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Relationship of Fruits and Vegetables Consumption with Children's Cognitive Function in Elementary School Makassar

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ABSTRACT

Introduction: Based on 2018 Basic Health Research data, the proportion of fruits and vegetables consumption among the Indonesian population ≥ 5 years old is still less, namely 95.5%. Eating fruits and vegetables can maintain cognitive function and repair damaged brain cells. The research aimed to determine the relationship between fruits and vegetables consumption and cognitive function in elementary school children in Makassar.
Methods: The research methodology is descriptive observational. The study sample size was 37 participants selected using a simple random sampling technique at SDN Borong Raya Makassar from September 2023 to October 2023. The independent variable was fruits and vegetables consumption, while the dependent variable in this study was cognitive function.
Results: Data analysis used the SPSS statistical Chi-square test where $p < 0.05$. The research results show that children who consume enough fruits and vegetables have good cognitive development (71.43%).
Conclusion: There is a relationship between fruits and vegetables consumption and cognitive function. Adequate consumption of fruits and vegetables can optimize children's cognitive development.

Keywords: Fruits; vegetable; cognitive function; children

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Introduction

The average fiber intake of the Indonesian population is only a third of what is recommended by the World Health Organization (WHO).[1] People can implement this by consuming fruits and vegetables. Vegetables and fruits contain various nutrients that are good for the body, such as vitamins, minerals, and dietary fiber. Vegetables and fruit must be consumed every day to meet the intake of vitamins and minerals that the body needs to achieve a healthy diet, which by the recommendations of balanced nutrition guidelines for optimal health.[2]

Based on 2018 Basic Health Research data, the proportion of fruits and vegetables consumption among the Indonesian population ≥ 5 years old is still less, namely 95.5%. The prevalence of under consumption of fruits and vegetables in South Sulawesi province is 94.7%, which is lower than the national prevalence of under consumption of vegetables and fruit, namely 95.5%.[3]

Low fruits and vegetables consumption is the most common behavioral problem, especially for school-aged children. Therefore, it is necessary to change children's behavior in consuming fruits and vegetables through increasing knowledge.[4] Consuming fruits and vegetables can affect cognitive function.[5] This is because fruits and vegetables contain the vitamin B group (6.9, 12), vitamin C, polyphenols and minerals which play a role in improving a person's cognitive status.[6]

The ingredients contained in fruits that can affect cognitive function are flavonoids. Flavonoids are polyphenolic compounds with a carbon chain in the form of C6C3C6, found in different amounts in each plant food. There are several subclasses of flavonoids, including anthocyanidins, which have the ability to interact in intercellular neuron signaling pathways which influence neurodegenerative and neuroinflammatory processes that are responsible for memory, learning and cognitive function.[7] Parents are required to provide a good nutritious food for their children, especially those that contain lots of fiber and are found in fruits and vegetables.[8]

Apart from being able to prevent degenerative diseases, consuming fruits and vegetables can also have a positive effect on reducing stress, maintaining cognitive function and repairing damaged brain cells.[9] Fruits and vegetables are a food group that contains various sources of micronutrients that the body needs in metabolic processes.[10]

Cognitive is the ability to learn or think to learn a new skills and concepts. People needs a skills to understand what is happening in the environment and skills to use a memory and problem solving.[11]

Methods

This research is quantitative research using a descriptive observational research design. Descriptive observational research is research that describes a situation or problem that is explored through

observations that occur in the field. This research was conducted in July – August 2023 at SDN Borong Raya Makassar District. Manggala, Makassar City, South Sulawesi. The population in this study were students at Borong Raya Makassar Elementary School with a sample of 3rd-grade elementary school students, used a simple random sampling technique, with a sample size of 37. The tools and materials in this research used the Semi-quantitative FFQ (Semi-Quantitative Food Frequency) as a method for collecting data about the frequency of food consumption during a certain period. The data obtained from this method includes meal frequency per day, per week and month, food portion sizes, a food photo book by the Individual Food Consumption Survey Team and the SYSTEM-R Cognitive Screening. The data analyzed was processed used IBM SPSS Statistics.

Result

In this research, it is classified based on the variables selected in the table in the form of: Univariate Analysis

Table. 1 Sample of Gender Frequency Distribution

Gender	n	%
Male	13	35,13
Female	24	64,87
Total	37	100,00

Source: Primary Data Analysis, 2023

Table. 1 The sample of gender distribution frequency, where the majority of the sample is female, namely 64.87%.

Table. 2 Sample of Age Frequency Distribution

Age (Year)	n	%
8	21	56,76
9	16	43,24
Total	Total	37

Source: Primary Data Analysis, 2023

Table. 2 The frequency distribution of the age of the sample, where the majority of the sample is 8 years old, namely 56.76%.

Table. 3 Frequency Distribution of Sample Fruits and vegetables Consumption Categories

Consumption	n	%
Enough	21	56,76
Deficient	16	43,24
Total	Total	37

Source: Primary Data Analysis, 2023

Table. 3 The distribution of sample fruits and vegetables consumption categories, where the majority of sample fruits and vegetables consumption is in the sufficient category, namely 56.76%.

Table. 4 Sample of Cognitive Frequency Distribution

Cognitive	n	%
Good	20	54,05
Deficient	17	45,95
Total	Total	37

Source: Primary Data Analysis, 2023

Table. 4 The distribution of sample environmental categories, where the majority of the sample has a good cognitive function, namely 54.05%.

Bivariate Analysis

Table. 5 Analysis of the Relationship between Fruits and vegetables Consumption and the Sample's Cognitive Function

			Cognitive function		Total	Mark-p
			Good	Poor		
Fruits and Vegetables Consumption	Enough	n	15	6	21	0,036
		%	71,43	28,57	100,0	
	Not enough	n	5	11	16	
		%	31,5	68,75	100,00	
Total		n	20	17	37	
		%	50,05	45,95	100,00	

Source: Primary Data Analysis, 2023

Table. 5 The result of the chi-square test which analyzes the relationship between fruits and vegetables consumption and cognitive function in the sample, where a p-value of 0.036 (<0.005) was obtained, which means there is a significant relationship between fruits and vegetables consumption and cognitive function.

Discussion

The respondents who consume sufficient fruits and vegetables tend to have good cognitive function, whereas respondents who do not consume enough fruits and vegetables tend to have poor cognitive function, which means there is a relationship between adequate consumption of fruits and vegetables and cognitive function.

Adequate fruits and vegetables intake is necessary to maintain normal cognitive function. Further cognitive decline can be avoided in the early stages of cognitive decline by consuming polyphenolic foods regularly. Flavonoid mechanisms have been shown to inhibit free radicals and modulate signaling pathways related to cognitive function and neuroprotection.[12]

According to experts, nutrition is the most important factor influencing children's cognitive development. Children who have good nutritional status will have optimal cognitive development and vice versa, children who lack nutrition will disrupt brain development and cause delays in cognitive development and ultimately lead to poor academic performance.[13]

This research is in line with Putu Ayu (2021) who stated that children who have a poor nutritional intake of vegetables and fruit have higher suspicions of impaired cognitive development than children who have good nutritional status, namely 85.7%.[14]

Similar results were also found by Indri Nurfadhilah (2019) in Banyumas district that there was a significant relationship between fruits and vegetables consumption and cognitive function of 64.5% and 35.5% was influenced by other factors outside those studied.[15]

Conclusion

The researcher concluded from this research is about 15 out of 21 children with adequate consumption of fruits and vegetables have good cognitive function so there is a significant relationship between adequate consumption of fruits and vegetables and cognitive function. The author suggests that parents needs more attention to educate the consumption of fruits and vegetables for their children, so the children consumption of fruits and vegetables can be sufficient, and also Borong Raya Elementary School to introduce more about the benefits of consuming fruitds and vegetables to its students, so the students likes to consume the fruits and vegetables, and also for future researchers it is best to conduct outreach regarding the benefits of consuming fruits and vegetables before conducting research

Conflicts of Interest

There is no conflict of interest.

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