Musamus Journal of Physical Education and Sport (MJPES)
http://ejournal.unmus.ac.id/index.php/physical
Volume 5, No. 2, April 2023, Pg. 285-296
DOI: 10.35724/mjpes.v5i02.7558

Contribution of Nutritional Status to the Learning Achievement of Eighth-Grade Students at SMPN 5 Mataram in 2023

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Abstract

Objectives: This study aimed to determine the contribution of nutritional status to the learning achievement of eighth-grade students at SMPN 5 Mataram in 2023.
Materials and Methods: This study used a quantitative approach. Data were collected through a sociodemographic questionnaire, measurements of body weight and height to determine nutritional status, and students' report card scores to assess learning achievement. The sample consisted of 75 students selected from a total population of 120 eighth-grade students at SMPN 5 Mataram. Data were analyzed using the Pearson Chi-square test with the assistance of SPSS version 20.
Results: The results showed that nutritional status had a statistically significant relationship with learning achievement in Indonesian language subjects ($p = 0.019$) and science subjects ($p = 0.029$), as both values were lower than the significance level of 0.05. In contrast, there was no statistically significant relationship between nutritional status and learning achievement in mathematics ($p = 0.051$), as the value was higher than 0.05. These findings indicate that nutritional status contributed to student learning achievement, although the strength of the relationship differed across subjects.
Conclusions: Nutritional status was significantly associated with students' learning achievement in Indonesian and science, but not in mathematics. Overall, the study supports the view that nutritional status contributes to academic achievement among eighth-grade students at SMPN 5 Mataram in 2023.

Keywords: Nutritional Status; Learning Achievement; Junior High School Students; Academic Performance; Mataram

INTRODUCTION

One of the problems of national development is the low quality of human resources, this problem is influenced by many factors such as food, public attitudes towards education and the education system including educational facilities and infrastructure that are still felt to be lacking, especially in rural areas. This problem has become a national concern with the existence of efforts to develop human resources as early as possible in a directed, integrated and comprehensive manner through various proactive and reactive efforts by all components

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of the nation. Education is not immune to various problems such as limited public understanding of the importance of education for their children, health and family nutrition problems that can affect student intelligence and academic achievement. (Anwar, 2005)

Until now, Indonesia is still a country that occupies a low Human Development Index (HDI) ranking *which* is influenced by, among other things, the poor nutritional and health status of the Indonesian population. (H. Hadi, 2005) The description of the nutritional status of school-aged children in Indonesia (Riskesdas 2013) shows the national prevalence of very thin nutritional status of 4.4% (boys) and 3.5% (girls), thin nutritional status of 7.7% (boys) and 6.7% (girls), overweight nutritional status of 10.8% (boys) and 10.7% (girls), and obesity nutritional status of 9.7% (boys) and 6.6% (girls). The main factors contributing to malnutrition are socioeconomic conditions and high rates of infectious and communicable diseases in children. (Rosso, 2009) On the other hand, the prevalence of obesity in school-age children is expected to continue to increase. Based on research data from 2004 conducted in ten major cities in Indonesia, the prevalence of overnutrition or obesity in school-age children was found to be around 12%. Obesity is influenced by an imbalance in nutritional intake and physical activity and can lead to decreased cognitive abilities, psychosocial disorders and complications of non-communicable and chronic diseases later in life. (Hartini, 2014)

Several studies have been conducted to determine the relationship between nutritional status and academic achievement in school-age children, but they have yielded mixed results. These differences in research findings may be influenced by factors other than nutritional status playing a more dominant role or by differences in data collection and interpretation among researchers. In Depok itself, the nutritional problems of school-age children have not been definitively determined because nutrition improvement programs in Depok have so far focused primarily on children under five (toddlers). (Hidayati, 2017)

The nation's economic crisis has resulted in nutritional problems that have led to a lost generation, a generation of millions of malnourished children, resulting in lower intelligence quotients (IQ). Children with Protein Energy Malnutrition (PEM) have an IQ score 10-13 lower than those without PEM. Children with anemia have an IQ score 5-10 lower than those without anemia. Children with iodine deficiency disorders (IDD) have an IQ score 50 lower than those without IQ. (Karsin, 2004)

Anthropometric measurements in school-age children are considered important as an indicator of nutritional status and public health. Malnourished children experience impaired

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physical, mental, and intellectual growth. These impairments can reduce learning potential, endurance, and work productivity. Therefore, to achieve optimal academic performance, children must receive adequate nutritional intake in the right quality and quantity to support their learning process. However, in Indonesia, schoolchildren are still found to be malnourished. (Syah, 2001)

Based on this background, it is necessary to conduct research on nutritional status and its relationship with the academic achievement of students at SMPN 5 Mataram. The researcher determined a sample of... student Class VIII of SMPN 5 Mataram with data collection methods using sociodemographic questionnaires and measuring body weight and height to assess nutritional status as well as recording students' latest report card grades to assess learning achievement.

RESEARCH METHODS

In this study, *a cross-sectional research design was used* to determine the relationship between nutritional status and student learning achievement at SMPN 5 Mataram. 2023. The method used in the study is a data collection method using a sociodemographic questionnaire and measuring body weight and height to assess nutritional status as well as recording student report card scores to assess learning achievement .

Population is the entire research subject (Suharsimi Arikunto, 2010). Population is all the data that concerns us within a specified scope and timeframe. Based on the opinion above, the population in this study is students. Mataram 5 Junior High School in 2023, totaling 120 students . The sample in this study were students of SMPN 5 Mataram. 2023 class VIII . Sampling was done by purposive sampling , which is a sampling technique based on certain considerations.

Purposive sampling is a sampling technique that uses the researcher's *judgment* to determine who is suitable (meets the requirements) to be included in the sample. Therefore, to avoid being too subjective, the researcher must have a certain background knowledge about the sample in question (and of course, the population) in order to truly obtain a sample that meets the requirements or objectives of the research (obtaining accurate data).

Based on the table above, it can be seen that the purposive sampling technique is very easy. However, researchers must select samples based on the desired criteria, namely, three factors to consider: being a current student at SMPN 5 Mataram. In 2023 , the sample used was 75 students in each class VIII .

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Research instruments are tools selected and used by researchers in data/information collection activities to make the data collection process systematic and easier (Suharsimi Arikunto, 2002: 126). This method is used to obtain objective data needed to produce objective research conclusions.

Data collection methods are a method used in research to collect or obtain the required data or information. In this research, the researcher used two methods, namely (1) the behavioral test method; (2) the documentation method.

The methodology of this research is as follows:

1. Nutritional Status Measurement

Weight and height measurements are calculated using standard weight percentages based on gender, age, height, and weight. The method is to divide the subject's measured weight by the weight for height in the table, then multiply by 100%. This can be seen in the following formula:

$$status\ gizi = \frac{\text{berat badan}}{\text{berat badan standart}} \text{ X } 100\ \%$$

After the calculations are carried out, the results are consulted in the following table of norms for assessing nutritional status based on body weight and height:

Table 2: Nutritional Status Assessment Based on BB/TB

% Standard	Nutritional status
> 90%	Good
81%-90%	Not enough
≤ 80%	Bad

2. Learning achievement

Learning achievement is defined as the mastery of knowledge or skills developed by subjects, which is usually indicated by test scores or grades given by teachers. In this study, learning achievement was measured by calculating the average scores for the subjects tested in the National Examination for Elementary School students, namely Indonesian Language, Mathematics, and Natural Sciences (IPA) as found on report cards, and comparing these scores with the class average scores for the related subjects. Student learning achievement is divided into two categories :

a. High: student report card scores (subjects of Indonesian, Mathematics, and Science) are more than/equal to the class average score for each subject.

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b. Low: student report card scores (subjects Indonesian, Mathematics, and Science) are less than the class average score for each subject.

at SMPN 5 Mataram were taken , and learning achievement was measured using student report card scores. Data analysis for weight and height was carried out using Z-scores. To determine whether there was a relationship between nutritional status and learning achievement, the Pearson Chi-square test was used in SPSS. 20.

RESULTS AND DISCUSSION

Of the 120 students in class VII of SMPN 5 Mataram In 2023 , 75 students completed the data and underwent weight and height measurements. Based on the nutritional status variable, no subjects were found to have malnutrition, and the majority had normal nutritional status (50.66%). The distribution of subject characteristics based on nutritional status can be seen in Table 1.

Table 1: Distribution of subject characteristics based on nutritional status

Variables	Number (n)	Percentage (%)
Nutritional status		
Malnutrition	0	0.00
Malnutrition	20	26.67
Normal	38	50.67
Overweight	10	13.33
Obesity	7	9.33

Characteristics of Research Subjects Based on Learning Achievement

Based on the learning achievement variable, it was found that there were 36 subjects with high learning achievement in Indonesian Language subjects (49.20%) and 38 subjects with low learning achievement in Indonesian Language subjects (50.80%). There were 34 subjects with high learning achievement in Mathematics subjects (46.40%) and 41 subjects with low learning achievement in Mathematics subjects (53.60%). There were 37 subjects with high learning achievement in Natural Sciences subjects (49.70%) and 38 subjects with low learning achievement in Natural Sciences subjects (50.30%). The distribution of subject characteristics based on learning achievement can be seen in table 2.

Table 2: Distribution of subject characteristics based on learning achievement

of Variables	(n)	Percentage(%)
Learning achievement (Language Indonesia)		

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Tall	36	48.00
Low	38	52.00
Learning achievement (Mathematics)		
Tall	34	46.00
Low	41	54.00
Learning achievement (science)		
Tall	37	49.35
Low	38	50.65

Hypothesis Tester

Nutritional Status and Learning Achievement

After conducting the Chi-square statistical test, there was a significant relationship between learning achievement in two subjects and nutritional status, namely Indonesian Language and Natural Sciences ($p<0.05$). The relationship between nutritional status and learning achievement can be seen in Table 3 . 4, and table 5.

Table 3: Relationship between nutritional status and language learning achievement Indonesia

Variables	**Learning achievement**		
	Indonesian		
	Tall	**Low**	***p* -value**
Nutritional status			
Normal	13 (37.1%)	22 (62.9%)	0.019
Abnormal	23 (59.0%)	16 (41.0%)	

Note: for the purposes of analyzing the relationship between nutritional status and academic achievement, the categories of malnutrition, undernutrition, overweight , and obesity are combined into “abnormal.”

Table 4: Relationship between nutritional status and academic achievement mathematics

Variables	**Learning achievement Mathematics**		
	Tall	**Low**	***p* -value**
Nutritional status			
Normal	14 (38.9%)	22 (61.1%)	0.051
Abnormal	20 (51.3%)	19 (48.7%)	

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Table 5: Relationship between nutritional status and science learning achievement

Variables	Science Learning Achievement		
	Tall	Low	*p* -value
Nutritional status			
Normal	15 (38.5%)	24 (61.5%)	0.029
Abnormal	22 (61.1%)	14 (38.9%)	

DISCUSSION

1. Nutritional status

Based on the nutritional status variable, it was found that the majority of subjects had normal nutritional status (50.67%), followed by undernutrition (26.66%), obesity (9.33%), overnutrition (13.33%), and obesity (9.33%). This study is also in accordance with research conducted by Hidayati (2012) which stated that there are several factors that play a significant role in the nutritional status of school-age children, including food intake, physical activity, and socioeconomic conditions. Unbalanced food intake can affect the nutritional status of school-age children through irregular breakfast habits, a tendency to prefer one or several types of certain foods, snacking habits, lack of fiber intake, and a tendency to consume fast food.

2. Learning achievement

Based on the learning achievement variable, it was found that the subjects who had high learning achievement in the Indonesian Language subject were 36 people (48.00%) and the subjects who had low learning achievement in the Indonesian Language subject were 38 people (52.00%). The subjects who had high learning achievement in Mathematics were 34 people (46.00%) and the subjects who had low learning achievement in Mathematics were 41 people (55.00%). The subjects who had high learning achievement in Natural Sciences were 37 people (49.35%) and the subjects who had low learning achievement in Natural Sciences were 38 people (50.65%). It can be seen that the subjects who had low learning achievement in each subject were more numerous than the subjects who had high learning achievement. According to Supariasa (2004), malnutrition in school-age children can cause the child's

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body to become weaker and more susceptible to disease so that they will often be absent from teaching and learning activities in class. In this study, learning achievement was measured based on the subjects tested in the National Examination at the School level. According to the Indonesian Ministry of National Education (2013), the National Examination (UN) is an activity to measure and assess the achievement of graduate competencies nationally in certain subjects within the science and technology subject group. The National Examination is useful in mapping the quality of educational programs and/or units, the basis for selection for entry to the next level of education, and providing guidance and assistance to educational units in their efforts to improve the quality of education.

3. Nutritional Status and Learning Achievement

Hypothesis test to determine the relationship between nutritional status and student learning achievement at SMPN 5 Mataram A 2023 study conducted using *the Chi-Square test* showed a statistically significant relationship between nutritional status and Indonesian language and science learning achievement ($p<0.05$). Umami W (2015) found a statistically significant relationship between nutritional status and learning achievement. In this study, the sample was grade VII I students whose learning achievement was assessed based on the average report card scores for the subjects of Indonesian language, mathematics, science, and social studies. Hartini *et al.'s (2014)* research on the relationship between obesity levels and academic achievement in school-age children showed that there was a significant relationship between obesity levels and academic achievement in mathematics and Indonesian language in elementary school students, with a stronger relationship between obesity levels and academic achievement in Indonesian language compared to mathematics. The higher the obesity level, the greater the risk of someone experiencing chronic disease complications. In addition, in school-age children, obesity has an indirect effect on cognitive decline, which is thought to be a result of the impact of diseases suffered by children with obesity (diabetes, sleep disorders in the form of *obstructive sleep apnea* (OSAS), and respiratory problems), psychosocial problems (low self-esteem, self-isolation, and depression), and social maturity.

On the other hand, there was no statistically significant relationship between nutritional status and mathematics learning achievement ($p>0.05$). This is in line with

research conducted by Puspitasary *et al* (2013) which showed no statistically significant relationship between nutritional status and mathematics learning achievement in 4th and 5th grade elementary school students. Satya (2012) stated that nutritional status does not always affect learning achievement. This can be caused by several factors, one of which is the family which is the main and first center of education among others in terms of educating children, the relationship between parents and children, guidance from parents, parental education, parental atmosphere, home atmosphere, and family economic situation. Slameto (2010) stated that factors that influence learning achievement can be divided into two types, namely internal factors and external factors. Internal factors include physical factors (such as health), psychological factors (such as interests, talents, motives, attention, maturity, readiness, and intelligence), and fatigue both physically and mentally. While external factors include family factors (namely how to educate children, relationships between family members, home atmosphere, economic and cultural background, and parental understanding); school factors (including teaching methods and curriculum, teacher-student relationships, student-student relationships, learning tools and standards, school hours, school building conditions); and community factors (such as how students interact with the community, mass media, student social interactions, and forms of community life).

The results of this study showed that most students had abnormal nutritional status but showed high learning achievement in Indonesian, mathematics, and science subjects. According to the researcher, this could occur because there are other factors that play a greater role in determining the learning achievement of the subjects originating from internal and external factors. Internal factors that can have a large influence include interest and motivation, while other factors that can have a large influence, especially in the school environment are the learning facilities and infrastructure available at the school, including the teaching methods applied by the teachers at the school. This can be explained by the taxonomy theory explained by Bloom that there are two main factors that play a dominant role in learning outcomes, namely student characteristics which include abilities, interests, previous learning outcomes, and motivation, as well as teaching characters which include teachers and learning facilities.

In this study, the subjects' academic achievement in all three subjects had a statistically significant relationship with their father's income level, and most of the

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subjects had fathers with high incomes (76.00%). According to the researcher, the presence of a large number of students with abnormal nutritional status but showing high academic achievement in all three subjects may also be caused by the characteristics of students who generally come from families with a high economic level (above the poverty line). Parents, especially fathers with a high economic level, are generally able to meet their children's needs well in terms of educational facilities and infrastructure needed for the continuity of the teaching and learning process. In addition, this can also occur because the level of intellectual intelligence (IQ/ *Intelligence Quotient*) of students can also influence academic achievement. Intelligence can be defined as a person's general capacity to consciously adapt to new needs in their environment through their way of thinking. In his study involving grade VII I students , Anees (2013) found that IQ has a significant relationship with student academic achievement.

CONCLUSIONS AND SUGGESTIONS

Based on the results of research and discussion regarding the analysis of the relationship between nutritional status and student learning achievement at SMPN 5 Mataram 2023 , it can be concluded that :

1. There were more female subjects than male subjects. The subjects' fathers and mothers had an average secondary education. Most subjects had fathers with monthly incomes above the poverty line, and most mothers were unemployed. Most subjects lived in nuclear families.
2. Most of the subjects had normal nutritional status (50.67%), followed by obesity, undernutrition, and overnutrition.
3. Most subjects had low learning achievement in Indonesian, mathematics, and science subjects, with the highest low learning achievement in mathematics (54.00%).
4. There is a statistically significant relationship between nutritional status and learning achievement in Indonesian (p=0.019) and science (p=0.029) while there is no statistically significant relationship between nutritional status and learning achievement in mathematics (p=0.0 5 1).
5. Father's income is a sociodemographic factor that has a statistically significant relationship with learning achievement in Indonesian (p=0.028), mathematics (p=0.032), and science (p=0.003).

Researchers recommend that parents pay attention to their children's nutritional status by considering factors that can influence nutritional status, such as maintaining nutritional intake and daily physical activity. Furthermore, they recommend that parents pay attention to their family's economic situation. The better the family's economic situation, the better the facilities and infrastructure the child will receive, thus facilitating the teaching and learning process and producing optimal results.

For educators, the results of this study can provide insight into students' nutritional status and its relationship to academic achievement. Teachers and health professionals are advised to provide counseling or incorporate additional materials into school learning related to nutritional status to encourage students to pay more attention to factors that can influence nutritional status, such as maintaining daily nutritional intake and avoiding sedentary behavior. Researchers also recommend monitoring children's growth status periodically every semester (6 months) to ensure proper monitoring of children's nutritional status.

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