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Nutritional Status and Anemia in Islamic Boarding School Adolescent in Kediri City East Java Indonesia

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ABSTRACT (10PT)

Anemia is one of the major health problems in the world that is often overlooked in both developing and developed countries. Toddlers, pregnant women and adolescents are a high risk group of anemia. Although anemia has been known as a community nutrition problem for many years, progress in reducing its prevalence is still considered low. Even in some countries found an increase in the prevalence of anemia in adult women. The purpose of this study was to determine the relationship of nutritional status with the incidence of anemia in adolescent girls in Islamic boarding schools in Kediri City.The design of this study was an observational study with a cross sectional approach. By using sistematic random sampling technique, a sample of 294 respondents was obtained. The independent variables studied was nutritional. The dependent variable studied was anemia status in adolescent girls. The instrument used was a questionnaire, the data were analyzed using simple poisson regression test with a robust variance estimator at a significant level of 5%. The prevalence ratio and 95% confidence interval were presented. From the results of the study, it was found that prevalence of anemia among adolescent girls was 29,93%. There was a relationship between nutritional status and anemia among adolescent girls (PR = 3.280, 95% CI = 2.330-4.616). Islamic boarding schools are expected to facilitate and strive to improve adolescent reproductive health, especially in preventing anemia by holding a forum such as PIK KRR (Information Center for Adolescent Reproductive Health Counseling) or other containers that can answer student questions related to reproductive health.

I. Introduction (*Heading 1*) (bold, 11 pt)

Maternal Mortality Rate (MMR) is one indicator of the degree of public health that can describe the level of community welfare and the quality of health services. One of the causes of death for pregnant women is bleeding during childbirth in addition to infection and eclampsia. Bleeding is one of the complications of childbirth which causes still high maternal deaths in Indonesia. Postpartum hemorrhage is still ranked first cause of maternal death in Indonesia (40-60%) (Najah, 2004). Maternal deaths include 41% occurring at puerperium, 28.5% due to bleeding, 22% eclampsia and 10% infection (Wuryanti, 2010). According to WHO, 40% of maternal deaths in developing countries are related to anemia in pregnancy.

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In addition to causing postpartum hemorrhage to cause death, anemia in pregnant women can also cause the incidence of Low Birth Weight (LBW) in infants. Research in Medan in 2004 showed that there was a significant relationship between weight gain and anemia in LBW. A pregnant woman who experiences Chronic Energy Deficiency and anemia will result in inhibition of fetal growth, thus giving rise to LBW risk (Trihardiani, 2011). During 2015, there were cases of neonatal deaths in the City of Kediri with the biggest cause being death due to LBW of 56.25%.

Anemia is one of the major health problems in the world that is often overlooked in both developing and developed countries. Toddlers, pregnant women and adolescents are a high risk group of anemia. Anemia can be defined as a condition where the hemoglobin (Hb) level in the blood is below normal. Anemic events spread almost evenly in various regions of the world. Based on Riskesdas data in 2007, the average prevalence of anemia in Indonesia was 11.9%, while according to Minister of Health's Decree, the average prevalence of anemia in Indonesia was 14.8%. Riskesdas data in 2013, showed that the average anemia prevalence nationally reached 21.7%. Anemic cases were higher in female (23.9%), compared to male (18.4%).

Adolescents are one of the high risk groups for anemia. After menstruation, adolescent girls are at higher risk of anemia compared to young men. This is due to rapid growth, hormonal changes, malnutrition, and the risk of increased blood loss during the menstrual period experienced every month. In developing countries, parasitic infections and other infectious diseases are more common as a cause of iron loss in the human body. In addition, adolescents, especially students, also have a high activity so that it affects irregular eating patterns and also adolescent girls are influenced by lifestyles that want to look slimmer so that they do strict diit without paying attention to the correct diit method (Premalatha et al, 2012). Anemia in adolescent girls have a long and lasting impact not only on adolescent girls themselves but also on later pregnancy and also on the baby or prospective baby if they do not immediately take early prevention and treatment. The prevalence of anemia in adolescents in developing countries is 27%, while in developed countries the prevalence is 6%.

Based on Chavada (2003), adolescent girls were more susceptible to nutritional difficulties than boys. In early childhood (0-4 years), the available international evidence shows that there is no statistically significant difference in nutritional status between girls and boys in all regions except South Asia. But in the continuation, adolescents girls have a greater risk than boys in terms of nutritional difficulties, especially anemia. Study conducted in Gujarat by Kotecha, 74.4% of girls aged 13 to 17 years experienced anemia.

Examination of anemia in adolescent girls are usually only done on students in high school in the city of Kediri, while the examination of anemia in adolescent girls who study in the area of Islamic boarding schools in the city of Kediri has never been done before, despite the socialization of the implementation of the examination of anemia in adolescent girls in Islamic boarding schools has often been done. Based on this background, the researchers interested in conducting research to determine the relationship between nutritional status and anemia among adolescent girls Islamic Boarding Schools in Kediri City.

II. Method

The design of this study was an observational study with a cross sectional approach. By using sistematic random sampling technique, a sample of 294 respondents was obtained. The independent variables studied was nutritional status. To determine the nutritional status used the calculation of BMI, namely by dividing the weight (kilograms) with the square of the height (meters). Nutritional status was underweight (if BMI <18.5) and normal (BMI=18.5-22.99). The tool that used to measure weight and height was microtoise. The dependent variable studied was anemia status of adolescent girls. To check the hemoglobin levels, blood sample of respondent were examined using hematology analyzer. The respondents were diagnosed with anemia if the hemoglobin level was less than 12 mg/dL.

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The instrument used was a questionnaire, the data were analyzed using simple poisson regression test with a robust variance estimator at a significant level of 5%. The prevalence ratio (PR) and 95% confidence interval were presented.

III. Results and Discussion

Prevalence of anemia among adolescent girls in Islamic Boarding School in Kediri City was 29,93%. Riskesdas data in 2013, showed that the average anemia prevalence nationally reached 21,7%. Anemic cases were higher in female (23,9%) than male. The prevalence of anemia in developing countries is greater than in developed countries. The prevalence of anemia in adolescent girls in Nepal is known to be 68,8%, where the prevalence of anemia in America is only 2%. Poverty and limited consumption of animal-derived foods contribute to the high prevalence of anemia in adolescent girls. Balci, et al. (2012), it is known that the prevalence of anemia in adolescent girls in Turkey is greater than in boys. As many as 76% of anemia sufferers come from middle to lower socio-economic. The results of research by Premalatha, et al. (2012), it is known that the prevalence of anemia in adolescent girls in Tamil Nadu, India is 78,75%. The results of Verma's research, et al. (2004), it is known that the prevalence of anemia in girls aged 6-18 years in Ahmedabad, Iran is 81,8%. Meanwhile, the results of research by Hioui, et al. (2008), it is known that the prevalence of anemia in school-age girls in rural areas is 58,3%.

Table 1. Socio-demographic, nutritional status, and prevalence of anemia of the study population

Variables		*n*	*%*
Age (yrs) (n=294)			
Median ± SD	14.5 ± 2.79		
≤14 yrs old		294	50.0
>14 yrs old		294	50.0
Nutritional status (n=294)			
Underweight (BMI <18.5)		87	29.59
Normal (BMI=18.5-22.99)		207	70.41
Anemia (n=294)			
Yes (Hb <12 mg/dL)		88	29.93
No (Hb ≥12 mg/dL)		206	70.07

From the study, it was found that most respondents have normal nutritional status (BMI 18,5–22,99). The average BMI of respondents with normal nutritional status was 19,98 kg/m^2. The average of BMI of respondents with underweight nutritional status was 16,36 kg/m^2. Prevalence of anemia among adolescent girls was 29,93%. There was a relationship between nutritional status and anemia among adolescent girls (PR = 3,280, 95% CI = 2,330-4,616).

Table 2. Simple poisson regression test with a robust variance estimator for anemia of the study population

Variables	Anemia				p value[a]	PR	95% CI)
	Yes (Hb <12 mg/dL)		No (Hb≥12 mg/dL)				
	n	%	n	%			
Nutritional status							
Underweight	51	57.95	91	44.17	0.003	3.280	2.330 – 4.616
Normal	37	42.05	115	55.83			

[a] significant level of 5%

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Nutritional status in adolescent girls are often influenced by eating behavior and body image. Nur Widianti's (2012) study found that there was a significant relationship between eating behavior and nutritional status in adolescent girls. The study of Laus et al (2009) in Brazil, found that there was a relationship between body image and nutritional status. Ramzi et al (2011) found that there was a significant relationship between BMI and hemoglobin levels. The results of Eckhardt et al (2008) study, conducted in three countries, namely Egypt, Peru and Mexico, found that anemia prevalence tended to decrease with an increase in BMI.

Malnutrition in adolescents occurs due to restrictions on food consumption by not paying attention to nutrition and health rules, so that nutritional intake is not in accordance with the recommended Nutrition Adequacy Rate. According to Jalal in Susanti (2012), children who live in Islamic boarding schools and orphanages are vulnerable to malnutrition. This is influenced by the existence of limitations in the economic field in the effort to fulfill nutrition, both for the students, and the boarding school itself.

In conditions of poor nutrition, reduced nutrition, the body will slowly carry out the adaptation process. Gradually there is wasting of body tissues, metabolism slows down, energy and oxygen requirements will be reduced so that the red blood cells needed to transport oxygen will also be reduced. In addition, when nutrient intake is reduced there is a limitation of some of the micronutrients needed in the formation of red blood cells.

IV. Conclusion

Islamic boarding schools are expected to facilitate and strive to improve adolescent reproductive health, especially in preventing anemia by holding a forum such as PIK KRR (Information Center for Adolescent Reproductive Health Counseling) or other containers that can answer student questions related to reproductive health.

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