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Correlation between Knowledge about Anemia and Iron and Folate Consumption with Anemia Status among Premarital Women in Bantul Regency, Yogyakarta Arini Hardiantia, Yhona Paratmanityaa, Miftakhul Jannaha and Roni Hamdania 1 Alma Ata University Jl. Brawijaya 99, Yogyakarta, indonesia Abstract Background/Aims: Anemia is a condition in which the number of red blood cells or hemoglobin levels in the blood is less than normal. Anemia remains a major problem for global public health. The World Health Organization (WHO) estimates that anemia affected more than 1.62 billion people worldwide. Data from National Health Survey (Riskesdas) in 2013 shown that anemia prevalence was 21.7%.

Yogyakarta Health Profile showed that the prevalence of anemia women of reproductive age has increased from 22,45% to 28,1% between 2010 and 2014, while in Bantul was 20% indicating a moderate public health problem. The objective of this study was to determine the correlation between knowledge, iron intake, and folate intake with anemia status among women of reproductive age in Bantul Regency. Methods: This research used cross sectional method. The samples were selected by using probability sampling method with simple random sampling technique by lottery and specifying inclusion and exclusion criteria. Data was analyzed with Chi-square test using SPSS.

Results: The results showed that there was no correlation between knowledge level and anemia status. Anemia status was significantly correlated with iron intake, but not with folate intake. Conclusion: Anemia was associated with iron intake among women of reproductive age. Key Words : Women of premarital fertile age, Knowledge, Anemia, Iron intake, Folate intake

Anemia is a condition the number of red blood cell or hemoglobin (Hb) level in the blood lower than normal. The causes can vary.

Like heavy bleeding, lack of iron level in the body, lack of folate and vitamin B12, leukemia, chronic disease, and so on (1). Anemia is still a big problem in the world. World Health Organization (WHO) estimates that anemia affect more than 1,6 billion people in worldwide (2). Women in premarital fertile age susceptible to anemia because of several problems, i.e menstruation every month, pregnancy, inadequate iron intake, parasitic infections, and most of women in premarital fertile age being worker. This condition make anemia heavier.

Because of that, women in premarital fertile age called vulnerable group of anemia and they need special attention to handle it (2). People who have lack access to food, tend to be suffering iron deficiency. Women in reproductive age was vulnerable group. The main reason was women in reproductive age have a risk of blood lost every menstrual period (3). The government conducted an iron supplementation program for women reproductive age and pregnant women. This program was made to avoid the risk of anemia. Although the rate of supplementation has been above the average, the prevalence of anemia in Indonesia still high (4). Knowledge is one of the factors that stimulate the health behavior.

If pregnant women know and understand the impact of anemia for themselves and their babies, they tend to have a good health behavior. If that can be achieve, women in premarital fertile age can avoid risks of the anemia in pregnancy. Good health behavior has an effect on the decrease of anemia incidence in women premarital fertile age (5). The purpose of this study was to measure the correlation of iron intake, folate intake, and knowledge with anemia among premarital women in Bantul, Yogyakarta.

Hypothesis of this study were: there was association between iron intakes with anemia, there was association between folate intake with anemia, and there was association between knowledge score with anemia. MATERIALS AND METHODS This study used cross-sectional method. This study was conducted in 10 sub-districts in Bantul regency, Yogyakarta, that were Pleret, Sedayu, Sanden, Kretek, Piyungan, Pandak, Kasihan, Banguntapan, and Pundong. Population of this study were women of premarital fertile age who stayed in study areas. The samples were selected using simple random sampling by lottery and specifying inclusion and exclusion criteria.

Independent variable of this study were iron intake, folate intake, and knowledge about anemia. Dependent variable of this study was anemia status. Instrument used in this study: data from office of religious affairs, questionnaire of sample identity, Semi

Quantitatif Food Frequency Questionnaire (SQ-FFQ), questionnaire knowledge of anemia, and Quick Check. Data from office of religious affairs consists of name, address, date of marriage, date of birth. Iron and folate intake were collected from Semi Quantitatif Food Frequency Questionnaire (SQ-FFQ).

List of food in SQ-FFQ arranged from food which common be eaten by people in that area. SQ-FFQ used to know the diversity of food and eating behavior. From that questionnaire, then the data entered to Nutrisurvey program to know the iron and folate intake from each subject. Data of supplement consumed by subject did not entered in Nutrisurvey. To collect knowledge about anemia used a questionnaire with 15 questions. Each question consists of four choices. Each people should choose the right answer. Each true answer has 6.67 points. The total point will be categorized into three knowledge scores.

The instrument used for examining hemoglobin (Hb) levels was a digital hemoglobinometer test, named quick check Hb. Blood test is done by primary health care. Data of Hb was used to determine anemia status. Data Analysis. Data were analyzed with SPSS. All measurements were presented as mean, percentages, and frequencies. Chi-square test was used to see the association of each independent with dependent variable and presented in tables. RESULTS Subject characteristic Total 190 women from 10 sub districts in Bantul enrolled in this study. The general characteristic of the subject presented in table 1. Most of subject was 21-35 year. The subject mostly had completed university (57.4%).

65.3% of the subjects working as government or private employee. Cut point of income level was Rp1.572.150 based on regional minimum salary in Bantul. Most of subject (71.1%) have income more than minimum salary. 20% from subject were anemia, with Hb level lower than 12g/dL. 124 of 190 women have medium category knowledge score. Most of subjects (54.7%) did not eat enough iron, and low folate intake (68.4% women). Table 1. General characteristic of the subjects Variables \_n \_% \_Age group = 20 year 21-35 year \_ 18 172 \_ 9.4 90.5 \_Education Junior high school Senior high school University \_ 5 76 109 \_ 2.6 40.0 57.4

\_Occupation not yet working Government/private employee Entrepreneur Others \_ 8 124 38 20 \_ 4.2 65.3 20.0 10.5 \_Income level =Rp 1.572.150 <Rp 1.572.150 \_ 135 55 \_ 71.1 28.9 \_Knowledge score Good Medium Low \_ 66 98 26 \_ 34.7 51.6 13.7 \_Iron intake Normal Low \_ 86 104 \_ 45.7 54.7 \_Folate intake Normal low \_ 60 130 \_ 31.6 68.4 \_Anemia status No Yes \_ 152 38 \_ 80 20 \_Iron supplement No Yes \_ 85 105 \_ 44.7 55.3 \_ Bivariate analysis Knowledge score about anemia grouped into 3 categories. That were "good" if knowledge score more than 80 "medium" when knowledge score 60-80,

and if score less than 60 called "low".

The association between knowledge score and anemia status was presented in this table: Table 2. relationship between knowledge score and anemia status

Knowledge score	Anemia status	p value
Not Anemia	Anemia	
n	%	n
%	%	%
Good	52	
34.2	14	36.8
0.812		
Medium	78	51.3
20	52.7	
Low	22	14.5
4	10.5	
Total	152	100.0
38	100.0	

Iron intake grouped into 2 categories. Low iron intake if less than 20.8 mg/day (<80% RDA) and normal iron intake if more or equal to 20.8 mg/day (=80% RDA). The grouping of iron intake based on the recommendation 26 mg/days for women. The relationship between iron intake and anemia status was describe in Table 3. Table 3.

relationship between iron intake and anemia status

Iron intake	Anemia status	p value
Anemia	NotAnemia	
n	%	n
%	%	%
Normal	11	17.2
75	49.3	0.024
Low	27	71.1
77	50.7	
Total	38	100.0
152	100.0	

Data of folate intake collected from SQ-FFQ. the recommendation folate intake for women aged 15-49 years old was 400-600 mcg/day. The cut of this score was 80% from RDA. Low folate intake if less than 80% RDA (that was less than 320 mcg/day), and normal folate intake if more than 80%RDA. The association of folate intake and anemia status describe in this table. Table 4.

relationship between folate intake and anemia status

Folate intake	Anemia status	p value
Anemia	NotAnemia	
n	%	n
%	%	%
Normal	11	28.9
49	32.2	0.696
Low	27	71.1
103	67.8	
Total	38	100.0
152	100.0	

DISCUSSION Based on Table 1. Most of subject was not anemia. Only 20% of subject has Hb level under 12 g/dL. Anemia prevalence in this study is near with national anemia prevalence (18%) (6). Based on table 2, more than half anemia women in this study (52.7%) have medium knowledge about anemia.

We did the Crosstabulation test of knowledge and income, the result show that 70% subject who have medium knowledge, have income under regional minimum salary (result were not shown). From table 2, there were many subjects who have medium and low knowledge about anemia, but they were not anemic. In theory, someone with good knowledge tends to avoid the disease, and people with low and middle knowledge will be more at risk for disease (7,8). Finding of this study were different with theory.

Subject with medium and low knowledge but they were not anemia. It can be due to subject's age and education level (2). Most of subjects from this study was college and aged more than 20 years. Knowledge and attitude correlated with education level of the subjects (9). Most of the subjects have been in university. People with high education

tends to have good attitude about eating behavior. Although they have not good knowledge about anemia, they known about food which contain iron and folate. Previous study reported that there was not significant correlation between knowledge score with anemia (10).

Iron was an important component of hemoglobin and have a special role in biological process. Hemoglobin consists of iron (heme) and protein globulin. They can binding with oxygen and distributed into all parts of body (11). Among subjects who anemia, we found that their iron intake was low and there was significant association. Data of iron intake was collected using SQ-FFQ and asked for last 3 months consumption history. From the SQ-FFQ we can see that most of subject has consumed food which contain iron, such as animal food, vegetables, and legume. Iron from animal foods has a high absorption rate. Heme was more easily to be absorbed (3).

Half of the subject has low iron intake, but they were not anemia. We can assume that the subject ate iron supplement twice a month when the menstrual period. That was based on subject's perception. They feel dizzy and weak every menstrual period and consumed iron supplement. They feel much better after that. Previous study shown that there was correlation iron intake and anemia (12). Folate is a part of Vitamin B complex that soluble in water. Folic acid **is one of the** vitamins that can influence the formation of Hb in the blood. From this study, there was no association between folate intake and anemia. This finding was in line with previous studies (13,14).

Among subjects who anemia, we found that their folate intake was low. Table 1 shown that 68.4% subject reported low folate intake. Previous study shown this condition too. Women in reproductive age in Probolinggo, East Java, tend to have low folate intake(15).

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