ASEAN Journal of
Agriculture and Food Engineering

Journal homepage: https://ejournal.bumipublikasinusantara.id/index.php/ajafe

Education of Dietary Habit and Drinking Water Quality to Increase Body Immunity for Elementary School

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ABSTRACT

This study aims to analyze the effect of nutrition education on knowledge and the provision of a balanced menu and quality drinking water on increasing body immunity in elementary school children. The research design was one group pretest-posttest. The research subjects were 20 elementary school students. The nutrition education intervention was carried out using blackboard media with a mind-mapping approach. The pre-test of balanced nutrition knowledge was carried out before the intervention, while the post-test was carried out after the intervention regarding nutrition education. The results showed that calculating the average N-Gain value of 77.6% (N-Gain > 76%) indicated that education about balanced nutrition effectively improved students' understanding of eating patterns and drinking water after receiving nutrition education intervention. From these results, we recommend that students bring a balanced menu and quality drinking water to be continued and monitored by the homeroom teacher. In particular, parents should support students by providing balanced meals.

ARTICLE INFO

Article History:
Submitted/Received 16 May 2022
First Revised 26 Jun 2022
Accepted 31 Aug 2022
First Available online 01 Sep 2022
Publication date 01 Mar 2023

Keyword:
Balanced menu,
Nutrition education,
Quality drinking water,
SNI.

1. INTRODUCTION

Diet is the most important behavior that can affect nutritional status. This is because the quantity and quality of food and drink consumed will affect nutritional intake, affecting individual and community health (Mayasari *et al.*, 2018). Healthy food has a balanced nutritional content, containing fiber and substances that the body needs for the growth and development process. Zubaedah confirms this healthy food is food that contains four healthy five perfect, namely carbohydrates, protein, vitamins, minerals, and milk (Zubaedah *et al.*, 2017). Food intake is the main factor determining a person's nutritional status. People with good nutritional status are usually supported by good intake; each individual must adjust the amount of food according to their needs so as not to experience undernutrition or overnutrition (Miko *et al.*, 2017).

Knowledge of nutrition will affect the intake of food that enters the body because knowledge of nutrition provides information related to nutrition, food, and its relationship to health (Aulia, 2021). Nutritional knowledge includes food and nutrients, sources of nutrients in food, food that is safe for consumption, food that does not cause disease, how to process food properly to make nutrients in food not lost, and how to live a healthy life (Lestari, 2020). Healthy food choices related to the fulfillment of balanced nutrition and health are influenced by adolescent nutritional knowledge (Jayanti *et al.*, 2019). The quality of human resources (HR) is the main factor needed to carry out national development. Nutritional factors are essential in achieving quality human resources (Rizal *et al.*, 2018).

Lifestyles and behaviors that do not support the consumption of healthy and nutritious foods cause individuals to have less control over their food. Lifestyle affects the eating habits of a person or group of people and has a particular impact, especially on nutrition (Saufika *et al.*, 2012). The modern lifestyle currently adopted by humans tends to make people like instant things. As a result, they tend to be lazy to do physical activities and like to eat instant food, which has a high sodium content (Ratna *et al.*, 2019). Family lifestyle also contributes to children's eating habits, especially instant food (Myrnawati et *al.*, 2016).

Snacks (high in calories) and junk food are foods that many teens prefer over a balanced daily staple. This results in the nutritional needs of adolescents not being met. In addition, inadequate dietary intake is also a factor that causes students to be thin. Excessive intake of carbohydrates, fats, and proteins can cause excess nutrition in students (Arieska, 2020).

Implementing a healthy diet cannot guarantee that you will be free from disease, but at least paying attention to the intake of daily food consumption patterns can minimize the risk of someone getting sick. The imbalance between the amount of food that goes in and out causes energy to accumulate in the body. The pattern of eating fast food regularly more than twice a week and the size or portion of food that is excessive also has a high number of calories can also accelerate obesity rates (Pajriyah P *et al.*, 2021).

Direct causative factor. Malnutrition is a nutritional imbalance in the food consumed and the spread of infectious diseases. Indirect causes are food security in the family, child care patterns, and health services. These three factors are related to the level of education, knowledge, and skills of the family and the level of family income (Pahlevi, 2012).

The human body has an immune system to fight viruses and bacteria that cause disease. However, malnutrition can weaken the immune system or a person's immune system. Therefore, the function of the immune system needs to be maintained so that the immune system is robust (Setyoningsih *et al.*, 2021). Energy is required by the body to preserve life, support growth, and perform physical activity (Sutrio, 2017). In addition to a healthy diet, quality drinking water also determines the body's immunity or health level for students.

DOI:
p-ISSN: 2963-9093; e-ISSN: 2961-9505

Drinking water allowed to be consumed drinking water that does not cause health problems. Quality drinking water is safe for health if it meets the physical, microbiological, chemical, and radioactive requirements contained in the mandatory and additional parameters (Rosyiah *et al.*, 2020). The compulsory parameters referred to are drinking water quality requirements that must be followed and adhered to by all drinking water providers so that they do not cause side effects on health when consumed. Quality drinking water is very much needed, especially by adolescents, which is obtained from food, drink, and metabolism to replace lost water to avoid dehydration (Morintoh *et al.*, 2015). Understanding healthy eating patterns and quality drinking water that needs to be consumed by students will affect the health of students and the effectiveness of the learning process activities.

This counselling is expected to increase the body's immunity in the school environment and disseminate the knowledge they have acquired in their respective families. The novelties of this study are as follows: (i) research conducted on the effect of education on quality diet and drinking water to the Elementary School Grade 4 Hanjuang Samijaya students; (ii) education process for quality diet and drinking water using mind mapping learning media; and (iii) research focusing on the effect of diet and quality water on body immunity.

2. METHODS

2.1. Research Subject

The research subjects were Elementary School Grade 4 Hanjuang Samijaya Students, West Bandung, Indonesia. We took a sample of selected students at Hanjuang Samijaya Elementary School. Respondents amounted to 20 people. Respondents consisted of 10 men and 10 women (see **Figure 1**).

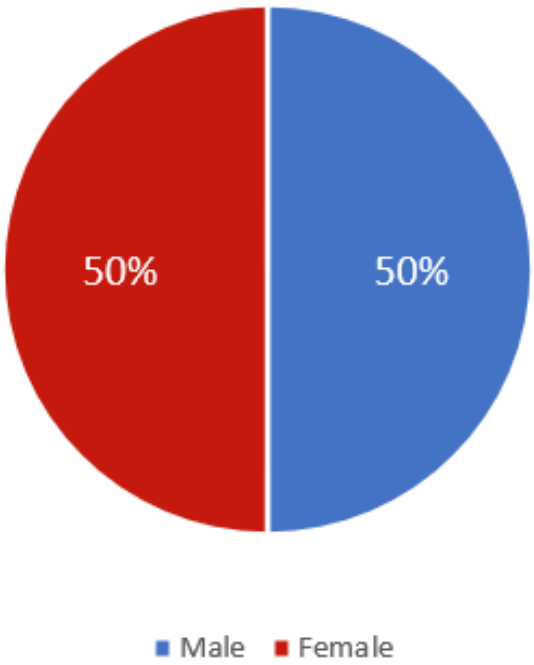

Figure 1. The percentage of respondents' gender.

2.2 Research Data Analysis

The research data was collected by distributing questionnaires to the 4th-grade students of Hanjuang Samijaya Elementary School. There are three stages in data collection, namely (i) distribution of pre-test questionnaires; (ii) providing educational actions through blackboard

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p-ISSN: 2963-9093; e-ISSN: 2961-9505

media; and (iii) distribution of post-test questionnaires. The data processing approach used is quantitative. The author makes 20 questions pre-test and post-test. **Table 2** shows the pre-test and post-test questions in this study. We are making questions focused on education about eating patterns and quality drinking water on the body's immunity. The types of pre-test and post-test questions are types of Yes and No answers. The scoring of the responses is marked as 1 for correct answers and 0 for incorrect answers.

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

No	Question	Pre-Test	Post-Test	Difference
1.	I know what a healthy diet is	70%	100%	30%
2.	I know the benefits of a healthy diet	65%	95%	30%
3.	I eat a balanced menu every day	85%	100%	15%
4.	I believe that I will be healthy if I keep my diet	95%	100%	5%
5.	I know that quality drinking water is always appropriately processed and correctly	90%	100%	10%
6.	I know what immunity is	45%	90%	45%
7.	Are carbohydrates a food the body needs as the primary energy source?	55%	100%	45%
8.	Is fat a backup energy source the body needs when the primary energy is exhausted?	60%	85%	25%
9.	Is protein necessary for the formation of body cells?	80%	95%	15%
10.	Can minerals help metabolic processes?	65%	100%	35%
11.	Can vitamins help regulate metabolism?	65%	100%	35%
12.	Is water drink can maintain fluid balance in the body?	90%	100%	10%
13.	Is water drink play an essential role in human survival?	55%	95%	45%
14.	Can polluted drinking water be at risk of causing various adverse effects on health?	35%	75%	40%
15.	Must water that is good for drinking meet Indonesian National Standards?	70%	95%	15%
16.	Can regular exercise and adequate rest increase the body's immunity?	75%	100%	25%
17.	Can food hygiene and personal and environmental hygiene increase the body's immunity?	85%	100%	15%
18.	Do eating patterns and drinking water affect the body's immunity?	65%	80%	15%
19.	What is the combination and balance of the food menu is the key to good nutrition?	80%	100%	20%
20.	Do you know the impact that occurs due to irregular eating patterns?	30%	50%	20%

2.3 N-Gain Value Analysis

In this study, the data analysis used was using the N-Gain calculation. The N-Gain calculation is carried out to increase student learning outcomes (Nismalasari *et al.*, 2016). The normalized gain or N-Gain value analysis aims to determine the effectiveness of specific methods or treatments/actions in the one-group pre-test post-test design research. The ideal score is the maximum value respondents can obtain when filling out the pre-test and post-test questions. Several categories of obtaining N-Gain values can be used to determine the conclusion of the final result (Nawir *et al.*, 2016).

DOI:
p-ISSN: 2963-9093; e-ISSN: 2961-9505

Table 2. Category interpretation of N-Gain effectiveness.

N-Gain Value	Interpretation
< 40	Ineffective
40 - 50	Less effective
56 - 75	Effective enough
> 76	Effective

3. RESULTS AND DISCUSSION

Table 3 shows the results of the gain value analysis to show the quality of the increase in the score obtained by each respondent after the intervention. Based on the data in **Table 3**, it is known that the average value of N-Gain is 77.6%, indicating that the method or treatment carried out by using mind mapping learning media in educational activities on eating and drinking water is quite effective for students. With an N-gain score of at least 40% and a maximum of 100%.

Table 3. Analysis of pre-test and post-test gain values.

No	Name	Score		N-Gain (%)	Category
		Pre-Test	Post-Test		
1	A	90	100	100	Effective
2	B	85	100	100	Effective
3	C	65	100	100	Effective
4	D	90	100	100	Effective
5	E	90	100	100	Effective
6	F	70	100	100	Effective
7	G	25	95	93	Effective
8	H	25	95	93	Effective
9	I	65	95	86	Effective
10	J	70	95	83	Effective
11	K	70	95	83	Effective
12	L	80	95	75	Effective enough
13	M	35	80	69	Effective enough
14	N	70	90	67	Effective enough
15	O	85	95	67	Effective enough
16	P	70	85	50	Less effective
17	Q	70	85	50	Less effective
18	R	90	95	50	Less effective
19	S	45	70	45	Less effective
20	T	75	85	40	Less effective

Figure 2 shows the analysis of differences in the pre-test and post-test results per question. Based on the picture, it can be seen that all respondents' results have increased from each question indicator. So, if seen from these results, blackboard media with a mind mapping approach can still be used in conveying material to students.

However, at least in the study, there are fewer effective categories. Mind mapping-based learning as an educational medium can help the level of understanding of the students of

DOI:
p-ISSN: 2963-9093; e-ISSN: 2961-9505

Hanjuang Samijaya Elementary School regarding the effect of eating patterns and drinking quality water on the body's immunity. In line with what was stated by (Widia *et al.*, 2020).

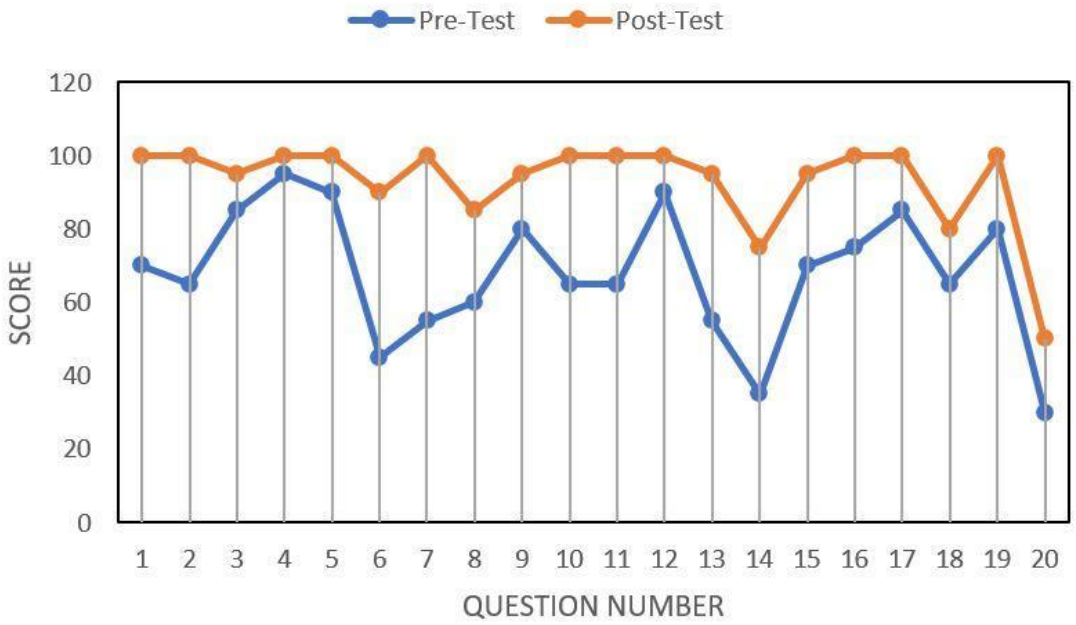

Figure 2. Pre-test and Post-test results.

4. CONCLUSION

The research that has been carried out aims to determine the effect of using mind mapping learning media in educational activities regarding the understanding of eating and drinking quality water for students at Hanjuang Samijaya Elementary School. There are three main steps carried out in this study, namely (i) taking the pre-test; (ii) educational actions through mind mapping learning media; and (iii) taking the post-test. The results showed an increase between the average value of the pre-test and post-test, starting with a value of 68.25 to 92.75. The N-Gain calculation is done to determine the effectiveness of the actions taken. The results show the average N-Gain value is 77.6% (N-Gain > 76%). This means that education through mind mapping learning media regarding the eating pattern and drinking quality water is effectively delivered to Hanjuang Samijaya Elementary School, Parongpong, West Bandung students. The effectiveness of the media is influenced by the pre-test scores that are not too small, and the post-test scores increase. So, it can be seen by doing this research that it is hoped that students can understand the effect of eating patterns and drinking quality water on body immunity.

5. ACKNOWLEDGMENT

We acknowledged Bangdos, Universitas Pendidikan Indonesia. This study is a part of community service (Program: community service program Thematic Literacy 2022 (11 July-10 August 2022 group 71) Lembaga Penelitian dan Pengabdian Masyarakat (LPPM), Universitas Pendidikan Indonesia.

6. AUTHORS' NOTE

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

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DOI:
p-ISSN: 2963-9093; e-ISSN: 2961-9505