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The Relationship between Iron Intake and Anemia in Elementary School Children in the Working Area of the Air Beliti Public Health Center, Musi Rawas Regency

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Abstract

Anemia is a health problem that often occurs in school-age children. Low iron intake is the most common cause of anemia in children. Anemia has an impact on physical growth disorders and decreased body resistance. The purpose of this study was to analyze the relationship between iron intake and the incidence of anemia in schoolchildren. This research is an analytic observational study with a cross-sectional design. The Hb examination was carried out to find out the anemia while the iron intake data was assessed by observation on a 24-hour dietary recall. The sample in this study was 80 elementary school children, with a simple random sampling method at five schools in the working area of Air Beliti Public Health Center. The HB examination result showed that 51.2% of respondents had anemia, while the dietary recall showed that 26.2% of children had insufficient iron intake. The statistical test showed that 81.0% of children with insufficient iron intake suffered from anemia. There was a significant relationship between iron intake and the incidence of anemia in elementary school-aged children in the working area of Air Beliti Public Health Center, Musi Rawas Regency (p=0,004; OR=6.198). Based on the results of the study, it can be concluded that there is a significant relationship between iron intake and the incidence of anemia in schoolchildren. Children with low iron intake are 6.198 times more likely to suffer from anemia. Therefore, it is recommended for parents to maintain a balanced nutritional and iron-rich food intake to prevent the incidence of anemia in children. As for the public health center to improve health education and socialization for parents regarding balanced nutrition and foods containing iron for schoolchildren.

Keywords
anemia; iron intake; elementary school children

I. Introduction

Anemia that occurs at elementary school age has an impact on physical growth disorders, decreased endurance, decreased intelligence, poor learning achievement and concentration and always looks lethargic, pale and not enthusiastic (Devi, 2012). Low body mass index, decreased immunity, frequent illness, easy infection and psychomotor retardation are manifestations of anemia in children. This is due to the important role of iron in maintaining the body's resistance to biochemical and cellular processes (Khairunnisa et al., 2020).

The World Health Organization (WHO) in the Worldwide Prevalence of Anemia reports that the total world population suffering from anemia is 1.62 billion people, with a prevalence rate in elementary school children of 25.4%, and 305 million schoolchildren worldwide suffer from anemia. Globally, the prevalence of anemia in school-age children shows a high rate of 37%, while in Thailand it is 13.4% and in India it is 85.5%. The prevalence of anemia among children in Asia is 58.4%, which is higher than the average in

Africa (49.8%). Based on the basic health research (2018), the national prevalence of anemia at the age of 5–14 years is 26.8% (Ministry of Health RI, 2018). Health problems experienced by elementary school and madrasah children include nutritional problems (thin or fat) and anemia. In the South Sumatra Province, based on the health screening of class 1 participants in the province (2018), 78.92% of them experienced nutritional problems such as anemia (Ministry of Health, 2018). In 2018, the Musi Rawas Regency was one of the regencies in South Sumatra Province included in the category of underdeveloped districts. One of the criteria for underdeveloped districts is food insecurity. The low economic status of society makes it difficult for society to meet the nutritional needs of the family. One of the critical nutritional ingredients needed for our body is iron (Fe). Until now, there has been no reported incidence of iron deficiency and anemia in elementary school children.

This study aims to analyze the relationship between iron intake and anemia in elementary school-age children in the working area of the Air Beliti Public Health Center, Musi Rawas Regency.

II. Research Methods

This research is quantitative research with a cross-sectional design. This research was conducted in the working area of Air Beliti Public Health Center, Musi Rawas Regency, in March 2021. Based on the calculation of the sample size using the sample size formula, the number of children was 80. The techniques for choosing schools and schoolchildren are random sampling and quota sampling, respectively. The inclusion criteria for the subjects in this study were elementary schoolchildren aged 7–12 years. Permission or approval was obtained from the parents regarding their willingness to participate in the study by signing an informed consent document. The exclusion criteria were used when the research subject data could not be found or was incomplete for various reasons; those who were currently suffering from chronic diarrhea and other chronic infectious diseases such as tuberculosis, pneumonia, and other infectious diseases also resigned at the time of the study. Each selected subject received parental consent by filling in an informed consent as a sign that the subject agreed to participate in the study. The Hb examination was carried out using a strip diagnostic rapid test and the nutritional intake data was collected via observation sheet on a 24-hour dietary recall. The data analysis used in this study included univariate and bivariate analysis using the Chi-Square test.

III. Results and Discussion

The subjects in this present study came from five elementary schools in the working area of the Air Beliti Public Health Center, Musi Rawas Regency. A total of 80 subjects were involved until the end of the study.

Table 1. Frequency Distribution of Subjects and Parents Characteristics in the working area of Air Biliti Public Health Center

No	Variable	n	%
1.	Age (years)		
	a. 7-9	10	12,0
	b. >9-12	40	50,0
	c. >12-14	30	38,0
2.	Sex		
	a. Male	35	43,8
	b. Female	45	56,2
3.	Class		
	a. III-IV	28	35,0
	b. V-VI	52	65,0
4.	Father's Education		
	a. Unschooled	2	3,0
	b. Low	57	71,8
	c. High	21	26,0
	Mother's Education		
	a. Unschooled	2	3,0
	b. Low	51	64,0
	c. High	27	34,0
5.	Father's Occupation		
	a. Famer	44	55,0
	b. Civil Servant	6	7,0
	c. Entrepreneur	30	38,0
6.	Mother's Occupation		
	a. Housewife	25	31,0
	b. Farmer	33	41,0
	c. Civil Servant	2	3,0
	d. Entrepreneur	20	25,0
7.	Parents' Income		
	a. < 500.000,-	11	13,8
	b. 500.000-1.000.000	37	46,2
	c. > 1.000.000	32	40,0
8.	Anemia		
	Yes	41	51,2
	No	39	48,8
9.	Iron intake		
	Less	21	26,2
	Sufficient	59	73,8
	Total	80	100,0

Based on table 1, the results showed that some respondents aged > 9-12 years old (50.0%), female gender (56.2%), and fifth-sixth grade (65.0%). The characteristics of fathers with low education (71.0%), mothers with low education (64.0%), fathers' occupations and mothers' occupations as farmers (55.0%) and (41.0%), respectively, and parents' income of around Rp.500,000–Rp.1,000,000 (46.2%). The HB examination result

showed that 51.2% of respondents had anemia, while the dietary recall showed that 26.2% of children had insufficient iron intake.

Table 2. The Relationship of Iron Intake with the Incidence of Anemia in Elementary School Children

Iron Intake	The Incidence of Anemia				Total		*p*	OR96% CI (Min-Max)
	Yes		No					
	n	%	N	%	N	%		
Less	17	81,0	4	19,0	21	100.0	0.004	6.198 (1,854-20,716)
Normal	24	40,7	35	28,8	59	100.0		
	41	51,2	39	48,8	80	100.0		

Based on Table 2, it showed that children who had insufficient iron intake and suffered anemia incidence of 17 (81.0%) while children with normal iron intake and suffered anemia, namely 24 (40.7%). The results of the analysis showed that there was a relationship between iron intake and the incidence of anemia (p value 0.004) with an OR value of 6.198, meaning that those with less iron intake were 6.1 times more likely to suffer anemia.

IV. Discussion

Based on table 1, the results showed that the majority of respondents aged > 9–12 years old (50.0%), female gender (56.2%), fifth-sixth grade (65.0%), fathers with low education (71.0%), mothers with low education (64.0%), fathers' occupations as farmers (55.0%), mothers' occupations as farmers (41.0%), income of Rp.500,000 –Rp.1,000,000 (46.2%), the incidence of anemia among respondents (51.2%), and sufficient iron intake (73.8%). From the results of the study, it was found that most of the respondents were female and suffered from anemia. The females were more prone to anemia compared to their male counterparts. The preparation for adolescence, the presence of menstruation, and an unhealthy lifestyle, such as unusual consumption of vegetables and fruit, lack of physical activity, and sugar consumption, but they consume more salt and fat, in line with research by Faiqah et al., (2019) that collected data that most of the respondents aged 12–24 years experienced anemia and were female. With increasing age, the need for iron varies between the ages and genders of women and men. The difference in iron needs between a lower and a higher one is related to growth Sari et al., (2014).

The present study revealed that the majority of children suffered from anemia. According to the Indonesian Ministry of Health (2018), the incidence of anemia in females is higher than in males. This condition is due to a lack of iron intake and children's habit of eating snacks or food from stalls with low iron content. In line with research conducted by Saptyasih et al., (2016) that found most junior high school students suffer from anemia. In line with the results of research by Ilahi et al., (2019) most teenage girls suffered from anemia. This is influenced by iron intake or lack of consumption of foods containing iron. The research conducted by Lestari et al., (2018) also found that most teenage girls who suffered from anemia were influenced by low consumption of foods containing heme iron and non-heme iron from vegetables, nuts, and fruit. Teenage girls more frequently consume snacks or instant noodles that have low iron nutrients and are below the RDA.

The data characteristics of the present study showed that the education level of parents was low. This education status can affect the incidence of anemia in schoolchildren. According to research by Tandirerung et al., (2013), parents with low education levels will affect the incidence of anemia in schoolchildren. The low education status would affect the variety and amount of nutrient intake consumed by the children.

Based on the present research, the results of the analysis showed that there was a significant relationship between iron intake and the incidence of anemia in schoolchildren in Musi Rawas Regency. The low iron intake would affect the growth and development of schoolchildren. In line with research by Wandini et al., (2017), there is a relationship between iron intake and the incidence of anemia in elementary-school children in the Punggur Lampung District. Similar to research by Jaelani et al., (2017) stated that there is a relationship between iron intake and the incidence of anemia and research by Arifin, (2013) found that there is a significant relationship between iron intake and the incidence of anemia. Low iron intake is caused by a mother's lack of control over her child's nutrition intake.

Anemia that occurs at elementary-school age has an impact on physical growth disorders, decreased endurance, decreased intelligence, poor learning achievement and concentration, and always looks lethargic, pale, and not enthusiastic Sirajuddin & Masni (2015). In line with the research conducted by Yanti et al. al., (2017), the incidence of anemia among schoolchildren was related to the learning achievement of children at SD Sonoageng because children suffering from anemia would experience impaired motoric growth, memory, and concentration, which have an impact on children's learning achievement.

V. Conclusion

Based on the results of the study, it can be concluded that there was a relationship between iron intake and the incidence of anemia in school-age children in Musi Rawas regency (p value 0.004) with an OR value of 6.198). Children who have low iron intake are 6.1 times more likely to suffer from anemia.

Based on the results obtained, it is recommended that the parents of respondents always provide good and balanced nutrition and always maintain environmental sanitation along with personal hygiene. The school could work together with the public health care provider to supply iron tablets to prevent anemia in the children.

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