempengaruhi anemia pada remaja putri. Buletin Penelitian Kesehatan 33(4), 2005, 162-171
[7]. Allen, LH. Iron Supplementation: Scientific,Issues Concerning Efficacy and Implications for Research and Programs. Journal of Nutrition; 132, 2002, 8138-98.
[8]. Dian V. Kelapa Muda Pelepas Dahaga Sejuta Manfaat. Surabaya: Stomata; 2016.
[9]. Aiba S, Manalu W, Suprayogi A, Maheshwari H. Gambaran Nilai Hematologi Tikus Putih Betina Dara Pada Pemberian Tombong Kelapa. Acta Veterinaria Indonesiana. 4(2), 2016, 74-81.
[10]. Maryanti D. Buku Ajar Kesehatan Reproduksi Teori Dan Praktikum. Jakarta: Nuha Medika; 2009
[11]. Putri Mc. Hubungan Asupan Makan Dengan Kejadian Kurang Energi Kronis (Kek) Pada Wanita Usia Subur (Wus) Di Kecamatan Terbanggi Besar.
[12]. Nicoletti, Carusso M, Coco M, Mancuso M. Menstrual Disorder in Adolescents. Ital J Pediatr; 29, 2003, 110-113.

[13]. Muwakhidah. Efek Suplemen Fe, Asam Folat Dan Vitamin B12 Terhadap Peningkatan Kadar Hemoglobin Pada Pekerja Wanita: Universitas Diponegoro Semarang; 2009.
[14]. Irianto koer W. Gizi dan pola hidup sehat. Yrama Media: Bandung; 2004.
[15]. Fakultas Kesehatan Masyarakat Universitas Indonesia. 2014. Gizi dan Kesehatan Masyarakat. Departemen Gizi dan Kesehatan Masyarakat. Jakarta: Rajawali Pers.
[16]. Soebroto I. Cara Mudah Mengatasi Problem Anemia. Yogyakarta: Bangkit; 2009.
[17]. RI D. Pedoman Penanggulangan Anemia Gizi Di Indonesia. Jakarta: Direktorat Bina Gizi Masyarakat; 2007.
[18]. Varney H. Buku Saku Bidan. Buku Kedokteran EGC: Jakarta; 2002.
[19]. Andrews N. Undestranding Heme Transport NEngl J Med. 353, 2004, 2508-9.
[20]. Ani LS. Metabolisme Zat Besi Pada Tubuh Manusia. Widya Biologi. 2(1), 2011, 3-9.

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