ORAL

Breakfast Habits and it's Relation to Nutritional Status And Anemia Among Elementary School Children

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Abstract

This research aimed at analyzing the correlation between breakfast habits and nutritional status and Anemia among elementary school children. Seven hundred and ninety-eight elementary school children (ESC) were included in this cross-sectional study and was done in March until May 2017. The subjects were the fourth, fifth and sixth graders of public schools (SD Bertingkat Kelapa Lima 1, SD Inpres Bakunase) and private schools (SD Asumpta, SD GMIT Naioni, SDI Maulafa dan SDK Don Bosco 3). Breakfast habits data were collected by filling questionnaire; nutritional status was estimated by BMI/Age, Height/Age. Body weight and height of subjects were measured directly, and anemia status was estimated by the hemoglobin test. The frequency of breakfast is determined based on having breakfast regularly and no breakfast and the sample usually consume breakfast before 7 am. The contribution of big size family, gender and age in students were higher with regular breakfast. Blood hemoglobin levels of samples from those of regular breakfast were higher significantly ($p < 0.05$) than those who have not to breakfast. There was a significant positive relationship ($p < 0.05$) between blood hemoglobin levels and breakfast status. There was no significant relationship ($p > 0.05$) between the status of breakfast with nutritional status according to BMI/Age and Height/Age. However, there was a significant positive relationship ($p < 0.05$) between the family size and age with nutritional status according to H/A and family big size with nutritional status according to BMI/Age. Samples with good breakfast habits tend to have good hemoglobin levels.

Keywords: Breakfast Habit, Hemoglobin Status, Nutritional Status

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INTRODUCTION

School age children are investments as they will inherit the nation. The future condition depends on the children qualification. Indonesia like any other developing countries generally face four nutritional problems namely Protein Energy Deficiency (PED), Lack of Iodine problems, Insufficiency of Vitamin A, and Iron Nutritional Anemia (Kurniawan, 2006).

United Nations declares Sustainable Development Goals (SDGs) which include one of the development objectives is to promote healthy life and support for welfare fot each individual of all age. The main factor for reaching the aim is the quality of Human Resources which should be developed since childhood (Best et al., 2010)

Two factors influence the individual growth and development, i.e genetic and environmental factors. One of the later is Nutrition. Nutrition deficiency influence the physical growth, mental, productivity, educational achievement, and immune function. Quantitatively, growth can be seen from body weight, height, and nutritional status. While qualitatively it can be seen through brain development which in turn influence the achievement (Ikalor, 2013).

One of the efforts to improve nutritional quality is regular balance in-take pattern. Having breakfast before 9 am can provide 15-30% of daily nutrition needed for a healthy, fit, active and intelligent life (Hardiansyah, 2012). Riskesdas (2013) shows that nutritional status prevalence at the age 5-12 years are: 30.70% short, 11.2% thin, and 18.8% fat. Up to now, East Nusa Tenggara Province occupies the third highest prevalence position for shortest and thinnest status and the lowest for fattest status. Hardiansya dan Perdana (2013) state that 69.6% Indonesian children did not have recommended balanced breakfast (25%) of daily need.

Post phoning having breakfast can cause lack of energy in the morning time and thus increase the risk of malnutrition (Kleinman et al. 2002). While this will trigger excessive in-take on other meal time, especially at night, that cause obesity (Martin et al. 2000).

In Indonesia, Iron Nutrition Anemia prevalence on children 5—12

years reach 29% (Riskesdas 2013). Iron deficiency has great impact to babies and children in later days such as immune system disturbance, increasing illness number, mental development decline, low educational achievement as growth function disturbances has impact on children intelligent.

METHOD

This is a cross-sectional study and was carried out on 6 Elementary Schools in Kupang district. The research was conducted from March up to May 2017. Purposive sampling technique with inclusive criteria was used and covered the fourth, fifth, and the sixth graders who are all healthy, cooperative, and willing to be respondents of the study. The total number of the students is 798.

The primary data include breakfast habit, anthropometry (height and body weight), and hemoglobin values. Nutritional status is categorized into IMT/U (very thin, thin, normal, fat, and obese), Anemia status is classified as Anemia (Hb<12mg/dl) and Normal (Hb 12mg/dl). Beakfast habit is devided into always have in comparison to seldom have breakfast.

The data were analyzed by means of *Microsoft Excel 2013 and SPSS for Windows Versi 22.0 Programs*. All variables are described in terms of by variance technique. Multiple variance in terms of Spearman correlation and Mann Whitney test was used to find out the relation between breakfast habit to nutrition status and anemia and to know the differences among them.

RESULTS AND DISCUSSION

Children Characteristics

The research classifies children into two groups namely those who seldom have breakfast and the other are those who always have. There are 645 children participated in the study, 149 children do not regularly have breakfast and 496 ones are always do. Observed characteristics are gender, age, and number of siblings. Table 1 will clarify the distribution of children characteristics.

Table 1. Distribution of Children Characteristics

Characteristics	Regular Breakfast		No Breakfast		Total		*p-value*
	n	%	n	%	n	%	
Age (year)							
<10	148	29,8	25	16,8	173	26,8	
10 - 11	308	62,1	108	72,5	416	64,5	0,04
12 - 13	40	8,1	16	10,7	56	8,7	
Total	496	100	149	100	645	100	
Gender							
Male	253	51	84	56,4	337	52,2	
Female	243	49	65	43,6	308	47,8	0,02
Total	496	100	149	100	645	100	
Siblings (person)							
< 3	170	34,2	42	28,2	212	33	
3 - 5	288	58,1	95	63,7	383	59,4	
> 5	38	7,7	12	8,1	50	7,6	0,05
Total	**496**	**100**	**149**	**100**	**645**	**100**	

The recent study was carried out on elementary school children aged 8 -- 13 years old. Generally the children of this age are able to choose and decide their preferable food (Dewi, 2012). Knowing the children age is important in classifying the nutrition status (Supariasa et al, 2001). On the basis of frequency of having breakfast the table shows that there are 16.8% children under 10 years, 72.5% of 10-11 years, and 10.7% 12- 13 of age who seldom have breakfast. Children who always have breakfast comprise 62.1% and they are 10-11 years old. In terms of gender, most boys are found to always having breakfast (51.0%) as well as seldom have ones (56.4%).

Family size determines household needs. The more the family member the greater the needs will be. Almost half of the sample either those who regularly having breakfast (58.1%) or seldom have (63.7%) came from similar family size that is 3-5 members. There is a significant difference between them ($p>0.05$).

Ardiana et al (2012) state that the bigger the family size the more varies the consumption patterns will be, as each member will have different food preferences. The number of family

member is related to the household income and this in its turn influence the patterns of consumption. The parents have an important role in providing acces to food as well as establishing values and attitude toward food of their offsprings. The parents' eating habits will surely immitated by their children (Fila and Smith, 2006).

Table 2. Distribution of Children Nutrition Status

Nutrition Status	Breakfast		No breakfast		Total		*p-value*
	n	%	n	%	n	%	
Height/Age							
Very Short	23	4,6	5	3,4	28	4,4	
Short	101	20,4	28	18,8	129	20	
Normal	369	74,4	115	77,2	484	75	0,034
Tall	3	0,6	1	0,6	4	0,6	
Total	496	100	149	100	645	100	
BMI/Age							
Very Thin	16	3,2	13	8,7	29	4,5	
Thin	72	14,5	19	12,8	91	14,1	
Normal	340	68,5	92	61,7	432	67	0,041
Fat	40	8,1	16	10,7	56	8,7	
Obese	28	5,7	9	6,1	37	5,7	
Total	496	100	149	100	645	100	
Hemoglobin Level							
Normal	347	70	124	83,2	471	73	
Anemia	149	30	25	16,7	174	27	0,029
Total	**496**	**100**	**149**	**100**	**645**	**100**	

Breakfast frequency in this research refers to number of days taken in a week. According to Pereira et al (2011) breakfast frequency contributes in regulating appetite and preventing obese. Kleinman et al (2002) said that children who have breakfast daily have better performance in answering questions and thinking ability. Millimet (2010) stated that cancelling breakfast has a risk of gaining weight as it will trigger having more food on the following meal time.

Health Ministry (2004) stated that nutritional status reveals the balance of between intake and out of nutrients coming from consumed food. It is also a measure of one's nutrition achievement

which is indicated in terms body weight and height (Almatsier, 2005). In this research children nutrition status is calculated by z-score as recommended by WHO.

In Table 2 Children nutrition status is indicated by Height/Age. There are 3.4% very short children on those who have no regular breakfast in comparison to 4.6% of children who have breakfast regularly. On BMI/A indicator it is found that there are 8.7% very thin children of the ir-regular breakfast group in comparison to 3.2% of those who regularly have breakfast.

Hemoglobin Level indicator shows that 16.7% of no breakfast children are anemia while 30% of regular breakfast group have anemia.

The table also shows that subjects of normal nutrition status who did not have regular breakfast by BMI/A and H/A indicators comprise 61.7% and 77,2% respectively. Millimet (2010) stated that breakfast can lowering Body Mass Index, as well as over nutrition and obese. Breakfast role in indicating nutrition status is indefinable due to duration of observed breakfast habit that covers only 7 latest days of the study

Anemia on teenagers is influenced by lack of iron containing meals and shortage of bioavailability of consumed food. There are three phases of anemia deficiency process namely firstly lack of iron supply in liver manifested in lowering of ferritin serum level or plasma, secondly, further iron supply decreasing that cause transferrin saturated, and thirdly iron supply deficience so that iron circulation level decrease and leads to microcystic hypocromic anemia that cause the decrease of hemoglobin concentration within red blood cells (Gibson 2005).

Rampersaud et al. (2005), stated that teenagers who have daily breakfast have higher carbohydrate, protein, fiber intake and less intake of fats comparing to those who do not have breakfast. Girls who have decent breakfast also have relative higher intake (Matthys et al. 2006), While those who do not have breakfast will suffer deficiencies of Vitamin A, Vitamin B6, Calcium, Copper, Iron, Magnesium and Zinc (Ruxton & Kirk, 1997).

Relation between Breakfast Habits with Children Characteristics

Spearman Correlation Test in Table 3 shows that there is a significant correlation between number of siblings and nutritional status (p=0.00; r=0.044) by H/A and BMI/A (p=0,002; r=0,032).

Table 3. Variables Correlation to Nutritional Status

Variables	Nutritional Status (BMI/A)	
	rs	p
Age	0,034	0,188
No of Siblings	0,044	0,000
Breakfast Habit	0,126	0,710

Variables	Nutritional Status (H/A)	
	rs	p
Age	1,000	0,013
No of Siblings	0,032	0,002
Breakfast Habit	0,107	0,451

While *Spearman* Test shows no significant correlation between number of siblings and nutritional status (p>0.05). This result is in line with Fauziati's study (2007) which states that the more number of siblings the lower the quality of food consumed. In Fauziati (2007) the family size was 3 ± 2 persons. Family size is related to incomes which in turn influence the consumption pattern of the household. However, instead of big size family if the allocation of income on food is enough the family is still able to provide decent food.

Spearman Correlation test shows in Table 4 that there is no significant correlation between Breakfast Habits (p=0.451; r=0.107) and Nutritional Status for Height/Age and BMI/Age indicators (p=0,710; r=0,126). This finding is different to Millimet (2010) which said that breakfast can lower BMI, decreasing possibility of over Nutrition and Obese. On the other hand skip the breakfast can lessen the chance to decrease the body weight as it will trigger more food consume during the day. However this findings are similar to Williams (2007) and Adesola *et al.* (2014) which support that there is no significant relation between Breakfast Habit and Nutritional status. A child who has regular breakfast does not necessarily means he/she has good Nutritional status as the breakfast only contributes around 15-25% of daily nutrition needs. Besides, the children breakfast habit were observed only one week so the relation is unable to be decided

Table 4. Relation between Nutritional Status and Hemoglobin Level

Variabel	Hemoglobin Level	
	rs	p
Age	0,115	0,345
No of Siblings	0,052	0,216
Gender	0,045	0,988
BMI/Age	0,015	0,206
Height/Age	0,030	0,052
Breakfast Habit	1,000	0,001

Table 4 also shows that there is a significant correlation between breakfast habit and subject anemia status. It is in line with Jackson et al. (2016) which stated that there is a positive relation between breakfast and iron status. Hence, the iron status is measured by means hemoglobin level and ferritin serum. Escott-Stump & Mahan (2008) said that breakfast containing animal protein can act as iron enhancer. Heme Iron absorption in cattle food is twice much better than non-heme iron. The assumed factor that can increase iron absorption are MPF (meat, poultry, and fish) because during the disgestion amino acid and polypeptide are released and then combine with non-heme iron and become dissolved compound ready to be absorbed by intestines. While vegetables and fruits are food group which source of Vitamin C and non-heme iron enhancer and therefore help iron absoption within food that contain iron non-heme (Hurrell & Egli 2010)

CONCLUSION AND SUGGESTIONS

Conclusion

Most of the children who either have regular breakfast or those who did not are coming from ordinary family. Their age around 10—11 years old. More boys have breakfast regularly than the girls. There is not much difference of nutritional status between children who always have breakfast and then those who seldom have.

The Mann-Whitney test shows that there is a difference in hemoglobin level between sample who have regular breakfast and those who do not. However, no difference is found between both group in terms of Height/Age and BMI/Age indicators.

Spearman correlation rank test shows that there are differences between breakfast habit and hemoglobin level, number of siblings and nutrition status in terms of BMI/Age and Height/Age

indicators, Age and Nutrition status by Height/Age indicator. No difference is found between children age, breakfast habit and Nutritional status.

Suggestions

Providing meals that have good quality and in appropriate amount tend to help children get better learning achievement. Therefore, parents and family support toward having regular breakfast are important. Moreover, educating parents is paramount especially concerning choosing various types good quality breakfast in accordance to balanced nutrition measures. Besides, teachers are suppose to inform and remind students on the importance of regularly having complete and nutritional breakfast.

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