COMPARATION OF EFFECTIVITY FROM CONSUMPTION TOMATO JUICE AND STRAWBERRY JUICEAGAINST LEVEL OF HAEMOGLOBIN IN THIRD TRIMESTER OF PREGNANT WOMAN

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Abstract

Keywords:
Tomato Juice, Strawberry Juice, Pregnant Woman, Level Of Haemoglobin

Tomato and strawberry is a one of fruit that have rich of benefits, content of that fruitprovides many benefits for the body because have many vitamin C , folic acid and Fethat very important to prevent anemia.

The purpose of this research was to comparise any effect ofconsumption of tomato juice strawberry juice against level of haemoglobin in third trimester of pregnant womanin Balowerti Public Health Center.

The research design is pre-experimental with one group pretest posttest design . The population are all third trimester pregnant woman and there are 30 respondentsselected by total sampling. This research have been work on May 2016. The data were analyzed by Wilcoxon and Mann Whitney test.

The results showed that Wilcoxon Test Results for Strawberry juice obtained $Z = -2.828$; $\rho = 0.005$ and $\alpha = 0.05$, tomato juice $Z = -3.500$; $\rho = 0.000$ and $\alpha = 0.05$, $\rho < \alpha$ means both Strawberry or tomato juice no influence. Mann Whitney test results obtained $Z = -2.536$; $\rho = 0.011$ and $\alpha = 0.05$, $\rho < \alpha$ means that there are differences in the effectiveness of Strawberry juice and tomato juice on hemoglobin levels third trimester pregnant women.

I.   Introduction

Generally, there are some changes in anatomy and physiology system of pregnant women. One of thatis a cardiovascularor haemodynamic. According to Varney (2008), a natural physiological changes that occur during pregnancy may experience normal blood cell count in pregnancy. The increase in the volume of blood plasma increase results from the mother, not the result of an increased number of red blood cells. Although there is an increase in the number of red blood cells in circulation, but the amount was not balanced by an increase in plasma volume. This imbalance will be visible in the form of a decrease in hemoglobin levels, which in turn can cause anemia in pregnant women.

Until now, high maternal mortality rate in Indonesia is still a priority in health department. Estimates from the World Health Organization report that from 35% to 75% (56% on average) of pregnant women in developing countries, and 18% of women from industrialized countries are anemic . However, many of these women were already anemic at the time of conception, with an estimated prevalence of anemia of 43% in nonpregnant women in developing countries and of 12% in women in wealthier regions. The prevalence of Fe deficiency is far greater than the prevalence of anemia and Fe deficiency (low serum ferritin and sparse or absent stainable Fe in bone marrow) often develops during the later stages of pregnancy even in women who enter pregnancy with relatively adequate Fe stores.

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Anemia means a deficiency of red blood cells can be caused due to the loss of red blood cells too much or the formation of red blood cells too much or the formation of red blood cells is too slow (Ganong, 2008). Anemia is a decrease in the quality of red blood cells in circulation, abnormality of hemoglobin content of red blood cellsor both. Anemia in pregnant women increases the frequency of complications in pregnancy and childbirth. The impact of anemia in pregnancy are abort, immature partus/premature, at the time of delivery, anemia can cause interference with his primary as well as secondary, high action due to childbirth the mother quickly tired and travel disruption operative actions need to be delivered, at the time of parturition, anemia can cause uterine involution Sub, durability against infections and a low breastmilk production , in the fetal are can make dismaturitas, mikrosomia, low birth weight, perinatal death.

Fe absorption is greatly influenced by the availability of vitamin C in the body of mother. The role of vitamin C in the process of Fe absorption that is helping the reduction of Ferri into Ferro in the intestine that facilitating absorpstion of the reduction process will be even greater when the pH in stomach is getting sour.

Vitamin C can increase the acidity so it can increase Fe up to 30%. The need for vitamin C of a pregnant women increased from mothers who are not pregnant, where a pregnant women need the 70 mg of vitamin C per day. The content of vitamin C in100 grams of strawberriescontains 60 mg of vitamin C, it also contains several types of minerals that are able to prevent various diseases as well as maintain the immunity of the body. In addition to containing vitamin C fruits of Strawberry also contains folic acid, vitamin B2, vitamin B1, vitamin A, Selenium, potassium, magnesium, ribovlafin, Fe, phosphorus, calcium, energy, carbohydrates, fats and proteins. The fruit of the Strawberry is highly recommended for pregnant women, because thevery beneficial to the formation of the hemoglobin levels in the blood.

Tomato is one of fruit which rich vitamin C too. The content contained in tomatoes include kaloid solanine (0.007%), saponins, folic acid, Malic acid, citric acid, biflavonoid, proteins, fats, sugars (fructose, glucose), adenine, trigonelin, kolin, tomatin, minerals (Ca, Mg, K, Na, Fe, sulfur, chlorine, vitamins (B1, B2, B6, C, E, niacin), histamine, and likopen (Dalimartha, 2007). Tomatoes contained Fe who can serve for the formation of red blood cells or hemoglobin. Because of many benefit of strawberry and tomato to pregnant woman, the researcher interested to study "Comparison of Effect from Consumption Strawberry and tomato Juice Against Level Of Haemoglobin In Third Trimester Of Pregnant Woman in Balowerti Public Health Center at Kediri city in 2016."

II. Materials And Methods

Methods
This research is a pre-experimental study with One Group Pre Test Post Test Design. This research is giving a pre-test before treatment, after being treated, then given a post-test. This methods are to determine whether there are differences between the results before being treated with after being treated.

The population is all third trimester of pregnant woman in the Balowerti health centers. The sample is a part of third trimester of pregnant woman are in the Balowerti health centers.

Inclusive criteria for sample:
    a.   Third trimester of pregnancy
    b.   Never consume strawberry juice and tomato juice during pregnant
    c.   Don't have allergy to consume strawberry and tomato

Exclusive criteria for sample:
    a.   Pregnancy woman wan't to be respondent
    b.   Have allergy to consume strawberry and tomato

The sampling technique uses total populasi sampling technique.The independent variables is the strawberry juice and the dependent variable is level of haemoglobin.This research was conducted in Balowerti Public Health Center at Kediri city, whereas this study was conducted in April 2016.
Ethical clearance process:

a.   Giving informed consent
b.   Interview with pregnant woman who being a sample
c.   Giving pre test
d.   Giving strawberry juice
e.   Giving post test
f.   Giving pre test
g.   Giving tomato juice
h.   Giving post test

To determine the effect of strawberry juice againts level of haemoglobin, the research used digital haemometer test and analytical data using Wilcoxon test and Mann Whitney test with an error level of 5%. Interpretation of the results of analysis, if the value of the test statistic > table value or values   obtained level $\rho < \alpha$ with $\alpha = 0.05$ significance level.

Make Strawberry Juice
Instrument
1.   Blender
2.   Cups
3.   Straws
4.   Knife
5.   Digital haemometer
6.   Blood lancet
7.   Alcohol swab
8.   Cotton

Materials
1.   100 grams of strawberry
2.   200 ml boiled water
3.   1 tablespoon sugar

How to make strawberry juice:
a.   Separate the leaves of strawberries with fruit, then wash it
b.   Enter strawberries, sugar and 200 ml of boiled water into a blender and then puree
c.   Pour into serving cups

Strawberry juice

Make Tomato Juice
Instrument
1. Blender
2. Cups
3. Straws
4. Knife
5. Digital haemometer
6. Blood lancet
7. Alcohol swab
8. Cotton

Materials
a. 175 grams of strawberry
b. 75 ml boiled water
c. 5grams tablespoon sugar

How to make tomato juice
1. Wash tomato in a water
2. Enter tomato, sugar and boiled water into a blender and then puree
3. Pour into serving cups

III. Results And Discussion

Results

Tabel 1. Frequency Distribution Characteristics of Respondents (Strawberry Juice) Based on Age in Balowerti Public Health Center at Kediri City In 2016

Age	Frequency	Presentation (%)
< 20 years old	1	6,7

20 – 29years old	7	46,7
>30 years old	7	46,7
Total	15	100

(source : Primary data 2016)

Tabel 2. Frequency Distribution Characteristics of Respondents (Strawberry Juice) Based on Educational Background in Balowerti Public Health Center at Kediri City In 2016

Educational Background	Frequency	Presentation (%)
Elementary school-junior high school	1	6,66
High school	12	80,0
College	2	13,3
Total	15	100

(source : Primary data 2016)

Tabel 3 Frequency Distribution Characteristics of Respondents (Strawberry Juice) Based on Job in the Balowerti Public Health Center at Kediri City In 2016

Job	Frequency	Presentation (%)
Housewife	9	60,0
Enterpreneur	2	13,3
Non Government Employees	4	26,6
Government Employees	0	00,0
Total	15	100

(source : Primary data 2016)

Tabel 4 Frequency Distribution Characteristics of Respondents (Strawberry Juice) Based on Number of Labor in Balowerti Public Health Center at Kediri City In 2016

Number of Labor	Frequency	Presentation (%)
Primipara	5	33,3
Multipara	9	60,0
Grandepara	1	6,67
Total	15	100

(source : Primary data 2016)

Tabel 5 Frequency Distribution Characteristics of Respondents (Tomato Juice) Based on Age in Balowerti Public Health Center at Kediri City In 2016

Age	Frequency	Presentation (%)
< 20 years old	1	6,7
20 – 29years old	11	73,3
>30 years old	3	20,0
Total	15	100

(source : Primary data 2016)

Tabel 6. Frequency Distribution Characteristics of Respondents (Tomato Juice) Based on Educational Background in Balowerti Public Health Center at Kediri City In 2016

Educational Background	Frequency	Presentation (%)
Elementary school-junior high school	2	13,3
High school	11	73,3
College	2	13,3
Total	15	100

(source : Primary data 2016)

Tabel 7 Frequency Distribution Characteristics of Respondents (Tomato Juice) Based on Job in the Balowerti Public Health Center at Kediri City In 2016

Job	Frequency	Presentation (%)
Housewife	11	73,3
Enterpreneur	2	13,3
Non Government Employees	2	13,3
Government Employees	0	00,0
Total	15	100

(source : Primary data 2016)

Tabel 8 Frequency Distribution Characteristics of Respondents (Tomato Juice) Based on Number of Labor in Balowerti Public Health Center at Kediri City In 2016

Number of Labor	Frequency	Presentation (%)
Primipara	6	40,0
Multipara	9	60,0
Grandepara	-	-
Total	15	100

(source : Primary data 2016)

Table 9 Frequency Distribution of level of haemoglobin Before Consuming strawberry juice and tomato juice in Balowerti Public Health Center at Kediri City In 2016

Level of haemoglobin	Before consume strawberry juice		Before consume tomato juice	
	Frequency	Presentation(%)	Frequency	Presentation(%)
≥11 gr/dl (no anemia)	1	6,66	-	-
9-10 gr/dl (low anemia)	10	66,6	13	86,7
7-8 gr/dl (moderate anemia)	4	26,6	2	13,3
>7gr/dl (high anemia)	0	00,0	-	-
Total	15	100,00	15	100,00

(source : Primary data 2016)

Tabel 10Frequency Distribution of level of haemoglobin after Consuming strawberry juicein Balowerti Public Health Center at Kediri City In 2016

Level of haemoglobin	Frequency	Presentation(%)
≥11 gr/dl (no anemia)	5	33,3
9-10 gr/dl (low anemia)	10	66,7
7-8 gr/dl (moderate anemia)	-	-
>7gr/dl (high anemia)	-	-
Total	15	100,00

(source : Primary data 2016)

Tabel 11 Frequency Distribution of level of haemoglobin before Consuming tomato juicein Balowerti Public Health Center at Kediri City In 2016

Level of haemoglobin	Frequency	Presentation(%)
≥11 gr/dl (no anemia)	12	80,0
9-10 gr/dl (low anemia)	3	20,0
7-8 gr/dl (moderate anemia)	-	-
>7gr/dl (high anemia)	-	-
Total	15	100,00

(source : Primary data 2016)

Tabel 12 Analysis of effectivity the level of haemoglobin Before and after Consuming strawberry juice in Balowerti Public Health Center at Kediri City In 2016

Level of haemoglobin	Before consume strawberry juice		After consume strawberry juice	
	Frequency	Presentation(%)	Frequency	Presentation(%)
≥11 gr/dl (no anemia)	1	6,66	5	33,3
9-10 gr/dl (low anemia)	10	66,6	10	66,7
7-8 gr/dl (moderate anemia)	4	26,6	-	-
>7gr/dl (high anemia)	0	00,0	-	-
Total	15	100,00	15	100,00
α= 0,05 ; Z=2,828 ; ρvalue = 0,005 ; ρ = 0,05				

(source : Primary data 2016)

Tabel 13 Analysis of effectivity the level of haemoglobin Before and after Consuming tomato juice in Balowerti Public Health Center at Kediri City In 2016

Level of haemoglobin	Before consume tomato juice		After consume tomato juice	
	Frequency	Presentation(%)	Frequency	Presentation(%)
≥11 gr/dl (no anemia)	-	-	12	80,0
9-10 gr/dl (low anemia)	13	87,7	3	20,0
7-8 gr/dl (moderate anemia)	2	13,4	-	-
>7gr/dl (high anemia)	-	-	-	-

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Total	15	100,00	15	100,00
$\alpha= 0{,}05$; Z=3500 ; ρvalue = 0,005 ; $\rho = 0{,}05$				

(source : Primary data 2016)

Tabel 14 Analysis of effectivity of Consuming strawberry juice andtomato juice in Balowerti Public Health against the level of haemoglobinCenter at Kediri City In 2016

Level of haemoglobin	*posttest* consume strawberry juice		*Posttest* consume tomato juice	
	Frequency	Presentation(%)	Frequency	Presentation(%)
≥11 gr/dl (no anemia)	5	33,3	12	80,0
9-10 gr/dl (low anemia)	10	66,7	3	20,0
7-8 gr/dl (moderate anemia)	-	-	-	-
>7gr/dl (high anemia)	-	-	-	-
Total	15	100,00	15	100,00
$\alpha= 0{,}05$; Z=2,536 ; ρvalue = 0,011 ; $\rho = 0{,}05$				

(source : Primary data 2016)

Based on table, the results of data analysis using the Mann Whitney test results obtained the value of Z =-2.536 and ρ-value 0.05 α 0.011 < meaning H0 is rejected and the H1 is accepted. This indicates the existence of a difference in the effectiveness of the giving of the Strawberry juice and tomato juice against the levels of hemoglobin of pregnant women in the Balowerti health center of Kediri 2016. So good Strawberry juice and tomato juice are equally have an influence in the increased levels of hemoglobin.

Discussion
Factors affecting low hemoglobin according to Dodik (2013), Fe that enters through the insufficient food needs, the increasing needs of the body and bleeding caused by hookworms infection, malaria and others.
On the study of pregnant women levels of haemoglobin in large part on low anemia. According to Atikah (2011) is a State of nutritional anemia a shortage of hemoglobin levels in the blood caused by a lack of nutrients required for the formation of hemoglobin.

The results showed that levels of hemoglobin during pregnancy is very important is done routinely with control checks the levels of hemoglobin and consume nutrition healthy and balanced in order to reply during her pregnancy did not experience a decrease in hemoglobin levels.

Lack of haemoglobin levels in pregnancy influence outcomes for infants and mothers, either in childbirth or pregnancy, parturition and the next. Many diseases can because of anemia, such as abort, prematurus partus, partus long because postpartum atony intertia, bleeding due to uterine atony, shock, infections of both intrapartum or postpartum. Anemia in pregnancy is a potential cause of morbidity and mortality of mothers and children (Winkjosastro, 2009).

The results showed that levels of hemoglobin during pregnancy is very important is done routinely with control checks the levels of hemoglobin and consume nutrition healthy and balanced in order to reply during her pregnancy did not experience a decrease in hemoglobin levels.

According to Manuaba (2010), factors that affect the formation of the blood are the components (ingredient) that comes from food (proteins, vitamins B12, folic acid and vitamin C, the basic elements of fe), the source establishment of blood (bone marrow), the ability of the intestine against reabsorbsi the materials needed, age of blood cells (erythrocytes) Limited (about 120 days), bleeding, menstrual disorders (chronic disease that caused bleeding in women, such as myomas metrium polik, cervix, and diseases of the blood, the parasites in the intestines)

Consumption of foods that contain lots of Fe. Foods that contain lots of Fe such as meat, beans, vegetables green creature. Fe is also very important to women who are menstruating, pregnant women and children. Consumption of foods that contain folic acid. Consumption of foods that contain folic acid such as dark green vegetables, bananas, citrus, nuts, types of cereal and others. Foods that contain vitamin B12. Can be obtained by consuming meat and milk. Fe tablet and the consumption of food or drink containing vitamin c. myriad benefits of vitamin C, one that is able to help the absorption of Fe. The types of foods that contain lots of vitamin C such as strawberries, fruit melon, guava, citrus fruits, broccoli, kiwi, papaya, red pepper and berries.

Strawberry fruit is a fruit that is rich in content, the benefits of strawberries are high in vitamin C so that it can be used as an antioxidant and improves body endurance. Vitamin C can increase Fe high enough to increase the levels of hemoglobin in the blood in relation to the large number of vitamin C that is present in the body of pregnant women (Hardjana, 2013).

Tomatoes are a source of essential nutrients that are beneficial in pregnant women. Tomatoes contain vitamin C and Fe that can help a mother and baby stay healthy. In addition the content of vitamin C in Tomatoes could be the formation of bones and teeth in the fetus. That's not just vitamin C also helps the process of absorption of Fe is needed during pregnancy. So when a pregnancy other than consuming extra Fe supplements then can also get an extra Fe from the tomatoes. Pregnant women can consume tomato juice so that the absorption of Fe needed better (Marwoto, 2011).

The results of data analysis using the Mann Whitney test results obtained the value of Z =-2.536 and ρ-value 0.05 α 0.011 < meaning H0 is rejected and the H1 is accepted. This indicates the existence of a difference in the effectiveness of the giving of the Strawberry juice and tomato juiceagainst of hemoglobin levels of pregnant women at work-area Balowerti health center in Kediri 2016. So good Strawberry juice and tomato juice are equally have an influence in the increased levels of hemoglobin because vitamin C that helps the absorption of Fe. However, more tomato juice gives a better effect for increased levels of haemoglobin in pregnant women at third trimester.

IV. Conclusion

Almost all respondents after consuming strawberry juice andtomato juice are have increase level of hemoglobin. Booth of them are so good to prevent anemia, but tomato juice are more effective than strawberry juice.

V. Acknowledgements

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