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The Relationship between Drinking Water Sources and Nutritional Status of Elementary School Children on the Martapura Riverbank

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Abstract:

Environment cleanliness has an indirect impact on nutritional status, particularly in the growth and development stages of children. In this study, school-age children living along the Martapura River's banks were asked to assess their nutritional health and the relationship between their drinking water sources. Study methodology employing a cross-sectional study design and analytical observational techniques. Research participants comprised 53 primary school students in grade 4 from SDN Keliling Benteng Ulu 2, SDN Keliling Benteng Tengah, and SDN Sungai Rangas Hambuku. Groups A (Martapura River water source group) and B (non-river water source group) comprised the seven groups of subjects: group 1 (very poor nutrition); group 2 (undernutrition); group 3 (normal nutrition); group 4 (obesity). Based on the data, it was discovered that 37 individuals (69.8%) had very poor nutritional status, and 39 individuals (73%), had the most commonly used gallons. The nutritional quality of primary school-aged children living along the Martapura Riverbanks did not significantly correlate with the sources of their drinking water, as indicated by the Fisher Exact test results, which revealed $p = 0.146$ ($p > 0.05$).

Keywords: Nutritional Status; Drinking Water Sources; Elementary School Age Children

Introduction

The need for water consumption that is safe for health is necessary because the presence of contaminants as part of water pollutants is part of the factors that affect nutritional status, especially children [1]. This is in accordance with research by Simbolon which states that environmental sanitation hygiene is related to children's nutritional status. The availability of potable drinking water is an important component in maintaining health, especially in the growth and development stages of children. [2,3] Research conducted by Johnson *et al* found that the quality of drinking water can affect children's health, including their growth.[4] Furthermore, research by Smith *et al*. also showed that contaminated drinking water can contribute to impaired growth and health problems in children.[1]

Although there have been studies on the relationship between drinking water quality and *nutritional status* in primary school-aged children, not many studies have specifically explored the relationship between drinking water sources and nutritional status based on BMI assessment in primary school children along the Martapura River. Therefore, this study aimed to determine the impact of drinking water source on nutriosioanl of school children, which may provide valuable information for future efforts to prevent malnutrition and improve the health of school children.

Research Method

An analytical observational method combined with a cross-sectional research strategy was used in this study. The study's subjects were 53 elementary school students in the fourth grade from SDN Keliling Benteng Ulu 2, SDN Keliling Benteng Tengah, and SDN Sungai Rangas Hambuku in the Martapura Barat Subdistrict. The participants were divided into seven research groups: group A (the Martapura River water source group); group B (the non-river water source group); group 1 (severely undernourished); group 2 (undernourished); group 3 (normal nutrition); group 4 (obesity).

The BMI of children is the dependent variable in this study [5,6], which is measured and categorized into four groups: Undernutrition: BMI more than 13 (5% percentile); normal: 5th - 95% percentile BMI > 18; overweight: 85–95 percentile, BMI > 21; and obesity: BMI > 23 (95 % percentile). The independent variable of this study is the source of drinking water, confounding variables are standardised weight and height measuring instruments.

Data collection was in the form of measuring body weight and height to obtain nutritional status and interviews to identify the source of drinking water used daily. Bivariate analysis used non-parametric statistical tests, namely the Fisher exact test with a degree of significance $\alpha = 0.05$ and a confidence level of 95%.

Results

Based on the data, it is known that the type of drinking water source used at home by primary school children consumes the most gallons water as many as 39 people (73%). This may be following some research results that show that the consumption of drinking water in gallon containers in Indonesia is currently increasing. Consumers need healthy drinking water every day and of course it is very easy to obtain and affordable .[7] Since clean water quality has an impact on health, it is important to take this into account while meeting daily demands.[8] It is assumed that there is a tendency for the demand for refillable drinking water to increase because the high demand for refillable drinking water leads to an increase in the volume of DAMIU businesses since consumers feel that spending money is wiser when they use refillable drinking water on a monthly basis.[9] The need for clean water, especially qualified drinking water, is usually fulfilled by tap water

(PAM), bottled drinking water (AMDK), and refillable water reservoirs. Along with technological advances, the fulfillment of clean water intended for drinking began to be fulfilled by the Refill Drinking Water Depo. [10]

In addition, the discovery of E.Coli in Martapura river water may be a consideration for residents around the riverbanks to use DAMIU. [11]

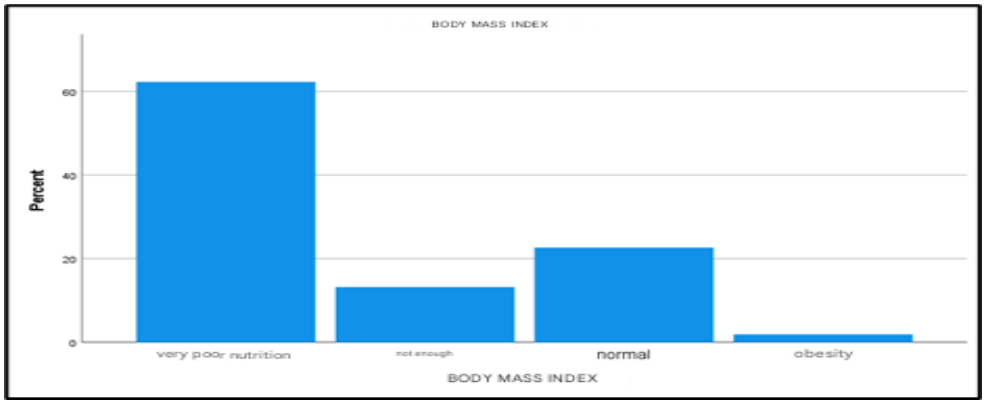

Figure 1. Types of Drinking Water Sources Used by Elementary School Children on the Martapura Riverbanks

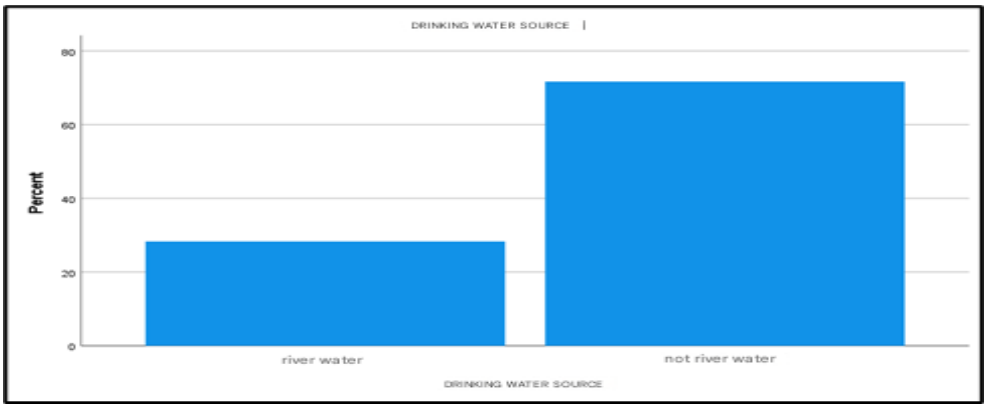

Figure 2. Nutritional Status Of Primary School Children On The Martapura Riverbanks

Based on the data in Figure 2, it is known that malnutrition status based on the measurement results of BMI by elementary school children is the largest population of 37 people (69.8%) compared to other nutritional status. In general, school-age children are a group that is prone to nutritional problems. The main causes of nutritional problems are food intake and infectious diseases. Children in primary school are among the populations most vulnerable to malnutrition. Low parental understanding, imbalanced dietary intake, and low economic status are some of the factors.[12] Undernutrition can increase the risk of morbidity and mortality in children. Undernourished children are very susceptible to infectious diseases. If undernutrition during infancy continues, it can affect intelligence, work capacity, and health conditions at a later age.[9,10] The number of reported cases of undernutrition and malnutrition in Banjar District in 2017 was 9 cases, an increase compared to 8 cases in 2016. All cases in 2017 received 100% treatment.[13]

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Table 1 Relationship between Drinking Water Source and Nutritional Status of School-Age Children in Martapura Riverbank

		Drinking Water Source		Totaly	P value of Fisher Exact Test
		River Water	Non River Water		
Nutritional Status	Undernutrition	13	24	37	
	Normaly	0	13	13	
	Overweight	1	2	3	0,146
	Obesity	0	0	0	
Totaly		14	39	53	

Table 1 shows a p value of 0.146 (p > 0.05) which means that there is no significant relationship between drinking water sources and the nutritional status of school-age children along the Martapura River.

Discussion

The results of this study are different from previous studies stating that water quality is associated with nutritional status in children, in this study it shows that drinking water sources from gallons and water sources from Martapura river water are not significantly related to the nutritional status of school-age children. In fact, the number of children whose drinking water source at home uses gallon refill water, which can be said to be a decent water source, has the highest nutritional status compared to children who drink from the Martapura river water source. This condition can be influenced by several other factors related to nutritional status, namely direct factors in the form of the quality and quantity of food consumed, as well as infectious diseases. Indirect factors include environmental sanitation, socioeconomics, birth distance, and income.[14-16] However, there is research conducted by et al whose results are similar to the research conducted which shows that there is no significant relationship between the availability of clean water sources (p = 0.407) and the incidence of stunting. According to them, it may be necessary to examine other variables that affect the nutritional status of children, namely parental education, balanced nutritional intake, breastfeeding history, and physical activity. [1]

Conclusions

There is no significant relationship between nutritional status and the type of drinking water source used by elementary school children along the Martapura River.

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