Nutritional Knowledge of Students on Consumption of Vegetables and Fruits and their Relationship with Micronutrient Intake

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Among Primary School of SDN 192 located in Singengu Village Kotanopan District, is a school that has a low student will in consumption of vegetables and fruit. This study aims to know the direct and indirect relationship of students’ nutritional knowledge with micronutrient intake through vegetable and fruit consumption at primary school students SDN 192 Kotanopan District. The type of research used is cross-sectional design. The sample in this study is determined by taking the entire population to be the subject of research, as many as 93 students. This research was conducted at Singengu Village in March to April 2018. The results show that the students’ nutritional knowledge does not have a direct relationship with the consumption of vegetables and fruit of students. Students’ nutritional knowledge has a direct relationship with vitamin A intake of t count = 1.89. Consumption of vegetables and fruits do not have a direct relationship with the intake of micronutrients. The researcher’s suggestion in this research are to create nutritional awareness among students about the content of vitamins and minerals in vegetables and fruits. Conducting counseling in schools about the benefits, content, and importance of vegetable and fruit consumption and provide healthy canteen that sell cooked vegetables and fruits.

Keywords: Students nutrition knowledge, consumption of vegetables and fruits, intake of micronutrients

INTRODUCTION

Healthy paradigm is one of the pillars of Healthy Indonesia. The implementation of a healthy paradigm is implemented through two efforts, namely family approach and cross-sectoral efforts through the Healthy Living Community Movement (PHBS).

PHBS has 3 main activities namely, checking health in a routine manner, physical activity, and consuming vegetables and fruit (Ministry of Health, 2018).

Indonesia has a variety of local vegetables and fruits that are of good nutritional value for health, ranging from spinach, kale, sweet potatoes, bananas, guava, apples, and so on. But in reality, the people of Indonesia are classified as consuming vegetables and fruits.

Data from Research and Development Center of the Ministry of Agriculture (2013) shows Indonesia is the country with the lowest fruit consumption in Asia region. China became the largest country consuming fruit with the achievement of more than 250 kilograms per fruit capita per year followed by Singapore and Vietnam, then Kamboja. Indonesia is not up to 50 kilograms per capita per year. Consumption of Indonesian fruits is only 34.55 kilograms per capita per year.

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Vegetable consumption of Indonesian people is only 40.35 kilograms per capita per year. The Food and Agriculture Organization of United Nations (2014) states that consumption is ideal for fruit of 73 kilograms per capita per year and vegetables is 91.25 kilograms per capita per year.

WHO recommends to consume vegetables and fruits as much as 400 grams per day or as much as 3 to 5 servings a day. Micronutrients (vitamins and minerals) are widely contained in vegetables and fruits are often overlooked, but nutrients are important for the body. Micronutrients have a myriad of health benefits that are still many who do not know it well (Ongko, 2015).

Consumption of vegetables and fruits that have not been sufficient to affect the supply of vitamins and minerals needed by the body. The results of Sriwahyuni, et al (2013), stated that as many as 15 (93.7%) of respondents categorized often consume fruits and vegetables, have adequate intake of vitamin A, and there are 35 (70%) respondents rarely consume fruits and vegetables that have vitamin A. A total of 21 (80.8%) respondents who frequently consume fruits and vegetables, have adequate vitamin C intake, and 31 (77.5%) of respondents rarely consume fruits and vegetables, have less vitamin C intake. There are 36 (54.5%) respondents who rarely consume vegetables and fruits have iron intake, zinc and calcium are less.

State Primary School 192 located in Singengu Village Kotanopan District, is a school that has a low student will on consumption of vegetables and fruit.

The results of preliminary survey of 50 primary school students in SDN 192 Kotanopan District, interviewed about consumption behavior of vegetables and fruits with guide questionnaire, found that 20 (40%) students consume vegetables every day and 30 (60%) students do not consume vegetables every day, 18 students (19.36%) consumed fruit every day and 32 students (64%) did not consume fruit every day. The vegetables consumed by the students are spinach, kangkung and leaves mashed yams and fruits are consumed by the students are the citrus, salak, starfruit, guava and apples.

Knowledge is a very important domain to shape one’s actions, because knowledge-based behaviors will be better than those not based on knowledge (Ministry of Health, 2014).

Therefore, this research needs to be done in Kotanopan District to analyze the relationship of nutritional knowledge of students with consumption of vegetables and fruits as well as its relation with micronutrients intake in primary school students in SDN 192 Kotanopan District Year 2018.

**AIMS**

1. Knowing the direct relationship of nutritional knowledge of students with the consumption of vegetables and fruit in primary school students SDN 192 Kotanopan District.
2. Knowing the indirect relationship of nutritional knowledge of students with micronutrients intake through vegetable and fruit consumption in primary school students SDN 192 Kotanopan District.

**RESEARCH METHODS**

**Types of research**

The type of research used in this research is analytic observational with cross sectional study design.

**Location and Time of Study**

The research was conducted at SDN 192 Kotanopan Sub-district, Mandailing Natal Regency with research time from January 2018 until April 2018.

**Population and Sample**

1. **Population**

   Population in this research is all primary school student of SDN 192 Kotanopan District that is 93 people.

2. **Sample**

   The sample in this study is determined by taking the entire population to be the subject of research, as many as 93 students.

**Method of collecting data**

Primary data were collected directly through interviews and observations including students' nutritional knowledge data and micronutrients intake data on primary school students SDN 192 Kotanopan District.

a. Data of students’ nutritional knowledge were collected using questionnaire.

b. Data of intake of micronutrients of students obtained by conducting interview with food consumption survey method that is food recall 2 x 24 hours to responder.

Secondary data was obtained from the report of UPT Head of Education Office of Kotanopan Sub-district about the number of students in SDN 192 Kotanopan District, and reference of books and research results related to the research.
Variables and Operational Definition

The variables in this study consist of exogenous variable (nutrition knowledge of students), intervening variable (consumption of vegetables and fruit) and endogenous variable (micronutrients).

The operational definitions of the research variables are as follows:
1. Nutrition knowledge of students is everything that students know about nutrition in vegetables and fruits.
2. Micronutrients is vitamin (vitamin A, vitamin B6, and vitamin C) and minerals (magnesium and iron) consumed by respondents in one day.

Measurement Method

The method of study in this study is as follows:

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RESULTS AND DISCUSSION

Analysis Results

Direct influence of exogenous variable with intervening variable and intervening variable with endogenous variable or indirect influences of exogenous variables with endogenous variables through the intervening variable, a path analysis test was conducted using LISREL 8.80 (Student).

Correlation Analysis

Correlation analysis is done to see whether there is relationship between exogenous variable with intervening variable, intervening variable with endogenous variable and exogenous variable with endogenous variable.

Direct Influence of Student Nutrition Knowledge with Consumption of Vegetables and Fruits

The calculation result obtained by coefficient value of \( p_{54} = 0.09 \) with \( t_{count} = 0.21 \). The value on the table with the significance level of 0.05 and the number of respondents \( n = 93 \) obtained \( t_{table} = 1.67 \) so that \( t_{count} \) is smaller than \( t_{table} \), then there is no direct influence of students nutritional knowledge with consumption of vegetables and fruit.

Research shows that students' nutritional knowledge does not have direct influence with the consumption of vegetables and fruit of students. The high level of consumption of vegetables and fruits of students is not influenced by their nutritional knowledge.

This research is in line with Putra's (2016) research on factors related to fruit and vegetable consumption in primary school children (case study on SDN Sekaran 1 and SDN PekundenSemarang), the result of chi square statistic test between nutrition knowledge of children with...
fruit and vegetable consumption at SDN Sekaran 1 obtained p value = 0.605 (p value greater 0.05) and in Pekunden SDN obtained p value = 1.000 (p value greater 0.05) it can be concluded that there is no significant relationship between students’ nutritional knowledge with the consumption of fruits and vegetables in students at SDN Sekaran 1 and SDN Pekunden.

Researchers assume that the knowledge of fruits and vegetables, especially about the benefits and recommended consumption of fruits and vegetables can increase the consumption of fruits and vegetables in children. Knowledge of fruits and vegetables can increase awareness and skill in preparing fruits and vegetables for consumption so that it will increase the amount of fruit and vegetable consumption in children. When the child knows about the amount of fruits and vegetables that must be consumed then the child will be aware and interested to try mengonsumsinya so increase the consumption of fruits and vegetables.

Direct Influence of Student Nutrition Knowledge with Micronutrients Intake

Micronutrients intake consists of vitamin A, vitamin B6, vitamin C, magnesium and iron

Direct Influence of Student Nutrition Knowledge with Vitamin Intake

The results of calculation of vitamin A intake obtained coefficient value p64 = -1.26 with the value of t-count = 1.89. The value of t-table with the significance level of 0.05 and the number of respondents (n) = 93 obtained t-table = 1.67 so that t-count is bigger than t-table, hence there is direct influence of nutrition knowledge of student with vitamin A intake.

The result of calculation of vitamin B6 intake obtained coefficient value of path p74 = 0.0 with t-count value = 0.0. The value on the t-table with the significance level of 0.05 and the number of respondents (n) = 93 obtained t-table = 1.67 so that t-count is smaller than t-table, hence there is no direct influence of nutritional knowledge of students with vitamin B6 intake.

The results of calculations on vitamin C intake obtained coefficient coefficient p84 = -0.34 with t-count = 0.21. The value on the t-table with the significance level of 0.05 and the number of respondents (n) = 93 obtained t-table = 1.67 so that t-count smaller than t-table, then there is no direct influence of nutritional knowledge of students with vitamin C intake.

Research shows that the nutritional knowledge of students has a direct influence with vitamin A. The intake of high intake of vitamin A is influenced by the level of nutritional knowledge of students. The amount of influence of students’ nutritional knowledge directly affects vitamin A intake by t-count = 1.89. In contrast to the intake of vitamin B6, and vitamin C. Nutrition knowledge of students does not have a direct influence with the intake of vitamin B6 and vitamin C students.

Higher level of nutritional knowledge is not necessarily followed by the better consumption of vegetables and fruit of students. So not necessarily students with high knowledge can understand and apply well the knowledge in everyday life (Khomsan,2000)

Direct Influence of Student Nutrition Knowledge with Mineral Intake

Result of calculation to magnesium intake got coefficient value of path p94 = -0.89 with t-count value = 0.87. The value on the t-table with the significance level of 0.05 and the number of respondents (n) = 93 obtained t-table = 1.67 so that t-count is smaller than t-table, hence there is no direct influence of nutritional knowledge of students with vitamin magnesium intake.

The calculation result of iron intake obtained coefficient value of p104 = 0.0 with t-count = 0.04. The value of t-table with the significance level of 0.05 and the number of respondents (n) = 93 obtained t-table = 1.67 so that t-count is smaller than t-table, hence there is no direct influence of nutritional knowledge of students with iron intake.

Research shows that nutritional knowledge does not have a direct effect on the students’ magnesium and iron intake. High and low intake of magnesium and iron students are not influenced by students’ nutritional knowledge. This research is in line with research of ramadhani and hidayati (2017) about factors influencing consumption of vegetables and fruits in adolescent girls SMPN 3 Surakarta obtained value p = 0.347, meaning p value greater than 0.05, there is no direct influence of student nutrition knowledge with mineral intake of students from consumed vegetables and fruits.

Knowledge is a very important factor for shaping one’s actions. Knowledge based on a proper understanding of vegetables and fruits, will foster the expected consumption of vegetables and fruits. If the student’s knowledge is lacking in nutrition, then efforts made to maintain the balance of food consumed with the required will be reduced and lead to less nutritional problems or more nutrients (Notoatmodjo, 2003).

Direct Influence of Consumption of Vegetables and Fruits with Micronutrients Intake

Micronutrients intake consists of vitamin A intake, vitamin B6, vitamin C, magnesium and iron.

Direct Influence of Consumption of Vegetables and Fruits with Vitamin Intake
The results of calculation of vitamin A intake obtained coefficient value \( p32 = -0.33 \) with \( t \) count = 0.46. The value at \( t \) table with the level of significance 0.05 and the number of respondents (\( n \)) = 93 obtained \( t \) table = 1.67 so \( t \) count is smaller than \( t \) table, then there is no direct influence of consumption of vegetables and fruits with vitamin A.

The results of calculation of vitamin B6 intake obtained coefficient value path \( p42 = 0.0 \) with \( t \) count = 0.0. The value on the \( t \) table with the significance level of 0.05 and the number of respondents (\( n \)) = 93 obtained \( t \) table = 1.67 so that \( t \) count is smaller than \( t \) table, then there is no direct influence of consumption of vegetables and fruits with vitamin B6 intake.

The result of calculation of vitamin C intake obtained coefficient value of path \( p52 = -0.02 \) with \( t \) count = 0.05. The value of \( t \) table with the significance level of 0.05 and the number of respondents (\( n \)) = 93 obtained \( t \) table = 1.67 so \( t \) count is smaller than \( t \) table, then there is no direct influence of consumption of vegetables and fruits with vitamin C intake.

Research shows that consumption of vegetables and fruits does not have a direct influence with the intake of vitamin A, vitamin B6, and vitamin C students. This research is in line with the research of Endrika (2015) about the adequacy of vegetable and fruit consumption in students of SMAN 1 Kuantan Hilir, the results obtained that consumption of vegetables and fruits do not have a direct influence with vitamin A.

Factors that affect the adequacy of vitamin A intake from fruits and vegetables are family income. Research conducted by Aswatini, et al (2008) in Lampung mentioned that to consume the fruit obtained by buying, the type of fruit is only in consumption if you have excessive money because the price for fruits is quite expensive.

**Direct Influence of Consumption of Vegetables and Fruits with Mineral Intake**

The calculation result of magnesium intake obtained coefficient value of path \( p62 = 0.11 \) with \( t \) count = 0.21. The value on the \( t \) table with the significance level of 0.05 and the number of respondents (\( n \)) = 93 obtained \( t \) table = 1.67 so that \( t \) count is smaller than \( t \) table, then there is no direct influence of consumption of vegetables and fruits with magnesium intake.

The calculation result of iron intake obtained coefficient value of path \( p72 = 0.0 \) with \( t \) count = 0.01. The value of \( t \) table with the significance level of 0.05 and the number of respondents (\( n \)) = 93 obtained \( t \) table = 1.67 so \( t \) count is smaller than \( t \) table, so there is no direct influence of consumption of vegetables and fruits with iron intake. This research shows that consumption of vegetables and fruits does not have a direct effect on the students’ magnesium and iron intake. High and low mineral intake of students is not influenced by the consumption of vegetables and fruit students.

**Indirect Effect of Student Nutrition Knowledge with Micronutrients Intake**

Micronutrients intake consists of vitamin A, vitamin B6, vitamin C, magnesium and iron.

**Indirect Effect of Student Nutrition Knowledge with Vitamin Intake**

The results of calculation of vitamin A intake obtained coefficient value \( p64-5 = 0.0 \) with \( t \) count = 0.05 and \( X5 \) to \( X6 \) of 0.0. Thus the indirect effect \( X1 \) to \( X6 \) through \( X5 \) \( p71-5 = 0.0 \) with \( t \) count = 0.15. The value of \( t \) table with significance level of 0.05 and the number of respondents (\( n \)) = 93 obtained \( t \) table = 1.67 so that \( t \) count is smaller than \( t \) table, hence there is no indirect influence of nutrition knowledge of students with vitamin A intake.

The result of calculation of vitamin B6 intake obtained coefficient value of path \( p74-5 = 0.0 \) with \( t \) count = 0.05 and \( X5 \) to \( X7 \) equal to 0.0. Thus the indirect effect \( X1 \) to \( X7 \) through \( X5 \) \( p71-5 = 0.0 \) with \( t \) count = 0.0. The value of \( t \) table with significance level of 0.05 and the number of respondents (\( n \)) = 93 obtained \( t \) table = 1.67 so that \( t \) count is smaller than \( t \) table, hence there is no indirect effect of nutrition knowledge of student with vitamin B6 intake.

The result of calculation of vitamin C intake obtained coefficient value of path \( p84-5 = 0.0 \) with \( t \) count = 0.05 and \( X5 \) to \( X8 \) of 0.0. Thus the indirect effect \( X1 \) to \( X8 \) through \( X5 \) \( p84-5 = 0.0 \) with \( t \) count = 0.01. The value of \( t \) table with significance level of 0.05 and the number of respondents (\( n \)) = 93 obtained \( t \) table = 1.67 so that \( t \) count is smaller than \( t \) table, hence there is no indirect influence of nutritional knowledge of students with vitamin C intake.

Research shows that students' nutritional knowledge does not have an indirect effect with the intake of vitamin A, vitamin B6 and vitamin C students. High intake of vitamin intake is not influenced by students’ nutritional knowledge. This research is in line with Arbie (2015) study which states that students’ nutritional knowledge does not have an indirect influence with the intake of vitamins from vegetables and fruits.

This shows that the higher level of nutritional knowledge is not necessarily followed by the better consumption of vegetables and fruit of students. So not necessarily students with high knowledge can understand and apply well the knowledge in everyday life.

**Indirect Effect of Student Nutrition Knowledge with Mineral Intake**

Calculation result of magnesium intake obtained by coefficient value of \( p94-5 = 0.0 \) with \( X1 \) to \( X5 \) 0.05 and \( X5 \)
Micronutrient Intake of Vegetables and Fruits and their Relationship with Nutritional Knowledge of Students


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