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The shrimp rebon as alternative for increasing hemoglobin levels in anemia pregnant

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ABSTRACT

Background

Anemia in pregnancy is one of the national problems because it reflects the value of socio-economic well-being of the community and its influence is very large on the quality of human resources. Increased iron status can also be done with various approaches, namely pharmacological and non-pharmacological. The main source of iron is animal foods including rebon shrimp. Rebon shrimp as a source of iron is needed in the formation of hemoglobin levels.

Method

The type of research used was research *True Experimental with a pretest-posttest control group design*. This study compiled two groups, namely the intervention group and the control group. Technique *Probability sampling* with method was *simple random sampling* used to get 34 respondents divided into 2 groups.

Results

The results of the test *Mann Withney* show values *p value of* 0,000 so that there are differences in hemoglobin levels in the intervention and control groups.

Conclusion

The results of the study after being given an intervention that rebon shrimp are effective as an alternative to increasing hemoglobin levels in anemic pregnant women.

Keywords: Anemia Pregnant, Rebon Shrimp, Hemoglobin Levels.

INTRODUCTION

Anemia in pregnancy is one of the national problems because it reflects the value of socio-economic well-being of the community and its influence is very large on the quality of human resources. Anemia in pregnant women is called "*Potential danger to mother and child*" (Potential to endanger mother and child). Therefore anemia requires serious attention from all parties involved in health services. [1]

Data on the 2010 World Health Organization (WHO), the prevalence of anemia in pregnant women is called by the world at 41.8%. The prevalence of anemia in pregnant women is estimated in Asia at 48.2%. In developing countries there are around 40% of maternal deaths related to anemia in pregnancy. The anemia rate of diindonesia pregnancies shows a fairly high value, based on the results of the 2013 Basic Health Research (Riskesdes), the prevalence of anemia in pregnant women in Indonesia was 37.1%, while the

incidence of anemia in pregnant women in Central Java in 2013 was 78.9 %, this figure is still higher than the national figure of 71.2%.[1, 2, 3] Anemia prevalence in Central Java, pregnant women who received Fe tablets in 2015, reached 90.74%, decreased compared to 2012, as much as 91.77%, where the highest area was in Kebumen District 90 , 77% and the lowest is in Kendal Regency as much as 70.48%. [2]

The impact of iron deficiency on pregnant women can be observed from the magnitude of maternal morbidity and mortality, increased maternal morbidity and mortality rates, and an increased risk of low birth weight. The main causes of maternal deaths include postpartum hemorrhage and placenta previa, all of which originate in iron deficiency anemia. [4] Associated iron deficiency is less favorable for mothers and infants, the incidence of anemia in pregnant women will increase the risk of maternal mortality compared to mothers who are not anemic. [5] Anemia in pregnant women can result in impaired fetal growth, abortion, prolonged labor, puerperal sepsis, maternal and fetal death. [6] Anemia in pregnant women also results in placental disorders such as hypertrophy, calcification, and infarction, resulting in impaired function. This can result in a disruption of fetal growth, so that appropriate prevention is needed to overcome anemia. [7]

To overcome the problem of anemia in Indonesia, the government has launched an equal distribution of Fe tablets to health services to be distributed to all pregnant women free of charge. The distribution is one of the achievement targets in Antenatal Care (ANC), four ANC visits are considered sufficient with details once every trimester and twice in the last trimester. One of the ANC visits was for the coverage of Fe 1 and Fe 3, where the administration of iron to pregnant women can be divided into Fe1 which is to get 30 tablets and Fe3 which is 90 tablets during pregnancy. [8] Prevention of anemia has been going on for a long time but the prevalence of anemia is still high. Anemia is indeed a complicated problem because anemia is an impact of various causes.

According to Gurendro 2010 administration of Fe tablets to pregnant women stated that the use of iron tablets in pregnant women did not increase their hemoglobin levels. Most anemia of pregnant women is caused by low iron intake.[9] Other studies of iron intake with anemia anemia have been carried out including Yulianan et al in 2013, that there was a significant relationship between risk factors for iron intake and anemia. [10] Increased iron status can also be done with various approaches, namely pharmacological and non-pharmacological. The provision of pharmacological therapy includes the provision of blood supplementation, better known as sulfas ferossus. [11] the many weaknesses of chemical drugs such as added blood tablets, chemical drugs have side effects that make consumers uncomfortable, high drug resistance, and the possibility of accumulating in the body this causes people to choose to use natural local food as a substitute for chemical drugs. [12] Other efforts that can be done by considering the consumption pattern of pregnant women who must still refer to a healthy and balanced diet contained in the general message of balanced nutrition (PUGS). Meal arrangements for pregnant women are not in quantity or quantity but in the quality or composition of nutrients, because these factors are more effective and functional for the health of the mother and fetus. For example, to increase consumption of high iron food ingredients. [13] The main source of iron hem is animal foods including rebon shrimp. Rebon shrimp is one of the marine products of the type of crustaceans but with a very small size compared to other types of crustaceans.[14] In addition to its high protein content, the other superior of rebon shrimp is iron of dried rebon shrimp containing iron as much as 21.4 mg. In 1.67 grams of rebon shrimp containing about 0.35 mg of iron, with a high iron content rebon shrimp allows it as an alternative to fortification with iron because rebon shrimp as a source of iron is needed in the formation of hemoglobin levels.

Andi's research (2018) on the consumption of kidney beans on increasing hemoglobin levels, with a dose of 10 grams of red beans with iron content of 50 mg, was obtained with an average Hb level before treatment 9.7 ± 0.9 and after being given treatment namely 12.5. Whereas in the research of Dewi (2016) about the consumption of long bean leaves to increase the hemoglobin level with a dose of 350 grams with iron content 23.45 mg obtained the average Hb level in the first week was 12.87 gr / dl and in the second week reached 14.33 gr / dl. [15, 16]

Based on these descriptions the researcher is interested in conducting research under the title "Shrimp rebon as an alternative to increasing homoglobin and ferritin levels in anemic pregnant women".

METHODS

Type of this study usedresearch *True-Experimental* with a *Pretest-Posttest Control Group Design.* The researchers compiled two groups, namely the intervention group and the control group. Examination of hemoglobin and ferritin levels was carried out twice namely before treatment (*pretest*) and after treatment (*posttest*).

The population in this study were all anemia pregnant women in theWork Area Ringinarum Health Center Kendal District. Determination of the minimum number of samples using atechnique *sampling probability* withmethod *sample random sampling* and based on inclusion and exclusion criteria are as many as 34 respondents divided into 2 groups with 17 people each group. In this study researchers conducted data collection by observing, identifying, interviewing and filling out the questionnaire. The collected data was analyzed through the IBM SPSS program version 21.0, and continued with a different test, namely the non-parametric(*testWilcoxon* and *TestWithney Mann Test*). The processed data is used as the basis for discussing problem statements, which are then presented in table form so conclusions can be drawn.

RESULTS

Table 1 Distribution of Frequency Characteristics of Respondents in the intervention group and the control group in the working area of the Ringinarum health center district. Kendal (N = 34)

Characteristics	Intervention Groups (N = 17)		Control Group (N = 17)		*P*
	N	%	N	%	
Age					0.383
<20 years	1	2.9	0	0.0	
20-35 years	15	44.1	15	44, 1	
> 35 years	1	2.9	2	5.9	
Education					0.347
SD	3	8.8	2	5.9	
SMP	7	20.6	9	26.5	
SMA	5	14.7	5	14.7	
PT	2	5.9	1	2.9	
Parity					0.808
Primipara	8	23.5	7	20.6	
Multipara	8	23.5	9	26.5	
Grandemultipara	1	2.9	1	2.9	
Body Weight					1,000
<47.97	9	26.5	9	26.5	
≥47.97	8	23 , 5	8	23.5	

Based on table 1, it is known that the age of respondents is on average 20-35 years with a *p value of* 0.383 and education of the average respondent of SMP with a *p value of* 0.347, the average parity of Multipara respondents with a value of *p value* 0.808, which means that there is no significant difference between age, education and parity between the control group and the intervention group. Respondents' body weight seen from the average weight <47.97 kg in the intervention group and the control group there were 9 respondents (26.5). While the respondents who had a weight of ≥47.97 kg in the intervention and control groups also got the same number, namely 8 respondents (23.5%) with a value of *p* 1.000, meaning that there was no significant difference in respondents' weight between the intervention group and the control group.

Table 2 Results of Analysis of Hemoglobin Levels in Intervention Groups and Control Groups in the Ringinarum Health Center Working Area of Kendal Regency (n = 34)

Hemoglobin	Mean ± SD	Z	T	P value

Variables					
	Pre	Post TestTest			
Intervention	10.01 ± 0.42	11.67 ± 0 , 43	-3,630	-	0.000 *
Control	9.92 ± 0.42	10.64 ± 0.33	-	-18.515	0.000 **

* Wilcoxon test
** Paired t test

Based on table 2 resultsResults show that differences in hemoglobin levels before and after the intervention group and the control group obtained a p value of 0.000 which means there were significant differences in hemoglobin levels before and after the intervention and control groups.

Table 3 Results of Analysis of Differences in Mean Difference Hemoglobin Levels of Pregnant Women in Intervention and Control Groups (n = 34)

Hemoglobin Variables	Mean ± SD		U	P value
	Intervention	Control		
Pre Test	10.01 ± 0.42	9.92 ± 0.42	-	0,000
Post Test	11.67 ± 0.43	10.64 ± 0.33	-	0,000
Difference	1.66 ± 0.008	0.71 ± 0.09	9,000	0,000

* Mann Whitney Test

Based on table 3 theresults *Mann Whitney test* obtained *p* 0.000 which meaning that there are differences in hemoglobin levels in the intervention and control groups.

optimally, besides that protein also transports iron to bring iron to places that need iron such as the accumulation of bone to form new hemoglobin.

The process of absorption of iron occurs twelve fingers (duodenum) and small intestine (jejenum), in the iron intestine hem is absorbed directly and not influenced by inhibitors or boosters the percentage of absorption is greater than non-heme iron. The heme iron compound is fully absorbed and after being in the intestinal epithelium it will be released from the porphyrin chain by the enzyme haemoxygenase, then transferred into the plasma or stored in the form of ferritin. In plasma it binds to transferrin. Transferrin transports iron into the bone marrow to combine to form hemoglobin.

In contrast to the research conducted by Sri R (2015) about the effects of supplementation of gambus extract on hemoglobin levels with a dose of 1500mg / day given for 4 weeks did not show significant results. The average hemoglobin level of the intervention group after being given gambus fish only increased by 0.5 gr / dl.[20] While this study with a dose of 1.67 gram rebon shrimp / kg bw obtained significant results. There was an increase in the average hemoglobin level of 1.66 gr / dl for 2 weeks. Although the protein content in gambus fish extract is higher than that of rebon shrimp. But the extract of gambus is low in iron, the high iron content in rebon shrimp is the main ingredient in the formation of hemoglobin. Protein itself is a

DISCUSSION

The Effect of Rebon Shrimp on Hemoglobin Levels

The results of the analysis showed that the hemoglobin level of anemic pregnant women in the intervention group obtained avalue of *p* 0.000 which means that there was an effect of giving rebon shrimp to hemoglobin levels. Before being given rebon shrimp the average respondent had mild anemia and after being given rebon shrimp for 14 days there was an increase in the average hemoglobin level of 1.66 g / dl. Increased hemoglobin levels due to rebon shrimp contain a fairly high source of iron. The iron contained in rebon shrimp is iron hem. where this hem iron can be absorbed maximally by the body. So that the body gets enough iron supply for hemoglobin formation

Iron is a group of minerals needed as the nucleus of hemoglobin, the main element of red blood cells is that this increase can be met from iron and iron reserves absorbed by the digestive tract. [17] Iron from hem is a constituent of hemoglobin and myoglobin. [18]

Another ingredient in rebon shrimp is protein, in 1.67grams of rebon shrimp contains 0.99 grams of protein.[19] Energy produced from protein helps the body's metabolism so that the body works

support substance, the energy source produced from protein plays a role in helping the body's metabolic processes, and plays a role in the process of transporting iron which carries iron to parts of the body that need iron.

Another study was conducted by Andi St (2018) The effect of consumption of kidney beans on anemia, with 10 grams of the content of 50 mg of Fe equivalent to being able to increase 2.8 g / dl for 2 days. Another study conducted by Dewi (2016) on the effect of consuming long bean leaves with a dose of 350 grams with the content of Fe equivalent to 23.45 mg was able to increase hemoglobin levels in pregnant women an average of 1.72 gr / dl per week.[14,15] While this study with a dose of 1.67 gram / kg of rebon shrimp weighing with a Fe content of 0.35 mg only averaged an increase of 1.66 gr / dl for 2 weeks. This is because in rebon shrimp does not contain substances that can help absorb iron such as vitamin C contained in panajang bean leaves is a water-soluble vitamin, the acidic nature of vitamin C makes the stomach pH more acidic so that more iron is absorbed. From the above research, an increase in hemoglobin levels is influenced by intake, absorption and metabolism.

Alternative Shrimp Rebon as an increase in Hemoglobin Level

Prevention of anemia during pregnancy is done by administering Fe tablets for 90 days at a dose of 60 mg. But according to Gurendro (2010) The use of iron tablets in pregnant women does not increase their hemoglobin levels. Most anemia of pregnant women is caused by low iron intake. [9]

Iron plays a role in the body in the process of cellular respiration, iron is a component of hemoglobin, myoglobin and cytochrome, there is also the enzyme catalase and peroxidase. In all these components iron as porphyrin.The iron left in the body binds to storage proteins (Ferritin and hemosiderin) and forms of transport (transferrin). Iron-containing compounds for the body play a role in the transport of O2 and CO2 formation of red blood cells, as catalysts for the formation of beta-carotene into vitamin A, collagen synthesis of DNA synthesis, detoxification of toxins in the liver of electron transport in the mitochondria, and activation of cell proliferation T, B cells and NK cells. [23] the need for Fe increases during pregnancy to meet Fe's needs due to increased blood volume, to provide Fe for the fetus and placenta, and to replace blood loss during labor. [24]

One way to overcome anemia in pregnancy according to Wiraksumah (2007) pregnant women need to consume iron-source food ingredients. Increased Hemoglobin levels in pregnant women are not only influenced by Fe supplements but are supported by substances needed in hemoglobin synthesis. In 1.67 grams of rebon shrimp contains iron as much as 0.35 mg. The iron content in rebon shrimp is very good for preventing or improving the condition of anemia in pregnant women which is needed for the formation of hemoglobin.

Based on the results of statistical tests that have been done using the Mann Whitney test obtained a value of *p* 0,000 means that there are differences in hemoglobin levels in the intervention and control groups. The results of this study are in line with the results of Andi St's research (2018). Consumption of red beans shows that it can effectively increase hemoglobin levels in anemic pregnant women.

CONCLUSION

Based on the research objectives obtained from the results of the data analysis and discussion presented in the previous chapter, the researchers conclude as follows:

1. Giving rebon shrimp with a dose of 1.67 g / kg BW can be used as an alternative treatment for anemia in pregnant women. The high iron content in rebon shrimp has the potential as an alternative ingredient in increasing hemoglobin levels in anemic pregnant women.
2. Giving rebon shrimp with a dose of 1.67 g / kg BB accompanied by Fe tablets has an effect on increasing the hemoglobin level of anemic pregnant women. The iron contained in rebon shrimp is heme iron which can be absorbed maximally by the body. Rebon shrimp also contains protein, the energy produced from protein helps the body's metabolism so that it works optimally, protein also as iron transport brings iron to the circulation of places that need iron to form new hemoglobin
3. Giving rebon shrimp with a dose of 1.67 g / kg BB accompanied by Fe tablets has an effect on increasing ferritin levels of anemia in pregnant women. iron content in rebon shrimp which is the material for the formation of hemoglobin levels and protein content in rebon shrimp which helps

in the transportation of iron so that the formation of hemoglobin becomes optimal and the remaining iron from the formation of hemoglobin increases ferritin levels.

4. There were differences in hemoglobin levels between groups given rebon shrimp accompanied by blood-added tablets with groups that were only given Fe tablets. This proves that hemoglobin levels are not only influenced by iron intake but require other supporting substances such as protein and energy which help in the metabolic process of hemoglobin formation.is
5. Thereno difference in ferritin levels between groups given rebon shrimp and Fe tablets with groups given only Fe tablet. This can be caused by lack of iron intake from rebon shrimp or can only increase hemoglobin in pregnant women but not left to be stored as iron / ferritin reserves.

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