

## The Relationship Between Dietary Patterns And Menstruation With Anemia Status Of Female Adolescents At State SMAN 1 Ngunut, Kabupaten Tulungagung

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### ABSTRACT

Adolescent girls as puberty age group , often lack of nutrition rich in iron because many of them had restricted food consumption habit. Moreover , the habit of consuming types of snacks that have no nutritional elements rich in iron , was the tendency on the part of young women until they were suffered with anemic . In Indonesia, the prevalence of anemia in adolescent girls in 2006 , was 28 % . Data collected from Survei Kesehatan Rumah Tangga (SKRT) in 2012 stated that the prevalence of deficiency anemia in adolescent girls aged 10-18 years is 57.1 % ( Depkes RI, 2012) . The results of the current survey of iron tablet supplementation program by Dinas Kesehatan Tulungagung in 2013 , showed that SMA Negeri 1 Ngunut was one of the schools that have students with anemia figure quite high, about 31 % . This study aims to determine the relationship of dietary habits and menstrual status of anemia in adolescent girls in SMA Negeri 1 Ngunut Tulungagung. This research used an analytic correlation with a case control study and a quantitative approach . The sample in this study are young women aged 15 to 17 years a number of 58 met the inclusion criteria consisted of 29 female students in the case group and 29 students in the control group . The sampling technique " Proportional Random Sampling " . The data analyzed used bivariate analysis using Chi Square test , whereas the multivariate analysis using linear regression with a confidence interval of 95% . Data collected was carried interviews with Food Frequencies Questionnaire ( FFQ ) to the diet, the questionnaire for menstrual and peripheral blood sampling method for anemia the variable using  $\beta$  Hemoque technique. Most of the research subjects in the case group rarely eat animal side dish than the control group often consume most of the animal side dish with more number (65.2 %). Subjects who rarely consume animal side dish had a 3.80 times greater risk of anemia compared to subjects who frequently consume animal side dish ( OR = 3.80 ; 95 % CI 1.30; 5.84 ) . Consumption of vegetable side dishes ( OR = 0.62 ; 95 % CI 0.32 ; 1.62 ) , fruit - fruit ( OR = 0.86 ; 95 % CI ; 0.32 ; 2.51 ) and snacks have a significant relationship but it is not a risk factor for anemia status . The healthy beverage consumption ( OR = 1.51 ; 95 % CI ; 1.30; 3.77 ) and iron supplementation ( OR = 3.39 ; 95 % CI 1.30; 6.84 ) has a significant relationship and a risk factors for anemia especially iron supplements , which subjects who rarely took iron supplements 3 times greater risk of experiencing anemia compared to subjects who often take iron supplements .There was a relationship between dietary habits and anemia status of young women in SMU Negeri 1 Ngunut Tulungagung , where adolescent girls have a frequency rarely consume food sources of heme have a greater risk of having anemia . Statistically not found the relationship between menstrual status of anemia in adolescent girls

but when seen from the results , young women who have a history of abnormal menstrual risk 1.3 times more likely to develop anemia than girls who have a normal menstrual history .

**Keywords : Adolescent, Dietary Habits, Menstrual Pattern, Anemia**

## **INTRODUCTION**

The rapid growth in teenagers leave a consequent increase in nutrient requirements in an effort to offset this growth. Diversity of food consumption was instrumental in helping improve the absorption of iron in the body. In adolescence, a person will experience changes in both cognitive, social-emotional, and lifestyle that can create an enormous impact on the eating habits of adolescents.

The types of snacks consumed are sweet cakes and pastry and sweets group while the group of vegetables and fruits that are rarely consumed in their diets low in iron, vitamins, and others. In addition the survey results show that teenagers like soft drinks, tea and coffee whose frequency is more often than the consumption of milk. Other data also showed that dietary intake of young women can not provide enough nutrients to meet their needs and more fifty percent of cases of anemia are scattered throughout the world are directly caused by the lack of input (intake) of iron. Young women biasaya very concerned about body shape, so much that limiting consumption of food and many abstinence to food (Dillon, 2005).

The iron requirement will increase in young women with respect to the occurrence of menstruation. Especially teenagers who have experienced menstruation, compared with yet menstruating, are more susceptible to anemia, in connection with the blood loss experienced during menstruation (Dillon, 2005). If the blood loss during menstruation is quite a lot, it means the amount of iron that is lost from the body is also quite large and this loss can lead to anemia (Wirakusumah, 1998). Young women with long periods lasting more than eight days and the menstrual cycle is short, ie less than 28 days allowed for the loss of iron in greater numbers. (Gleason & Scrimshaw, 2007).

In Indonesia, the prevalence of anemia in adolescent girls in 2006, ie 28%. Data Household Health Survey (Household) in 2012 stated that the prevalence of deficiency anemia in infants of 40.5%, 50.5% of pregnant women, postpartum mothers 45.1% of young women aged 10-18 years and 57.1% aged 19 -45 years of 39.5%. Women have the highest risk of suffering from anemia, especially young women (MOH, 2012). Research Wirawan (2005) in East Jakarta high school students showed the prevalence of anemia was 44.4%. While Tambunan (2005) gain of 107 high school students in Jakarta, 24.3% had iron deficiency anemia. Results of research conducted by Permaesih et al (2000) showed that the percentage of patients with anemia in adolescent women group of students as much as 44.4%.

Iron deficiency can disrupt the immune status and cognitive function at various age levels. According Soekirman (2000), iron deficiency anemia in adolescent group can cause a variety of effects including a lowered immune system so susceptible to disease and decrease the activity related to the physical work ability and learning achievement. Besides, teenagers who suffer from anemia decreased fitness so will hinder sports performance and productivity. Micronutrient deficiencies in adolescence can have a negative impact on the growth and maturation of the reproductive organs (Dillon, 2005).

A momentary observation carried to high school 1 Ngunut. Selected high school 1 Ngunut Tulungagung, because based on survey results when iron tablet supplementation program by Tulungagung District Health Office in 2013, SMU Ngunut Tulungagung have a student number with anemia are quite high at around 31%. The results of the initial survey in SMU Negeri 1 Ngunut showed that 31% were sitting in class X, XI and XII are anemic with high levels of hemoglobin <12 g / dl characterized by young women in high school 1 Ngunut often complain of fatigue, dizziness, decreased fitness, reduced concentration and learning

achievement. Based on the description of the above problems, researchers are interested in examining the relationship diet and menstrual status of anemia in adolescent girls at high school 1 Ngunut, Tulungagung.

## **METHOD**

This study is observational analytic study using a case-control design with quantitative approach. This design aims to measure the degree of relationship between two independent variables (diet and menstruation) as a risk factor or cause and the dependent variable (anemia) as a result. Groups of cases are young women who are anemic, while the control group is young women who did not have anemia. Case-control design is done by determining the first group were ill (cases) as the subject to attribute positive effects, and no pain (control) as the subject of a negative effect. Then traced backward (retrospective) to search for causal factors (risk factors) the result.

The target population in this study were all young women sitting in the class X and XI SMU Negeri 1 Ngunut Tulungagung number of 468 students in the academic year 2014/2015. For a population of 29 students earned cases that have been detected are anemic in accordance with the results of the screening Ngunut District Area Health Center, while the control population taken from the class representative are selected according to predetermined criteria researchers a number of 29 students. In this study was not done calculation of sample size for a population case limited the number of events a total of 29 students who have been detected are anemic. So as to control population is also taken as many as 29 students who did not have anemia. Based on the above information, the total overall sample is 58 students, with a sampling technique "proportional random sampling". Of the total sample selected, no one dropped out of the study.

The independent variables in this study were eating and menstrual history. A diet is a patterns of consumption and food habits of young women who measured qualitatively namely food sources of iron consumed during one week, to the type of food consumed consisting of : dishes animal, Vegetables, fruits, food snacks, drinks and iron supplements. Menstruation is a state and menstrual habit respondents include: the number of periods (views of pads used), long periods (from the number of days of menstruation) and the frequency of menstruation (menstrual regularity in the first period). The dependent variables in this study were anemic condition depicted young women of the value measured by the hemoglobin levels of  $\beta$  method Hemoque views of hemoglobin levels  $<12$  g / dl.

The first phase of data collection is the measurement of diet by using questionnaires semi-quantitative food frequency questionnaire (FFQ) and the measurement of bleeding patterns containing questions about the old days, the amount of bleeding and menstrual frequency of each study subjects who had met the inclusion criteria.

Data analysis included univariate, bivariate and multivariate analyzes. Univariate analysis performed to describe each variable frequency distribution of research include the age of the subject, diet, shelter, eating patterns, and pattern of menstruation. Bivariate analysis using Chi Square test. In case control studies, estimates of relative risk represented by Odds Ratio (OR), which is the ratio between the number of subjects with the disease at one time with all existing subjects. OR is calculated by using a 2x2 table. RP must be accompanied by a confidence interval (confidence interval), the confidence interval used was 95% or error level of 0, 05%.

## **RESULT**

### **1. Analysis Univariate**

Analysis univariable to explain or describe the characteristics of each - each variable based on the type of data. The research subjects were 58 respondents consisted of 29 cases and 29 controls.

Tabel 4 Characteristics of Respondents (age , description and residence of respondents feeding behavior of respondents)

Characteristics of Respondents	Case					
	Anemia (29)		Not Anemia (29)		Total (58)	
	n	(%)	n	(%)	n	(%)
1. Age						
a. 15 yrs	8	27,58	10	34,48	18	31,03
b. 16 yrs	16	55,17	13	44,82	29	50
c. 17 yrs	7	24,13	6	20,68	13	22,41
2. Residence						
a. Home	23	79,31	25	86,20	48	82,75
b. Rent Room	6	20,69	4	13,8	10	17,75
3. Eating Habits						
frequency						
a. > 3 kali	6	20,68	8	27,58	14	24,13
b. 3 kali	19	65,51	20	68,96	39	67,24
c. 2 kali	4	13,79	1	3,44	5	8,62
Dietary Restriction						
a. Yes	8	27,58	12	41,37	20	34,48
b. No	21	72,42	17	58,62	38	65,51
Suggested Food						
a. Yes	5	17,24	2	6,89	7	12,06
b. No	24	82,75	27	93,11	51	87,94
Snacking						
a. Yes	9	31,03	11	37,93	20	34,48
b. No	20	68,97	18	62,06	38	65,52

Sumber : Data Kuesioner Februari 2015

Based on the table it can be seen that the majority of respondents, who are anemic or not 16 years old as many as 29 respondents . Most respondents respondents live in their own homes about 48 respondents , the majority of respondents do not have specific dietary restrictions by 38 respondents , the majority of respondents do not have certain foods recommendation by 51 respondents.

From the data the answer on the question of food become restricted, was eating meat and chicken . The grounds were written that meat and chicken contain a lot of fat that can lead to obesity .

At the point the question of food into the suggestion , from the response data is written , the recommended foods are foods such as vegetables and fruit. At the point the question of consumption of certain snacks , most respondents answered no kind of snacks that are often consumed fried snacks

## 2. Analisis Bivariable

Bivariable analysis is an analysis was done to see the relationship between independent variables and the dependent variable , the

variable outside with external and independent variables with the dependent variable .

Tabel 4 Corelation Between Dietary Habits and Anemia

Frekuensi Konsumsi Jenis Bahan Makanan	Kasus						<i>P value</i> (uji 1 sisi)	<b>OR (95% CI)</b>
	Anemia (29)		Tidak Anemia (29)		Total (58)			
	n	(%)	n	(%)	n	(%)		
1. Lauk Hewani								
a. Jarang	13	44,8	10	34,8	23	39,7	0,001	<b>3,80 (1,30;5,84)</b>
b. Sering	16	45,2	19	65,2	35	60,3		
2. Lauk Nabati								
a. Jarang	8	28,6	8	28,6	16	27,6	0,301	<b>0,62 (0,32;1,62)</b>
b. Sering	20	71,4	20	71,4	42	72,4		
3. Sayuran								
a. Jarang	16	45,2	8	28,6	16	27,6	0,026	<b>1,53 (0,62;3,77)</b>
b. Sering	13	44,8	20	71,4	42	72,4		
4. Buah – buahan								
a. Jarang	21	72,4	12	41,3	33	56,8	0,001	<b>0,86 (0,32;2,51)</b>
b. Sering	8	28,6	17	48,7	25	43,2		
5. Makanan Jajanan								
a. Jarang	15	51,7	16	45,2	31	53,4	0,010	<b>0,64 (0,25;1,51)</b>
b. Sering	14	49,3	13	44,8	27	46,6		
6. Minuman Sehat								
a. Jarang	8	28,6	8	28,6	16	27,6	0,004	<b>1,51 (1,30;3,77)</b>
b. Sering	20	71,4	20	71,4	42	72,4		
7. Suplemen Zat Besi								
a. Jarang	13	44,8	10	34,8	23	39,7	0,000	<b>3,39 (1,30;6,84)</b>
b. Sering	16	45,2	19	65,2	35	60,3		

Sumber : Data Kuesioner Februari 2015

Based on table, it can be compared to the frequency of food consumption of the case group and the control group. On the animal side dish consumption, most of the subjects in the case group often consume animal side dish (45.2%), whereas in the control group most often consume large animal side dish with higher numbers (65.2%). From the above results it can be seen that respondents who rarely consume animal side dish had a 3.80 times greater risk of anemia than girls who frequently consume animal side dish (OR = 3.80; 95% CI 1.30; 5.84).

Consumption of vegetable side dishes (OR = 0.62; 95% CI 0.32; 1.62), fruit - fruit (OR = 0.86; 95% CI; 0.32; 2.51) and snacks have a significant relationship but it is not a risk factor for anemia status

The healthy beverage consumption (OR = 1.51; 95% CI; 1.30; 3.77) and an iron supplement (OR = 3.39; 95% CI 1.30; 6.84) had a significant association and a risk factor the status of anemia especially iron supplements, which respondents rarely take iron supplements can be risky 3 times more likely to have anemia than girls who often take iron supplements.

Based on the results of the bivariate analysis showed that all of the variables associated with diet anemia ( $p < 0.05$ ) and positively correlated. It showed that the higher the frequency of consumption of animal side dish, vegetables, fruit, healthy beverage, and iron supplements, the higher the hemoglobin level, which means the lower the incidence of anemia.

Tabel 5 Corelation Between Menstrual Pattern and Anemia

Menstuasi	Kasus				Total		<i>p</i> value	OR (95% CI)
	Anemia (29)		Tidak Anemia (29)					
	n	%	n	%	n	%		
Normal	25	86,2	28	96,6	53	91,4	<i>p</i> = 0,352	<b>1,39</b> <b>(0,69;3,54)</b>
Tidak Normal	4	13,8	1	3,4	5	8,6		
Total	29	100	29	100	58	100		

Sumber : Hasil Pengolahan SPSS Maret 2015

From a comparison of menstrual patterns in the table above , both in the case group and the group control the majority have normal menstrual patterns respectively - 86.2 % respectively in the case group and 96.6 % in the control group . Based on the results of the bivariate analysis , we can see that menstruation did not show a significant correlation (  $p = 0.352$  ) with anemia status of the calculation results obtained odds ratio OR = 3.39 ( 95 % CI ; 1.30; 8.54 ). wherein abnormal menstrual history has a greater risk of experiencing anemia three times the normal teenage menstrual status

### Analisis Multivariable

Multivariate analysis with multiple linear regression is used to determine the variables that most influence the eating patterns seen on the frequency of food consumed (side of animal , vegetable side dishes , vegetables , fruit - fruit , drinks, and iron supplements ) and menstrual patterns against anemia , Based on the results obtained by analysis of the most influential variable is of variable diet .

Result Showed from this table :

Tabel 6 Analisis Multivariat

Variabel	<i>p</i>	Adjusted R <sup>2</sup>
Pola Makan :		
- Lauk hewani	0,001	0,227
- Lauk nabati	0,301	
- Sayuran sumber heme	0,067	
- Buah – buahan	0,264	
- Minuman sehat	0,004	
- Suplemen Zat Besi	0,001	
Pola Menstruasi	0,166	0,17

Based on the above results of multivariate analysis coefficient of determination (adjusted R<sup>2</sup> ) obtained 22.7 % , this shows that the variation seen anemia status of hemoglobin levels of 22.7 % can be explained by the variable diet (as seen from the frequency of consumption of animal side dish , vegetable side dishes , vegetables , fruit - fruit , healthy beverages and iron supplementation ) , while at 77.3 % explained by other variables not examined in this study .

## DISCUSSION

### A. Relationship Between Dietary Habits with Anemia

#### 1. Consumption Animal Dishes pattern

The analysis showed that the animal side dish diet showed a significant association with anemia status with the value of a positive correlation ( $p = 0.001$ ). It can be seen that the diet is a variable that showed significant association with anemia status with  $p < 0.005$ .

In foods there are 2 kinds of iron is heme iron sources (40%) and non-heme iron non-heme iron is the main source of iron in the diet. Usually there are in all kinds of green vegetables, legumes - beans, potatoes and cereals as well as some types of fruit - fruit. While

almost all the heme iron found in animal foods include meat, fish, chicken, liver and organ - other organs (Almatsier, 2005).

This animal sources can actually improve the absorption of iron. When viewed from the frequency, the percentage of anemia rare instances consume animal side dish slightly higher than the example that is not anemic. This means more rare example anemia consume both foods are compared example does not anemia.

These results are consistent with research conducted by Hulu (2004) which indicates that the sample is not more rare anemia consuming food sources of animal protein than in the example anemia. However, although the example anemia consume more animal side dish than in the example are not anemic, allegations of high food consumption factors that can inhibit the absorption of iron and low consumption of food that can help the absorption of iron in the body can cause an imbalance of iron in the body. Animal protein helps the absorption of iron in the body to accelerate the absorption of heme iron that is forming hemoglobin (Almatsier 2009).

## 2. Natural Dietary Habits

The analysis showed that the vegetable side dishes diet showed a significant association with anemia status with the value of a positive correlation ( $p = 0.031$ ).

Most of the respondents often consume vegetable side dishes. Percentage frequency of consumption of vegetable side dishes anemia example is not much different from the examples are not anemic.

Tempe and tofu is a source of vegetable protein donate large enough protein content in nutrients. But the vegetable protein has a quality that is lower than animal protein. This is because, phytic acid contained in soybean and processed products can inhibit the absorption of iron. However, because the iron contained in soybean and processed products still enough, the final result of the absorption besipun will usually positive (Almatsier 2009).

## 3. Vegetables consumption pattern

Table 4 shows that the diet of vegetables, most respondents (89.9) shows often consume green vegetables. Of these, the majority of respondents who consume green vegetables showed no anemia results.

In line with the results of Upstream (2004) which indicates that the sample is not anemic consume more vegetables than in the example anemia. Green leafy vegetables contain high iron so if frequently consumed, it will increase the iron stores in the body. Vegetables and fruits are also a source of minerals and vitamin C, which is expected to spur the absorption of iron. Some types of green vegetables also contain oxalic acid which can inhibit the absorption of iron, but the effect of obstructing relatively smaller than phytic acid in cereals and tannins contained in tea and coffee (Almatsier 2001). To overcome this, it is usually a combination of menu consisting of green vegetables, animal protein and fruit can improve kuaitas menu so as to increase the level of absorption of iron from food (Kumar 2012). The analysis showed that there was significant relation between diet vegetables green vegetables with anemia status with the example of the value of a positive correlation ( $p = 0.026$ ). This shows that the more green vegetables consumed tendency to suffer from anemia will be smaller.

## 4. Fruits Consumption Pattern

Based on Table 4, it can be seen that most respondents (89.9%) often consume fruit - fruit. The analysis showed that there was significant relation between diet fruit - fruit with anemia status with the example of the value of a positive correlation ( $p = 0.026$ ).

Fruits source of vitamin C such as oranges, papaya, tomatoes, guava, and mango can help the absorption of iron. Organic acids such as vitamin C can help non-heme iron absorption by changing the shape of the ferries iron into ferrous form is more easily absorbed. It is known that vitamin C may help the absorption of iron in the prevention of anemia, but if the iron consumed in limited quantities, the function of vitamin C as an enhancer of iron will not run

(Setijowati, 2012). The percentage of time the fruit is slightly higher consumption by examples that are not anemic. These examples show that anemia does not consume more fruit - fruit than in the example anemia.

Analysis results showed a significant relationship between diet fruit - fruit with anemia status with the example of the value of a positive correlation ( $p = 0.026$ ). This shows that the more often consume fruit - fruit rich in vitamin C, the tendency to suffer from anemia will be smaller.

#### 5. Consumption of Iron Supplement dan Helathy Drinks

Drinks in this study include fruit juices and milk and consumption of iron supplements. Bioavailability of iron in the diet is strongly influenced by the factors driving and inhibiting (FAO / WHO (2001).

Milk is a good food source of protein that has a high bioavailability. Protein contained therein role in the distribution of nutrients including iron distribution. But milk also contains high calcium which can inhibit iron absorption. Milk is actually good for the absorption of iron fortified formula is the iron. Usually can be non-fat yogurt or skim milk. There are about 20.3 percent of example anemia is rarely consume dairy. This shows the tendency that the frequency of milk consumption in examples that are not anemic relatively more often than the example of anemia. Most of the milk consumed by teens is milk with high calcium content, because they think the milk is more beneficial to the growth and maintain the body is not overweight. While the reason for most of the respondents who do not consume milk mention that milk contains a lot of calories, so they are afraid of obesity if you consume too much milk.

In the majority of respondents found the majority of respondents frequently consume fruit juice. It is better to help the absorption of iron. As is known, the largest content in the fruit juice or fruit - fruit is usually a mineral and vitamin C. It is known that vitamin C may help the absorption of iron in the prevention of anemia, but if the iron consumed in limited quantities, the function of vitamin C as an enhancer iron will not run (Setijowati, 2012).

Supplement products on the study include vitamin C supplements, fish oil, and iron supplements. Food supplements are products used to complement the food. Basically the function of supplements is as additives to improve and increase endurance (Sudarisman 1997 referred to under Habibi 2003). There are about 7.7 percent of example take a daily supplement and the largest percentage of consumption of supplements contained in the example anemia (8.5%). This shows that the example of anemia more often supplements compared example anemia is not associated with anemia allegedly suffered.

Overall analysis shows that there is a significant relationship between the frequency of consumption of drinks and supplements with examples anemia status ( $p = 0.000$ ).

#### B. Corelation Between Menstrual Pattern and Anemia

Based on bivariate analysis showed that statistically the relationship between menstrual patterns with the incidence of anemia was not significant with  $p = 0.352$  results. This is not in line with studies conducted on young women in the sanctuary where there is a significant relationship between menstrual patterns with the incidence of anemia.

The absence of menstrual pattern relationship with the incidence of anemia is suspected because in this study did not measure out a specific amount of blood during menstruation. Measurement of the amount of blood that comes out is only seen by the respondent's perception of replacement pads every day. Besides taking the measurements made when the respondent does not menstruate.

In general, women bleed 30-40 ml each menstrual cycles between 21-35 days with longer menstrual 3-7 days. The amount of blood that comes out effect on the incidence of anemia because women did not have sufficient iron stores and low iron absorption into the body so that it can not replace iron lost during menstruation. If the note again, in Table 6 were obtained 4 respondents (13.8%) of the cases had mensstruasi cycles are not normal. This is

consistent with the theory put forward by Arisman (2004), which states that teenage daughter who had experienced menarche, if blood loss during menstruation is very much can cause iron deficiency anemia, due to the amount of blood lost during a menstrual period ranges from 30 - 40 cc, which is equivalent to the amount of substance Bezi lost about 12.5 to 15 mg / month.

The amount of iron lost during menstruation depends on the number of blood that comes out each menstrual period. Iron resulted in a loss of iron reserves decreased. If iron deficiency continues the iron reserves is completely emptied, the supply of iron for erythropoiesis is reduced, causing disruption in the formation of red cell anemia clinically but not yet occurred. If the amount of iron declined steadily then eritropoesis increasingly impaired that hemoglobin levels begin to decline, the consequences arising anemia called iron deficiency anemia.

It can be concluded that the respondents who have a history of abnormal menstrual be prone to anemia when compared to those respondents who have a normal menstrual history.

## CONCLUSION

Based on the research that has been done , it was concluded as follows : There is a relationship between diet and anemia status of young women in high school I Ngunut Tulungagung , where adolescent girls have a frequency rarely consume food sources of heme have a greater risk of having anemia . Statistically not found the relationship between menstrual status of anemia in adolescent girls but when seen from the results , young women who have a history of abnormal menstrual risk 1.3 times more likely to develop anemia than girls who have a normal menstrual history .

Based on these results , the things that can be suggested to the subject of which is the need to increase the intake of foods containing iron , in terms of both quality and quantity. There should also be counseling about nutrition in order to prevent anemia and anemia countermeasures by the school.

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