

# BREAKFAST HABITS AND NUTRIENT ADEQUACY LEVEL OF SNACKS IS CORRELATED WITH NUTRITION STATUS AMONG ADOLESCENT IN SMPN 1 TUBAN

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## ABSTRACT

Adolescent often skip breakfast, so snacks are usually used as substitute for breakfast at school. Some snacks have unbalanced nutrient content. An imbalance in nutrient intake can affect nutritional status of adolescents. The purpose of this study was to analyze correlation between breakfast habits and nutrition adequacy level of snack with nutritional status of adolescents. The study design used in this study was cross sectional. The sampling technique was proportional random sampling with total sample of 77 students. Data on breakfast habits were obtained through questionnaires, while data on the adequacy level of snacks intake was obtained through 2x24 hours food recall. The correlation test used was spearman correlation. The results showed that there were correlation between breakfast habits, the adequacy level energy, protein, fat, and carbohydrate of snacks with nutritional status. Adolescent with poor breakfast habits and high adequacy of nutritional levels of snacks tend to have more obesity nutritional status.

**Keywords:** breakfast habits, nutrient adequacy level, nutritional status, snack

## INTRODUCTION

Adolescence is a period of biological, social and cognitive changes. (WHO, 2015). Adolescents undergo physical changes with varying duration. Nutritious intake is needed by adolescents to increase physical growth and body development. An unbalanced nutritional intake will lead to over or under nutritional status (Adriani, 2012).

Nutritional status in early adolescence must be considered in order to achieve optimal nutritional status to support adolescent growth in the future. Indicator in measuring nutritional status in 13-15 years age group use the results of anthropometric assessments of body weight and height, which are then displayed in body mass index according to age (BMI / U) (Balitbangkes, 2014). Based on the 2018 Basic Health Research data related to nutritional status in 13-15 years age group, it shows an increase in prevalence of overnutrition and obesity. Nationally, in 2013 over nutrition and obesity in 13-15 years age group showed prevalence of 10.8%. In 2018, over nutrition and obesity in 13-15 years age group increased to 16%. A similar increase also occurred in East Java Province, in 2013 over nutrition and obesity in 13-15 years age group showed prevalence of 11.9% and increased to 19.3% in 2018.

Good nutritional intake in adolescence is needed to replace malnutrition experienced during childhood and is needed to meet physical growth. (WHO, 2015). Adolescents are prone to change in behavior and lifestyle, especially changes in eating behavior. Irregular eating patterns are often carried out without paying attention to nutritional balance (Adriani, 2012). One of the causes of children being overweight is their habit of not eating breakfast which leads to an increase in frequency of consumption of snack foods that are high in calories, sugar and fat (Steiner, 2012). In addition, children who are accustomed to not having breakfast and not being balanced with intake increment will be at risk of malnutrition. The nutritional status of adolescents who usually eat breakfast are better than those who skip breakfast. Adolescents who have good breakfast consumption habits consume fewer calories in a day and are less likely to be obese (Rampersaud, 2005).

Adolescents are very difficult to find time to sit down to eat and prefer to skip meals or just snacking (Khan, 2009). Energy fulfillment of adolescents while at school are obtained by consuming snack food from stall, canteen, cafeteria, and snacks sold by mobile trader around school environment (BPOM, 2013). Street food is a form

of food or drink that is served by street vendor for sale in public place and can be consumed directly by buyer. (Food and Agricultural Organization, 2009). School age children have a tendency to eat meal or snack according to what they want. Other factors that can affect include environment, pocket money, peers, and parents (More, 2014). Results of calculating calorie intake in adolescents show that 43% of calories are obtained only from sugar addition in snack foods (Khan, 2009). The more variety of snack foods sold by traders will encourage the habit of street food consumption for school children, especially during school break hours.

According to Basic Health Research 2013, the prevalence of obesity in 13-15 years age group in Tuban district exceeds provincial prevalence of 8.9% and national prevalence of 8.3%. State Junior High School 1 Tuban is one of school located in East Java. The location of school, which is right in the middle of the city, makes it easier for students to access street food sold by local traders. Based on the results of preliminary study conducted to determine children's snack consumption, it is known that 68.8% students prefer to buy snack on roadside, stall, and school canteen rather than bringing lunch from home, 65.2% of teenagers prefer to eat fried foods such as rolled omelettes, pentol and others, 55.1% of adolescents consume drinks with flavor additives more often, and 63.3% of adolescents do not read the nutritional content on packaging label when buying snack food. Based on the explanation of these identified problem that has been mentioned, researcher conducted a study on the relationship between breakfast habits and the level of nutritional adequacy of snack with nutritional status of adolescents at SMPN 1 Tuban.

## METHOD

Study design used in this study was cross sectional. Population in this study were students of SMPN 1 Tuban with a total of 380 students. The chosen subjects were students of class VII and VIII of SMPN 1 Tuban. Based on Lemeshow formula, the subjects were 77 students (Lemeshow, 1997). Technique of taking the subjects in this study was used proportional random sampling until obtained

total of class VII 38 students and class VIII 39 students. Students need to met inclusion criteria include not having verbal or speech impairment, not having dietary restrictions and not fasting during study.

Primary data were obtained through anthropometric assessments to determine adolescent nutritional status. Digital scales with an accuracy of 0.1 kg are used to measure body weight and a microtoise with an accuracy of 0.1 cm is used for measuring height. Primary data in this study were obtained through interviews with questionnaire on respondent characteristics (age, gender, pocket money for snacks) and parental characteristics (parental education, parental occupation, total parental income). Pocket money for respondent's snacks is categorized into 4 quartiles, which is K1, K2, K3, and K4. Parental education is categorized into primary level education (if have completed primary school / junior high school / equivalent), secondary level education (if have completed senior high school / equivalent) and high level education (if have completed diploma / university). Parent's income is classified into 4 quartiles, that is K1, K2, K3, and K4. Breakfast habits data were obtained through interviews with a questionnaire. Breakfast habits are grouped into two categories, that is good breakfast habits and poor breakfast habits. Respondents were entered category of good breakfast habits if they meet three criteria, namely breakfast every day (7x / week), breakfast before 09.00, and breakfast energy intake > 15% RDA (Soetardjo, 2011; Hardinsyah, 2012). If one of these three criteria cannot be met, respondent is categorized as having poor breakfast habit. The level of nutritional adequacy (energy, protein, fat, and carbohydrates) of snack food was obtained through a 2x24 hours food recall interview. The application used to convert the interview results is Nutrisurvey, after that the results are compared with nutritional adequacy rate (RDA). The level of adequacy is divided into three, that is low (<80% RDA), moderate (80% -100% RDA), and high (> 100% RDA). Determination of nutritional status in adolescents using BMI / Age indicator. The nutritional status of BMI / Age was categorized into severe undernutrition (<-3 SD), undernutrition (-3 SD to <2 SD), normal (-2 SD to 1 SD), obese (> 1 SD to 2 SD), and obesity (> 2 SD).

Test used to find the correlation between breakfast habits and level of nutritional adequacy of snacks with nutritional status was Spearman correlation test. Research ethics was obtained through approval from the Health Research Ethics Commission (KEPK) Faculty of Nursing Universitas Airlangga with Certificate Number 1357-KEPK.

## RESULT AND DISCUSSION

Table 1 shows 46.8% of respondents were 13 years old. This age group is categorized as early adolescent who is happy with new things, has the courage to face various risks, has broad interests and is not afraid of being wrong (Direktorat PLP, 2004).

The results of the study based on gender showed that 58.4% of respondents were female. At the age of 13-15 years, sex differences can affect the respondents nutritional intake needs. This is adjusted with differences in nutritional adequacy rates between men and women. Based on 2019 Indonesian RDA, the nutritional adequacy rate for men is greater if it is equalized to the nutritional adequacy level for women in the same age.

In terms of the amount of pocket money for snacks, more than half of respondents received pocket money for snacks that were in the range of Rp. 5,000 to Rp. 10,000. The amount of pocket money for snacks is one of the many indirect factors that have effect on nutritional status. The amount of pocket money affects the purchasing

**Table 1.** Respondent Characteristics

Respondent Characteristics	n	%
<b>Age</b>		
13 years	37	46.8
14 years	34	44.2
15 years	7	9.0
<b>Sex</b>		
Male	32	41.6
Female	45	58.4
<b>Pocket Money for Snacks</b>		
Rp. 5.000 - 10.000	44	57.1
> Rp. 10.000 - 15.000	23	29.9
> Rp. 15.000 - 20.000	8	10.4
> Rp. 20.000 - 25.000	2	2.6

power of respondents towards various snack choices (Rosyidah, 2015).

### Parent Characteristics

Based on Table 2, more than half of respondent's parents have education level in the middle category, that is 57.1%. Parents with a higher level of education have a high level of concern for the quality and nutritional content of served food, so that the nutritional needs of family can be fulfilled properly (Permaesih, 2005).

The largest respondent's total family income is included in the 2nd quartile category with an income range from Rp. 2,500,000 to less than Rp. 4,000,000. As much as 79.2% of respondents have an income level that has reached even higher when compared to the district minimum wage in Tuban for 2019 of Rp. 2,233,641.85. The amount of family income can influence family consumption patterns. Sufficient family income can increase the allocation of daily food purchases, so that needs can be fulfilled in terms of both quantity and quality.

### Breakfast Habits

Table 3 shows that almost half of the respondents had breakfast in the category always (7x / week), that is 46.8%. The less frequent

**Table 2.** Parent Characteristics

Parent Characteristics	n	%
<b>Father Education</b>		
Primary Level	9	11.7
Secondary Level	44	57.1
High Level	24	31.2
<b>Mother Education</b>		
Primary Level	7	9.1
Secondary Level	44	57.1
High Level	26	33.8
<b>Parents Total Income</b>		
<Rp. 2.500.000	16	20.8
Rp. 2.500.000 - <Rp. 4.000.000	22	28.6
Rp. 4.000.000 - <Rp. 7.000.000	18	23.4
≥ Rp. 7.000.000	21	27.2
<b>Income Level</b>		
< UMK Tuban	16	20.8
≥ UMK Tuban	61	79.2

**Table 3.** Breakfast Habit Criteria

Criteria	n	%
<b>Breakfast Habit Criteria</b>		
<b>Frequency</b>		
Rarely (<3x/week)	31	40.2
Sometimes (4-6x/week)	10	13.0
Always (7x/week)	36	46.8
<b>Breakfast Time</b>		
< 09.00 am	36	46.8
≥ 09.00 am	41	53.2
<b>Energy Intake</b>		
<15% RDA	40	51.9
≥15% RDA	37	48.1
<b>Breakfast Habit Category</b>		
Good	27	35.1
Poor	50	64.9

breakfast, the greater the increase in nutritional status (Watanabe, 2014). This is in line with research of Kral et al (2011), frequency of breakfast if done regularly will not lead to excess food consumption at the next meal.

Breakfast is food consumption that is done before 09.00 am. based on the results of the study, 53.2% of respondents consumed breakfast at ≥ 09.00 am. This habit doesn't included into category of good breakfast habits. Breakfast time limits are required to collect data regarding breakfast consumption (Borton et al. 2005).

A healthy breakfast is recommended to meet around 15-30% of RDA. The results showed that more than half of respondents had energy intake <15% RDA, that is 51.9%. Foods that are consumed to replace the unmet energy adequacy usually have higher energy density, simple carbohydrates and have higher fats (Nurul, 2015; Kant, 2005).

In table 3, it is found that there are 64.9% respondents categorized as poor breakfast habits, this occurs due to the three criteria did not fulfilled. Respondents who have habit of having breakfast for 7 times / week do not all meet energy intake needs of more than 15% RDA. In addition, respondents whose breakfast intake was sufficient (> 15% RDA), not all ate breakfast before 09.00. Based on the results of in-depth interview, it was found that the reasons respondents missed breakfast because not lust or not hungry, fear of being late or late, not having time to cook, and fear of stomach

**Table 4.** Adequacy Nutrients Level of Respondent's Snack

Nutrient Adequacy	n	%
<b>Energy</b>		
Low	28	36.4
Moderate	32	41.6
High	17	22.1
<b>Protein</b>		
Low	21	27.3
Moderate	19	24.7
High	37	48.1
<b>Fat</b>		
Low	16	20.8
Moderate	28	36.4
High	33	42.9
<b>Carbohydrate</b>		
Low	19	24.7
Moderate	26	33.8
High	32	41.6

pain. The usual solutions when skipping breakfast include buying snacks or packaged rice in the school canteen. In addition, respondents usually bring milk or bread from home.

#### Adequacy Nutrition Level of Snack

The nutritional adequacy level of snack is presented in Table 4, showing that 41.6% of respondents' energy sufficiency level is in the sufficient category. Nearly half of the respondents had excess protein adequacy level that is 48.1%. As much as 42.91% of respondents has high fat adequacy level. Carbohydrate adequacy level were high in 41.6% respondents. Snacks that contain high fat can contribute to increase the risk of overweight or obesity in children (Steiner, 2012). Excess consumption of street food can cause a decrease in appetite. Low and long-lasting appetite can affect nutritional status (Kelishadi, et al. 2017).

#### Variable Correlation

Based on Table 5, it can be seen the correlation between breakfast habits and nutritional status with a p-value of 0.000. The correlation value of this relationship is negative, which shows the opposite direction of the relationship, the is the less good the breakfast habit, the higher the nutritional status.

In this study, it was found that respondents with nutritional status were lean (2.6%), fat (14.4%) and obese (12.9%) were categorized as having poor breakfast habits.

Breakfast habit is one factor that can affect nutritional status of adolescents. Breakfast is very important to be eaten as a supply of fuel for nutritional needs in the morning. The habit of skipping breakfast can be a risk factor for health problems. The disadvantages of leaving breakfast include reducing cognitive function in children, reducing children's motivation and enthusiasm for activities, deficiency of macro and micro nutrient which can have a negative effect on physical, mental and health condition (Mhurchu, et al., 2010). The habit of leaving breakfast can be one of the causes for the body to experience nutritional deficiencies that cannot be replaced through other meal times (Rampersaud, 2005). Body lacks glucose as a result of skipping breakfast so that body breaks down energy supplies from fat tissue (Chitra, 2007). If this happens for a long time and continues to process it can result to malnutrition.

Based on Table 5, there is a correlation between level of energy adequacy ( $p = 0.000$ ), protein ( $p = 0.001$ ) fat ( $p = 0.000$ ), and carbohydrates ( $p = 0.000$ ) of snack with nutritional status. The correlation value of this relationship is positive, which shows the direction of an unidirectional relationship, that is the higher the level of energy, protein, fat and carbohydrates adequacy from snack food, the higher the nutritional status. In line with research that has been conducted, a correlation was found between fat content of snack and nutritional status (Dini, 2017; Nuryani, 2018). Snack intake is an alternative to fulfill nutrition for individuals who have limited main food consumption and have not met RDA (Syafitri, 2009). Consumption of snack foods that are high in fat and have a high energy density (such as chocolate, donuts, mini terang bulan, martabak, egg rolls, brains, cireng, etc.) causes children not to feel full quickly so it tends to increase the amount of consumption which ultimately has an impact on nutritional status (Jannah, 2017).

**Table 5.** Variable Correlation

Variable	Nutritional Status								Total		p-value	r
	Underweight		Normal		Overweight		Obese		n	%		
	n	%	n	%	n	%	n	%				
<b>Breakfast Habits</b>												
Good	0	0.0	27	35.1	0	0.0	0	0.0	27	35.1	0.000*	-0.390
Poor	2	2.6	27	35.1	11	14.3	10	13.0	50	64.9		
<b>Adequacy Level Energy</b>												
Low	2	2.6	17	22.0	1	1.3	0	0.0	20	25.9	0.000*	0.594
Moderate	0	0.0	36	46.8	10	13.0	0	0.0	46	59.8		
High	0	0.0	1	1.3	0	0.0	10	13.0	11	14.3		
<b>Protein</b>												
Low	2	2.6	33	42.9	5	6.5	0	0.0	40	52.0	0.001*	0.362
Moderate	0	0.0	19	24.6	6	7.8	0	0.0	25	32.4		
High	0	0.0	2	2.6	0	0.0	10	13.0	12	15.6		
<b>Fat</b>												
Low	2	2.6	17	22.1	0	0.0	0	0.0	19	24.7	0.000*	0.464
Moderate	0	0.0	34	44.1	11	14.3	0	0.0	45	58.4		
High	0	0.0	3	3.9	0	0.0	10	13.0	13	16.9		
<b>Carbohydrate</b>												
Low	2	2.6	24	31.2	3	3.9	0	0.0	29	37.7	0.000*	0.587
Moderate	0	0.0	30	38.9	8	10.4	2	2.6	40	51.9		
High	0	0.0	0	0.0	0	0.0	8	10.4	8	10.4		

Based on table 5, it is found 12.9% of respondents that have obese status, have poor breakfast habits, but the level of energy, protein and fat in their snacks included in excess category. This shows that respondents with obesity nutritional status consume excess snack food due to poor breakfast habits. In line with the findings of Mariza, et al. (2013), there is a correlation between breakfast habits and snack habits in children. The more often children skip breakfast, 1,5 times greater risk of children for taking snacks. In addition, it was found that there was a correlation between the habit of consuming street food and nutritional status. The habit of consuming street food has a seven-fold higher risk of experiencing an increase in nutritional status which leads to overnutrition and obesity.

## CONCLUSION

Breakfast habit and nutritional adequacy level of snack were related to nutritional status. Respondents with poor breakfast habits and high adequate nutrition levels of snack were tend to have obese nutritional status. It is expected that respondents can improve the quality of their breakfast habits by fulfilling the nutritional intake of 15-30% of daily needs and consuming breakfast every day before 9 am. With the fulfillment of nutritional needs of breakfast, the intake of street food is reduced so that it can achieve optimal nutritional status.

## ACKNOWLEDGEMENT

Author would like to thank SMPN 1 Tuban for allow to conduct research at SMPN 1 Tuban, grade VII and VIII students who volunteered to become respondents, counseling teachers who had taken the time to accompany during data collection.

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