Association between Tea-drinking Habits and Anemia on Pregnant Women in Makassar, Indonesia

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ABSTRACT

Background: The condition of anemia in pregnant women in Indonesia is exacerbated by the habits of consuming tea. Anemia in pregnant women is still a health problem and a high-level cause of death that causes maternal bleeding indirectly. In Indonesia, tea is the most consumed beverage after water. The aroma of fragrant tea and its distinctive taste make this drink widely consumed. Tea can also be used as an antioxidant, improve skin, and slim the body. However, tea-drinking habits in pregnant women can affect the risk of anemia because tea contains tannins that can inhibit the absorption of iron.

Purpose: To analyze the association between tea-drinking habits and anemia on pregnant women in Makassar, Indonesia.

Methods: This was a quantitative study with cross-sectional design. The subject in this study was 36 pregnant women in the 2nd trimester of pregnancy that was chosen by accidental sampling. The analysis that used was chi-square test to examine the association between tea-drinking habits and anemia. A systematic questionnaire was used to collect data by interviewing respondents.

Result: Of the 36 pregnant women who always drink tea, 22 respondents (48%) had anemia and 14 respondents (30%) were not anemic. Meanwhile, of 10 respondents who did not have tea consumption habits, 6 respondents (13%) had anemia and 4 respondents (9%) did not suffer from anemia. Chi-square test showed p=1,000 (p>0,05), which means that there was no association between tea consumption and anemia.

Conclusion: Tea-drinking habit was not related to anemia in pregnant women in Makassar, Indonesia. Pregnant women may consume tea after eating but they need to control the interval, at least one hour after having a meal to avoid anemia.

Keywords: *Anemia; Pregnant women; tea consumption*

BACKGROUND

One of the physiological changes of women during pregnancy is changes in the blood circulation system, blood volume increase, erythrocytes increase. The number of erythrocytes in pregnancy increases to meet the needs of oxygen transport which is very important during pregnancy. Oxygen is needed for various metabolic processes of fetal development that take place in every cell or tissue. Disorders of erythrocytes that still often occur are anemia (Almatsier & Sunita, 2011).

Anemia is a lack of hemoglobin levels from the normal amount. Pregnant women are categorized into anemia if the hemoglobin level is <11 g/dL in the first and third trimesters and 10.5 g/dL in the second trimester (Saifuddin, 2012). Several factors cause anemia, namely malnutrition, lack of iron in the diet, impaired absorption, loss of a lot of blood (menstruation, puerperium, etc.), chronic disease, and high iron needs. Iron during pregnancy is needed to affect fetal development, increase immunity in the fetus, accelerate wound healing after childbirth. The food consumed by pregnant women is an important thing that must be considered to minimize the incidence of anemia in pregnant women (Besral et al., 2007).

The habits of Indonesians who consume tea will exacerbate the condition of anemia in pregnant women. Tea is the most consumed beverage after water. The aroma of fragrant tea and its distinctive taste make this drink widely consumed. Tea can also be used as an antioxidant, maintain skin, and slim the body. However, the habit of drinking tea in pregnant women can affect the risk of anemia. This is because one of the contents of tea, namely tannins, can cause an inadequate iron absorption process (Simanjuntak, 2008).

According to WHO, 40% of maternal deaths in developing countries are related to anemia in pregnancy. Excessive blood loss accompanied by loss of iron hemoglobin and depletion of iron stores in pregnancy can be an important cause of iron deficiency anemia in subsequent pregnancies (Septiawan, 2015). Nutritional anemia is still one of the nutritional problems in addition to the three other main nutritional problems in Indonesia (Saifuddin, 2012; Yulia & Yuna, 2015). The impact of iron deficiency on pregnant women can be observed from the magnitude of maternal morbidity and mortality, increased fetal morbidity and mortality, and increased risk of low birth weight (Khofifah, 2015; Kusumah, 2015). The main causes of maternal death include postpartum hemorrhage and placenta previa, all of which originate because of deficiency anemia (Arisman, 2007).

The frequency of anemia in pregnancy in the world is quite high, ranging between 10% and 20% (Wiknjosastro, 2005). In 2010 WHO reported that the prevalence of anemia in pregnancy globally was 55%. The prevalence of anemia in pregnant women in Indonesia in 2010 was 70% or 7 out of 10 pregnant women suffer from anemia (Almatsier & Sunita, 2011). The prevalence of anemia in pregnant women in Makassar in 2015 was 98.4% (Sumarni & Stang., 2015).

Information from medical records found the incidence of anemia in pregnant women in 2015 was 10.6% or 144 cases of 1356 pregnant women and in 2016 of 5.23% or 138 cases of 2638 pregnant women (Machmud et al., 2019). Observation results showed that 6 of 7 pregnant women who suffer from anemia consume tea every day at least once a day after eating. According to the condition, this study will observe whether tea consumption after eating can cause anemia in pregnant women. Some research about anemia has been conducted in Makassar. However, studies about anemia in pregnant women especially in Pertiwi maternal and child hospitals are still limited. This study is expected to result a recommendation about how pregnant women should consume

safely tea during pregnancy to avoid being anemia because anemia is an indirect cause of maternal death (Mochtar, 2004; RSIAPertiwi, 2016).

OBJECTIVE

We aim to analyze the association between tea-drinking habits and anemia in pregnant women in Makassar, Indonesia.

METHODS

This was a cross-sectional study that was conducted in Pertiwi maternal and child hospital in Makassar, Indonesia. The number of samples was 46 that was calculated by using a formula of *minimal sample size* (Azis, 2010; Bobak, 2005). The sample in this study was pregnant women in the 2nd trimester of pregnancy that was chosen by accidental sampling (Varney, 2006; Wiknjosastro, 2005, 2009). Pregnant women who were interviewed were those who were in the location (hospital) when we gathered data. Data was collected in 2017 by using a systematic questionnaire that was administered to respondents. We need to ask pregnant women first before interviewing to know whether they would like to participate in this study or not. The inclusive criterion of the sample was pregnant women in the 2nd trimester pregnancy. Meanwhile, those who were getting sick such as blood disorders, infectious diseases, inflammatory diseases, cancer, and a history of heavy menstrual bleeding were dropped out from this study. The information about their health problems was gained from them before starting to interview.

Computer analysis as applied to analyze data. Data were analyzed with the univariate method to know the frequency of respondents' characteristics. Meanwhile, chi-square test was used to know the association between tea consumption and anemia.

RESULTS

This study has been conducted on 46 mothers who have babies aged 6 months. Data on the characteristics of respondents in this study consisted of maternal age, education, occupation, age of last-child, knowledge, and exclusive breastfeeding.

Subject Characteristics

The data analysis used in this study was chi-square analysis. This analysis is used to identify the characteristics of the research subjects. The frequency distribution is presented in table 4.1 below.

Table 1. Characteristics of Respondents, Makassar 2017

Characteristics	F	%
Age		
20-35	30	65,2
>35	16	34,8
Education		
Primary School	17	36,9
Senior high school	15	32,7
University	14	30,4
Occupation		
Housewife	17	36,9
Entrepreneur	16	34,8

Civil Servant	13	28,3
Parity		
1 - 2	14	30,4
≥ 3	32	69,6

Of 46 respondents, there were 30 (65,2%) who are in age 20-35 years, while they aged>35 years were 16 respondents (34,8%). shows that the number of respondents who were completed their education were almost similar for each level. There were 17 respondents completed their education on primary school-Junior high school level, senior high school (32,7%) and 30,4% graduated from university. shows that of 46 respondents, 36,9% respondents work as a housewife, self-employed (34,8%), and civil servant (28,3%). showed that most of respondents had parity ≥ 3. The number was 68,6%, while they who had parity 1-2 were 30,4% (table 1).

Tea Consumption and Anemia on Pregnant Women

Bivariate analysis was conducted to know the relationship between independent and dependent variable. Chi-square test was used with a significance level ($\alpha = 0,05$).

Table 2. Association between Tea Consumption and Anemia, 2017

Tea Consumption Habits	Anemia				Percentage		$\alpha = 0,05$
	Yes		No				
	F	%	F	%	F	%	
Yes	22	48	14	30	36	78	P = 1,000
No	6	13	4	9	10	22	
Total	**28**	**61**	**18**	**39**	**46**	**100**	

Table 4.5 showed that of the 36 pregnant women who always drinking tea, 22 respondents (48%) had anemia and 14 respondents (30%) were not anemia. Meanwhile, from 10 respondents who did not have tea consumption habit, 6 respondents (13%) had anemia and 4 respondents (9%) did not suffer from anemia.

Statistic test result showed p= 1.000 (p >0.05), it means, there was no relationship between drinking tea habits and the incidence of anemia on pregnant women in Pertiwi Maternal and Child Hospital, Makassar in 2017.

DISCUSSION

The need for iron in pregnant women is on average close to 800mg. This requirement consists of, about 300 mg needed for the fetus and placenta and another 500 mg used to increase maternal hemoglobin mass (Carsel & Syamsunie, 2016; Mansjoer, 2008). More than 200 mg more will be excreted through the intestines, urine, and skin. Food for pregnant women every 100 calories will produce about 8-10 mg of

iron. The calculation of eating 3 times a day with 2500 calories will produce about 20-25 mg of iron per day. During pregnancy with a calculation of 288 days, pregnant women will produce as much as 100 mg so that the need for iron is still lacking for pregnant women (Manuaba, 2010).

There are several causes of anemia in pregnant women including gestational distance, nutritional status, previous illness, bleeding, malnutrition, and impaired absorption (malabsorption). During pregnancy, the mother must meet the needs of iron. Iron in pregnant women is very important because during pregnancy the mother's Hemoglobin must remain normal according to her gestational age (Amirudin & Wahyudin, 2004; Handayani et al., 2008). The iron needed by the mother can be obtained from the food consumed by the mother. This is parallel to theory of (Beck et al., 2014; Indriyani & Amirudin, 2006), certain conditions affect the absorption of iron from food in the gastrointestinal (GI) tract and from time to time can cause anemia. Not all foods that contain iron can move properly into the mother's body. This could be caused by malabsorption in the mother's body. Drinking tea is one of factors that inhibits the process of iron absorption because tea contains tannin (Masrizal, 2007). Iron absorption is enhanced when consumed with foods high in vitamin C such as orange juice but substances in coffee and tea inhibit iron absorption (Gudeta et al., 2009; Haileslassie et al., 2017).

The tannin in tea plays a role in inhibiting the process of iron absorption. So far, tea is used by pregnant women to relieve nausea and vomiting experienced by mothers during pregnancy. Though the consumption of tea is not recommended for pregnant women because it can interfere the absorption of iron consumed by the mother. During pregnancy, iron is very important for the mothers and they need 2 times more than non-pregnant women. If the Hemoglobin is not fulfilled and this happens continuously, pregnant women can be at risk of suffering from anemia.

This study showed that there was no association between drinking-tea habits and anemia on pregnant women at Pertiwi Maternal and child hospital. The similar result with a study in Ethiopia suggested that 72.9% of the study subjects had the habit of drinking tea immediately after meal and 66.58% had the habit of eating fruits after meal. Multiple logistic regressions did not show statistically significant association between anemia and any of the dietary habits (Jufar & Zewde, 2014). A study in Turkey also supported our finding, the study in Turkey found that 90% of pregnant women drank tea at breakfast and only 8% consumed animal protein daily. The study did not suggested a significant association with tea and meat consumption though anemia was less prevalent in women who consumed one portion of animal protein daily and who did not drink tea at breakfast (Karaoglu et al., 2010).

The result of this research is not similar to other studies. Study in Ethiopia in 2018 revealed that Pregnant mother who occasionally used caffeine from tea had risky 2.01 times more likely developed anemia as compared to mothers never used this substance (Galegos, 2000). Another study in Indonesia in 2013 suggested that tea consumption was an inhibit factor that predict iron deficiency on pregnant women. The study showed that tea consumption played an important role in iron deficiency, with

tannin levels of tea showing a positive correlation with serum levels of ferritin (Masthalin et al., 2015). Previous research demonstrated that tea consumption decreased iron absorption in the gastrointestinal tract (Nasir & Abdul, 2011). A study conducted by Yudi (2015), showed that there is a relationship between drinking tea habits and the incidence of anemia in pregnant women at the Kotabumi II Public Health Center, North Lampung Regency. It was stated that consuming tea 2 hours after eating has a risk of suffering from anemia almost 2 times.The similar result suggested by (Sin, 2008), the study also found there was a relationship between tea consumption and hemoglobin levels in Jenawi District, Karang Anyar Regency. Another study in BPS Bringin Taman Sidoarjo found that tea consumption related to incidence of anemia (Arisman, 2007).

Researchers in this current study assume that not all respondents who consumed tea developed anemia. A total of 14 (30%) respondents did not suffer from anemia even though they consumed tea. This could be explained that the time when they consume tea does not coincide with the consumption of iron sources such as milk or Fe tablets and other types of food, so that the absorption of iron is not disturbed. Conversely, there were 6 (13%) respondents who did not always consume tea but they had anemia (Cunningham, 2007; Depkes-RI, 2009). They will suffer from anemia although not consume tea because the consumption of iron sources is very less, they did not consume Fe tablets and other sources of iron such as egg yolks (Dinkes & SulawesiSelatan, 2015; Yogyakarta Health Office, 2019). Pregnant women can consume tea during pregnancy period but they have to avoid drinking together with the consumption of foods containing iron such as green vegetables, this will greatly inhibit the absorption of iron (Djamilus & Herlina, 2008). However, if the consumption of tea is regulated in such a way that it does not coincide with consuming food sources containing iron, Fe tablets, the absorption of iron in pregnant women will be better. Consuming tea between meals and simultaneously consuming vita- min C and/or meat, fish and poultry were the main dietary recommendations to prevent anemia (Zijp et al., 2000).

The limitation of this study was the number of samples which was small. The small sample size leads to the result of this study that revealed there was no association between tea-consumption and anemia. Moreover, researchers did not collect more information from respondents about tea consumption habit such as how long they consume tea, how many glasses they consume every day, type of tea, and time when consuming tea (Girma & Genebo, 2002; Saifuddin, 2006).

CONCLUSION

This study suggested that there was no association between tea consumption and the incidence of anemia in pregnant women at Pertiwi maternal and child hospital, Makassar. However,this study found that pregnant women who always drinking tea have a higher incidence of anemia (48%) than pregnant women who did not tea-drinking habit (30%). Pregnant women may consume tea after eating but they need to concern to the interval. Drinking tea one hour after having meal would not inhibit the absorption of iron from the food. Further research is needed by using another design

such as case control to observe the association between drinking-tea consumption and anemia. Research could be focus also on which tea or tea type that can cause anemia when being consumed after eating. Another thing, further research can observe between the length of or duration of consuming tea after having meal.

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REFERENCES

Almatsier, & Sunita. (2011). *Gizi Seimbang Dalam Daur Kehidupan*. Jakarta, PTGramedia Pustaka Utama.

Amirudin, & Wahyudin. (2004). Studi Kasus Kontrol Anemia. *Jurnal Medical Unhas*, *1*(1). http://med.unhas.ac.id/index.php?

Arisman. (2007). *Buku Ajar Ilmu Gizi Dalam Daur Kehidupan*.

Azis. (2010). *Metode Penelitian Kebidanandan Teknik Analisis Data*. Jakarta: Salemba Medika.

Beck, K. L., Conlon, C. A., Kruger, R., & Coad, J. (2014). Dietary determinants of and possible solutions to iron deficiency for young women living in industrialized countries: a review. *Nutrients*, *6*(9), 3747–3776.

Besral, Meilianingsih, L., & Saliar, U. (2007). Pengaruh Minum Teh terhadap Kejadian Anemia pada Usila di Kota Bandung. *MAKARA, Kesehatan*, *11*(1).

Bobak. (2005). *Buku Ajar Keperawatan Maternitas Edisi 4*. Jakarta ; EGC.

Carsel, & Syamsunie. (2016). Metode Penelitian Kesehatan dan Umum. In *Biru Langit Jogja*.

Cunningham. (2007). Obstetri Williams. In *Jakarta: EGC. Edisi: 21*.

Depkes-RI. (2009). Profil Kesehatan Indonesia tahun 2008. In *Jakarta :Depkes RI*.

Dinkes, & SulawesiSelatan. (2015). *Kejadian Anemia IbuHamil.*

Djamilus, & Herlina. (2008). *Faktor Resiko Kejadian Anemia IbuHamil Di Wilayah Kerja Puskesmas Bogor*.

Galegos. (2000). *Severe Anemia In Pregnancy ; 2000 report of workshop held at the institute of child and mother health in dhaka, bangladesh ; international development researsh center*. http:/www.jimmonolorg/content/160/5/2523 full.html

Girma, W., & Genebo, T. (2002). *Determinants of nutritional status of women and children in Ethiopia*.

Gudeta, Regassa, & Belay. (2009). Magnitude and factors associated with anemia among pregnant women attending antenatal care in Bench Maji, Keffa and Sheka zones of public hospitals, Southwest, Ethiopia, 2018: a cross-sectional study. *PloS One*, *14*(11), e0225148.

Haileslassie, Mulugeta, & Girma. (2017). Feeding practices, nutritional status and

associated factors of lactating women in Samre Woreda, South Eastern Zone of Tigray, Ethiopia. *Journal of Nutrition*, *12*(2), 28. https://doi.org/10.1186/1475-2891-12-28

Handayani, Wiwik, & Haribowo., A. S. (2008). *Asuhan keperawatan pada klien dengan gangguan sistem hematologi*. Salemba Medika: Jakarta.

Indriyani, & Amirudin. (2006). *Indriyani dan Amirudin. (2006). Faktor Resiko Kejadian Partus Lama Di RSIA Siti Fatimah Makasssar, Artikel Ilmiah*.

Jufar, & Zewde. (2014). Prevalence of anemia among pregnant women attending antenatal care at tikur anbessa specialized hospital, Addis Ababa Ethiopia. *J Hematol Thromb Dis*, *2*(125), 2.

Karaoglu, Pehlivan, Egri, Deprem, Gunes, Genc, & Temel. (2010). The prevalence of nutritional anemia in pregnancy in an east Anatolian province, Turkey. *BMC Public Health*, *10*(11–12).

Khofifah. (2015). *Bahaya minum the setelah makan*.

Kusumah. (2015). *Kadar Hemoglobin Ibu Hamil Triwulan I-III Dan Faktor-Faktor Yang Mempengaruhinya Di RSUP H Adamalik Medan (Thesis)*. Sumatra Universitas Sumatra.

Machmud, Hatma, & Syafiq. (2019). Tea consumption and iron-deficiency anemia among pregnant woman in Bogor District, Indonesia. *Media Gizi Mikro Indonesia*, *10*(2), 91–100.

Mansjoer. (2008). *Kapita Selekta dan Kedokteran*. Jakarta : Media Asculapius.

Manuaba. (2010). *Ilmu Kebidanan, Penyakit Kandungan dan KB untuk Pendidikan bidan edisi 2*. . Jakarta:EGC; 2010.

Masrizal. (2007). Anemia Defesiensi Besi, 2007. *Jurnal Kesehatan Masyarakat*, *1*(2). http://www.searchinpdf.com.

Masthalin, Laraeni, & Dahlia. (2015). Pola Konsumsi (Faktor Inhibitor dan Enhancer Fe) Terhadap Kejadian anemia Remaja Putri. *Jurnal KEMAS*, *11*(1), 80–86.

Mochtar. (2004). *SinopsisObstetri*. Jakarta : EGC.

Nasir, & Abdul. (2011). *MetodePenelitianKesehatan*. yogyakarta: NuhaMedika

RSIAPertiwi. (2016). *Kejadian Anemia PadaIbuHamil*.

Saifuddin. (2006). *Buku Acuan Nasional Pelayanan Kesehatan Maternal dan Neonatal*. Jakarta: Yayasan Pustaka Sarwono Prawirohardjo.

Saifuddin. (2012). *Buku Acuan Nasional Pelayanan Kesehatan Maternal dan Neonatal*. Jakarta: Yayasan Pustaka Sarwono Prawirohardjo.

Septiawan. (2015). *Jurnal Kesehatan E-ISSN 2548 5695*.

Simanjuntak. (2008). *Hubungan Anemia Pada Ibu Hamil dengan Kejadian BBLR di BP RSU Rantaurapat : (thesis)*. Medan :Universitas Sumatra Utara.

Sin, S. (2008). *Masa kehamilan dan persalinan*.

Sumarni, & Stang. (2015). *Statistik Untuk Kebidanan*.

Varney. (2006). *Buku Ajar AsuhanKebidanan*. Jakarta : EGC.

Wiknjosastro. (2005). *Ilmu Kandungan Edisi Kedua Cetakan Ke 4*. Jakarta ; EGC.

Wiknjosastro. (2009). *Ilmu Kebidanan, Edisi Ketiga*. Jakarta: YBP-SP.

Yogyakarta Health Office. (2019). *Neoplasma Serviks Uteri*.

www.dinkes.jogjaprov.go.id/

Yulia, & Yuna. (2015). *The Bagi Ibu Hamil*.

Zijp, Korver, & Tijburg. (2000). Effect of tea and other dietary factors on iron absorption. *Critical Reviews in Food Science and Nutrition*, *40*(5), 371–398.