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The Importance of Vitamin and Mineral Intake for 12-Year-Old Child Growth

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ABSTRACT

This study aims to provide an understanding of the importance of vitamins and minerals, as well as foods and drinks containing vitamins and minerals according to age. As to prevent children's growth and development disorders. The method used in this research is pre-experimental with a quantitative approach. The research was carried out at Hanjuang Samijaya Elementary School in July 2022 with a sample of 15 students. The stages of the research are pretest, socialization of the importance of vitamins and minerals for the growth of children aged 12 years, and posttest. Based on the results of the study, students' understanding of the importance of vitamin and mineral intake for the growth of 12-year-old children increased after being given socialization. The percentage of students' average N-Gain score is 60%. This indicates the socialization carried out is quite effective. This is because of the enthusiasm of students in paying attention when socialization is being held, then the information can be conveyed and understood properly. Students who previously did not know and paid less attention to the vitamins and minerals their bodies needed, became more aware of and paid attention to the importance of these things. With this research, it is hoped every parent and child will pay attention to the intake of vitamins and minerals needed by the body. As to avoid impaired child growth and development.

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1. INTRODUCTION

Vitamins are complex organic bonds usually obtained from food and do not produce energy. Vitamins can be grouped into fat-soluble vitamins and water-soluble vitamins (Permana *et al*., 2018). The function of vitamins in general is closely related to the function of enzymes, especially the B vitamins. Enzymes are organic catalysts that carry out and regulate biochemical reactions in the body (Rahmi, 2019). Vitamins also function as regulators of physiological and biochemical processes in the body, and maintenance of life through their roles as coenzymes, co-factors, and several stages of energy metabolism and growth. Vitamins and minerals work in various ways in the human body (Ernawati & Soekatri, 2013). Vitamins are useful for the process of growth, regulation, and repair of body functions, while minerals play a role in several stages of energy metabolism reactions, growth, and maintenance of the body.

First, this type of nutrition helps the cells and organs of the body to carry out their functions. Second, vitamins and minerals help boost the immune system in children (Setyoningsih *et al*., 2021). The two functions of vitamins and minerals for children can certainly support the child's growth and development process and maintain overall health. Micronutrients, namely vitamins and minerals, are needed by the body in small amounts. Vitamins are complex organic substances that function as substances to measure the growth and maintenance of the body's biological systems (Neldi, 2018). Minerals are chemical elements with certain molecular weights and valences are biologically available. The human body needs at least 20 kinds of mineral elements if all the organs and systems in the body work efficiently (Baihaki, 2017). Some of the important ones include calcium, sodium, iodine, phosphorus, potassium, iron, and magnesium while others are needed in small amounts, including copper (CO), zinc (ZN), cobalt, and four. Minerals function to support the growth and repair of body tissues and help regulate body functions (Paramitha, 2018).

In children aged 12 years, there are several vitamins and minerals their bodies need, namely 1) Vitamin A, besides being useful for maintaining healthy eyes and skin, vitamin A is also known to have an important role in cell growth and development (Wahyuni *et al*., 2020). 2) Vitamin B12, Vitamin B12, or Cobalamin help strengthen bones, improve mood, and sharpen memory. 3) Vitamin C, is important for forming and maintaining healthy bones, teeth, and gums (Rahayu *et al*., 2022). 4) Vitamin D, serves to form and strengthen bones by helping the absorption of calcium in the body (Louisa, 2017). 5) Vitamin E can protect and maintain the health of body cells and red blood cells. This vitamin is also known to have antioxidants that are good for skin health (Valentina *et al*., 2014).

The minerals needed by children aged 12 years are, 1) Calcium is useful for strengthening bones and teeth. Adolescents grow optimally (Tjahja, 2018). 2) Iron is useful for the transportation of red blood cells and contains oxygen to be circulated throughout the body (Wadhani *et al*., 2017). 3) Zinc has an important role for children because it can help the body's normal growth. 4) Magnesium has a role in maintaining healthy muscles, nerves, bones, and heart rhythm (Prianggoro, 2022). 5) Potassium helps maintain fluid balance in the blood and body tissues and is beneficial for muscles and the nervous system (Fitriani & Andriyani, 2015).

The high level of child malnutrition in Indonesia could be due to several factors, such as economic level and the difficulty of finding impactful work the ability of parents to provide very healthy food difficult, poor sanitation causes the condition of the house not clean, and has an effect as well as the food to be processed, education some parents have a low level of education cause they don't know the importance of vitamin and mineral intake for the growth

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and development of children, and the effect of nutritional intake on children for his future (Inten & Permatasari, 2019).

If vitamins and minerals are not met, children are at risk of developing growth disorders or other health problems, including those related to certain vitamin or mineral deficiencies (Nurmaliza & Herlina, 2019). Fulfilling it since childhood can reduce the risk of health problems until adulthood (Afa, 2020). Therefore, we researched to socialize the importance of vitamin and mineral intake for the growth of children aged 12 years, to provide education regarding the meaning, and explanation of the benefits of vitamins and minerals, as well as foods and drinks containing vitamins and minerals according to age. If the socialization is successful, it can add insight to the students. Students pay attention to the intake of vitamins and minerals that are consumed, then this can be prevention against children's growth and development disorders.

2. METHODS

2.1. Research Subject

This research was conducted at Hanjuang Samijaya Elementary School, Cihanjuang, Parongpong, West Bandung, West Java, Indonesia in July 2022. The sample in this study was some 12-year-old students of grade 6B at Hanjuang Samijaya Elementary School, Indonesia. The number of respondents was 15 students with a description of 9 female students and 6 male students.

2.2. Research Design Analysis

The research design used in this study was pre-experimental with a quantitative approach. Pre-experimental is experimental research conducted only for one group, as an experimental group without a comparison group (Effendi, 2013). The data collection technique carried out was by giving pretest and post-test questionnaires will be filled out by students. The instrument used for the knowledge test is a written test in the form of a questionnaire with 20 questions (see **Table 1**). If the respondent answers yes, he will get 1 point, and if he/she answers no, he/she will not get points. The stages of the research are holding a pretest to test initial knowledge, giving treatment (socialization), giving a posttest after socialization, calculating the average score, and conducting a t-test to test the difference in the average score of students' knowledge, either from the pretest or posttest.

Table 1. Pre-test and post-test questions.

"The Importance of Vitamin and Mineral Intake for 12-Year-Old Child Growth"			
No.	**Question**	**Yes**	**No**
1.	Do you know what vitamins are?		
2.	Are vitamins important for the body?		
3.	Do you know what vitamins are needed at the age of 12 years?		
4.	Do you know the benefits of vitamin A?		
5.	Do you know the benefits of vitamin B 12?		
6.	Do you know the benefits of vitamin C?		
7.	Do you know the benefits of vitamin D?		
8.	Do you know the benefits of vitamin E?		
9.	Do you know which foods contain vitamins?		
10.	Do you know what minerals are?		
11.	Are minerals important for the body?		
12.	Do you know the difference between vitamins and minerals?		

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Table 1 (continue). Pre-test and post-test questions.

"The Importance of Vitamin and Mineral Intake for 12-Year-Old Child Growth"			
No.	**Question**	**Yes**	**No**
13.	Do you know what minerals are needed at the age of 12 years?		
14.	Do you know the benefits of iron?		
15.	Do you know the benefits of magnesium?		
16.	Do you know the benefits of zinc?		
17.	Do you know the benefits of calcium?		
18.	Do you know the benefits of potassium?		
19.	Do you know what foods and drinks contain minerals?		
20.	Have you been consuming foods and drinks that contain vitamins and minerals?		

2.3 N-Gain Value Analysis (*Normalized Gain*)

To find out the increase in students' knowledge and understanding of the importance of vitamin and mineral intake for the growth of 12 years of age, it is necessary to calculate the average normalized gain score (N-Gain). Analysis of the effectiveness test data was carried out using statistical analysis of the research data (Zein *et al*., 2019). Gain tests were carried out to find out if there was an increase between the pretest and the posttest. The formula used in calculating the N-Gain value for data analysis in this study can be seen in Equation (1).

$$N\ Gain = \frac{Skor\ Posttest - Skor\ Pretest}{Skor\ Ideal - Skor\ Pretest} \quad (1)$$

In concluding the final results of the study, there is a focus in the form of several categories of the results of the overall average N-Gain value and also the interpretation of the results of the percentage of the average N-Gain value. **Table 2** shows the reference for the interpretation of the average N-Gain score and **Table 3** shows the reference for the category of interpretation of the effectiveness of N-Gain.

Table 2. Distribution of N-Gain means to score.

N-Gain Value	Category
g > 0.7	Tall
0.3 g 0.7	Currently
g < 0.3	Low

Table 3. Category of N-Gain effectiveness interpretation.

Percentage (%)	Interpretation
< 40	Ineffective
40-55	Less effective
56-75	Effective enough
> 76	Effective

3. RESULTS AND DISCUSSION

The results of the research will be described include a description of the results of the data and a discussion on the effect of socializing and the importance of vitamin and mineral intake for the growth of children aged 12 years in the research sample, namely students of class 6B Hanjuang Samijaya Elementary School with a total of 15 students. The students have

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done a series of pretest, socialization, and posttest research. The following is the research data obtained (See **Table 4**).

Table 4. Analysis of pre-test and post-test gain values.

No.	Name	Pretest	Postest	Postest-Pretest	Score ideal (100-Pretest)	N-Gain Score	Category
1.	Student1	55	80	25	45	0.56	Currently
2.	Student 2	45	35	-10	55	-0.18	Low
3.	Student 3	55	90	35	45	0.78	Tall
4.	Student 4	45	100	55	55	1.00	Tall
5.	Student 5	40	85	45	60	0.75	Tall
6.	Student 6	50	80	30	50	0.60	Currently
7.	Student 7	30	80	50	70	0.71	Tall
8.	Student 8	50	75	25	50	0.50	Currently
9.	Student 9	50	80	30	50	0.60	Currently
10.	Student 10	45	70	25	55	0.45	Currently
11.	Student 11	65	95	30	35	0.86	Tall
12.	Student 12	25	80	55	75	0.73	Tall
13.	Student 13	50	100	50	50	1.00	Tall
14.	Student 14	60	90	30	40	0.75	Tall
15.	Student 15	55	70	15	45	0.33	Currently
Rata-Rata		**48.0**	**80.7**	**32.7**	**52.0**	**0.6**	**Currently**

Based on the results in **Table 4**, it is known out of 15 students, the highest score in the pretest was 65, the lowest score was 25, and the average score was 48. After being given socialization regarding the understanding of the importance of vitamin and mineral intake for the growth of children aged 12 years, the highest posttest score was 100, the lowest score was 35, and the average score was 80.7. From the data from the research, the level of students' understanding of the importance of vitamin and mineral intake for the growth of children aged 12 years has increased.

Students who previously did not know and paid less attention to the vitamins and minerals their bodies needed, became more aware of and paid attention to the importance of these things. The percentage of the students' average N-Gain score is 60%. This indicates the socialization carried out to the sample, namely students regarding the understanding of the importance of vitamins and minerals for the growth of children aged 12 years, is quite effective. On average, students can understand the material intended at the time of socialization, but there is one student who is confused by the existence of socialization. This can be seen from the test results which show a decrease in the value of.

This study used a pre-experimental method, namely experimental research conducted only for one group, as an experimental group without a comparison group. Pre-experimental is one part of statistics, therefore, to test the effect of the difference in mean values, we used the t-test: Paired Two Sample for Means (See **Table 5**).

The results of statistical tests using t-test: Paired Two Sample for Means listed in the table from 15 samples of students, the average value of the student pretest is 48 and the post-test is 80.7. The t-test on the data shows the t-count, which is -7.39905 is smaller than the t-table, 1.75305. From these data, the students' post-test scores increased significantly.

From the data from the research, socialization about the importance of vitamins and minerals for children aged 12 years is considered quite effective and influential. This is because the collaboration between us and the students is quite good. Students have high

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enthusiasm. The aims and objectives conveyed by we are well received. We also at the time of carrying out the socialization used the method of discussion and question and answer. Students remained focused on paying attention and understanding. Students who previously did not know and paid less attention to the vitamins and minerals their bodies needed, became more aware of and paid attention to the importance of these things.

Table 5. t-Test: Paired two samples for means.

	Variable 1	*Variable 2*
Mean	48	80.66667
Variance	110	249.5238
Observations	15	15
Pearson correlation	0.202636	
Hypothesized mean difference	0	
df	14	
t Stat	-7.39905	
P(T<=t) one-tail	1.68E-06	
t Critical one-tail	1.76131	
P(T<=t) two-tail	3.36E-06	
t Critical two-tail	2.144787	

4. CONCLUSION

The results of the study were gained regarding the importance of vitamin and mineral intake for the growth of children aged 12 years. When we conducted the post-test, the average student did not understand and pay attention to the intake of vitamins and minerals for their body growth, but when they were given treatment or socialization, the average value of students' knowledge increased. Students become more aware of and pay attention to the importance of vitamin and mineral intake. The percentage of N-Gain scores on students' scores, is 60%. This shows the socialization carried out is categorized as quite effective. With this research, it is hoped every parent and child pay attention to the intake of vitamins and minerals needed by the body. As to avoid impaired child development.

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6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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