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The Influence of Nutritious Food Consumption Patterns in the Free Nutritional Meal Program (MBG) on the Mathematics Learning Achievement of Students at SDS Maniamas Ngabang

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***Abstract*:**
This study aims to analyze the effect of the Free Nutritious Meal (Free Nutritious Meal - MBG) program on the mathematics learning achievement of students at SDS Maniamas Ngabang. The research is motivated by a government initiative to address nutritional deficiencies in children, which often impacts the quality of education. This study used a quantitative approach with a pre-experimental one-group pretest-posttest design. Data were collected from 35 students through mathematics achievement tests administered before (pretest) and after (posttest) the implementation of the MBG program. Descriptive statistical analysis showed an increase in the average mathematics learning achievement score from 85.83 to 89.28 after the program was implemented. A paired-sample t-test yielded a significance value (p-value) of 0.000, which is less than 0.05. This result indicates a statistically significant difference between students' learning achievement scores before and after participating in the MBG program. Thus, it can be concluded that the Free Nutritious Meal (MBG) program has a significant positive effect on the improvement of mathematics learning achievement for students at SDS Maniamas Ngabang.

Keywords: Nutritious Food, Free Nutritional Meal Program (MBG), Mathematics Learning Achievement, SDS Maniamas Ngabang.

Introduction

The Free Nutritional Meal Program (MBG) is one of the flagship initiatives launched by the Prabowo-Gibran government, aimed at addressing malnutrition and improving the quality of human resources in Indonesia. The primary targets of this MBG program are children, students, and pregnant women. This is based on data from the Ministry of Health and the Coordinating Ministry for Human Development and Culture, which shows that 41% of students experience hunger, which has a negative impact on the quality of education (Kiftiyah et al., 2025) . Many developing countries, including Indonesia, still face significant challenges in accessing nutritious food, directly impacting the quality of education. The Free Nutritional Meal Program is expected to create equality in education, as every student will have the opportunity to enjoy nutritious food regardless of their economic and social background. Currently,

no official conceptual framework has been announced to implement this program. The distribution of free lunches, if aligned with the National Strategic Framework, is intended to increase consumption of appropriate and nutritious foods and expand access to food (Andin et al., 2025) .

According to (Nazidah et al., 2022) , the MBG program plays a crucial role in human growth and development, especially during childhood. Adequate nutritional needs are essential for optimal early childhood development, which are obtained through the food and drink they consume. Academic achievement plays a crucial role in evaluating students' success in the learning process, mapping the challenges they face, and providing guidance for achieving better results. Student learning success is influenced by external factors, including their environment and learning styles, including the strategies and methods students employ during learning (Apriyanto & Herlina, 2020) . Academic achievement demonstrates students' progress in various areas, including the knowledge, skills, and abilities they acquire after undergoing the learning process. This is the result of students' efforts in learning; the more diligent they are, the better their achievements. Furthermore, academic achievement is closely related to personal character, which plays a crucial role in achieving student academic success (Waritsman, 2020) . "Learning achievement is the end result of the interaction between learning activities and teaching activities. From a teacher's perspective, the teaching process will end with an evaluation of learning outcomes, while from a student's perspective, learning achievement is the culmination of the learning process." Students' ability to understand or absorb the material that has been taught can be measured through assessments conducted by teachers. Learning achievement resulting from efforts in the learning process can be measured through exams. Therefore, it can be concluded that learning achievement is an ability obtained from an effort, in this case, the learning effort that is visible in each exam that shows changes in student behavior and learning abilities (Widiati et al., 2022) . Education is the most important foundation for creating an intelligent and healthy generation. One element that supports student learning success is nutritional conditions. Good nutrition significantly influences brain development, focus, and physical endurance of students. Starting the beginning of the 2024/2025 academic year, SDS Maniamas Ngabang is one of the schools that received the Free Nutritious Meal (MBG) program from the local government. This initiative aims to ensure that students receive adequate nutrition during the school day. In mathematics lessons that require a high level of concentration, the impact of nutrition on student learning outcomes is crucial to investigate. Therefore, this study was conducted to determine whether a nutritious diet through the MBG program impacts student mathematics achievement at SDS Maniamas Ngabang.

Good nutritional status is crucial for ensuring proper growth and development, especially for children in elementary school. Malnutrition, whether in the form of stunting or obesity, can negatively impact children's health and academic

performance, and can have long-term consequences. To address this issue, various countries have implemented school nutrition programs to increase students' access to healthy foods (Devi & Jatra, 2022) . A healthy diet should be complemented by proper nutrition. This means that elementary school children need to receive the nutrients their bodies need, which come from the food they eat every day. Besides providing energy, nutritious food also plays a crucial role in brain development. A diet lacking adequate nutrition can disrupt brain metabolism and negatively impact students' academic performance (Melania et al., 2022) .

Providing adequate nutrition for school-aged children is crucial to support their growth and development. Childhood is a crucial period, characterized by intensive growth and development, requiring a balanced nutritional supply. Adequate nutrition serves to maintain physical health, increase endurance, and facilitate intellectual development (Kevin Andreas Halomoan Tambunan et al., 2025) . This situation of malnutrition directly impacts the nutritional status of the community, especially children who are highly vulnerable to malnutrition. One step taken by the Indonesian government to increase public access to nutritious food is the Free Nutritious Meal (MBG) policy, which aims to encourage healthy eating habits and reduce malnutrition rates. However, despite the positive objectives of this policy, its implementation faces several challenges that require further research (Fatimah et al., 2024) .

Research Methods

This research method uses a quantitative approach to measure the effect of nutritious food consumption patterns on students' mathematics learning achievement. The collected data will be analyzed statistically to determine the relationship between the variables studied. This research will be conducted at Maniamas Private Elementary School (SDS) located in Ngabang, Landak Regency, West Kalimantan Province, with postal code 79354. This research will be conducted in the odd semester of the 2024/2025 academic year. The population in this study is all fifth grade students of SDS Manisamas Ngabang in the 2024/2025 academic year, totaling 95 students spread across three classes: VA, VB, and VC. According to (Candra Susanto et al., 2024) A sample refers to a portion of a population selected for observation or research purposes. By using a sample, researchers can make more efficient and cost-effective generalizations from the sample to the entire population. Proper sample selection is crucial to ensure that the resulting picture is accurate and reflects the entire population. The use of non-representative samples can lead to errors in generalizing research results. Data collection methods using tests are a form of measurement in education or learning. Measurement is the procedure for assigning numbers or symbols to the attributes of an object or activity according to certain rules based on agreed-upon criteria and rules. Learning outcome measurement is the process of measuring competency achievement by students (Saputra et al., 2022) . Documentation is a planned process for collecting, recording, and organizing relevant information or

official evidence. The primary goal of this activity is to produce accurate and structured records, whether in written form, images, videos, or other formats. (Hasan, 2022) .

A normality test is a method for determining whether data obtained from the field conforms to a specific theoretical distribution, specifically the normal distribution. In other words, the purpose of this test is to identify whether the collected data originate from a population with a normal distribution. Data are considered to follow a normal distribution if they approximate a normal distribution pattern, where the data are clustered around the mean or median. A normal distribution can occur when the number of data above and below the mean is balanced, and the standard deviation is also balanced (Haniah, 2023) . It is used to determine whether the distribution of pretest and posttest data is normally distributed. The tests used are: Shapiro-Wilk or Kolmogorov-Smirnov. The homogeneity test functions to determine whether the variances of several populations are equal or not. This process is a very important initial step before conducting analyses such as the independent sample t-test and ANOVA. The test for equality of two variances is conducted to assess whether the data distribution is homogeneous by comparing the variances of two or more groups. If the variances of the data groups are similar, there is no need to conduct a homogeneity test again because the data is already considered homogeneous. Homogeneity test can be carried out if the data group follows a normal distribution. (Usmadi, 2020) . This test is conducted to determine whether the variance between data groups is homogeneous. The test used is Levene's Test. A hypothesis test is an initial, temporary statement regarding an issue that is still conjectural and requires proof of its truth. This conjecture is a temporary truth that will be tested with data obtained during the research process (Mandailina et al., 2022) .

Results and Discussions

The research of results section contains exposure to the results of the analysis related to research questions. Any research results should be discussed. The discussion contains the meaning of the results and a comparison with the theory and/or the results of similar research. Length of exposure to results and discussion of 75-85% of the total length of the article. If results are separate from the discussion, the Results section only presents the results of research without having to discuss, new discussions are conducted in Discussion. Start systematically writing results. Do not present images from table data (use only one).

The normality test aims to determine whether data is normally distributed. This test is performed using the Kolmogorov-Smirnov method. The standard used is that if the significance value (p-value) is greater than 0.05, the data can be considered normally distributed.

Table 1 Normality Test Results

	Before Intervention	After Intervention
N	35	35
Kolmogorov-Smirnov Z	1,137	1,059
Asymp. Sig. (2-tailed)	0.151	0.209

The Asymp. Sig. (2-tailed) value for the data before the intervention was 0.151 , and for the data after the intervention was 0.209 . Both values are greater than 0.05 , so it can be concluded that the mathematics score data before and after the intervention were normally distributed . Next, a homogeneity of variance test was conducted to ensure that the variance of the two data groups (before and after the intervention) was homogeneous . This test was conducted using the Levene's Test method , with the criteria that the data is considered homogeneous if the significance value (p-value) > 0.05.

Table 2 Results of Homogeneity Test

Levene Statistics	df1	df2	Sig.
1,341	1	68	0.251

The Levene test results showed a significance value (p-value) of 0.251 , which is greater than 0.05 . This indicates that the variance of the mathematics score data before and after the intervention is homogeneous . Furthermore, a paired t-test was used to test the comparative hypothesis between two groups of data, namely student scores before and after the intervention. The decision-making criteria were based on the significance value (p-value): if $p < 0.05$, then there is a significant difference between the two groups.

Table 3 Results of the t-test

	t	Df	Sig. (2-tailed)
DATA AFTER MBG - DATA BEFORE MBG	5,925	34	0.000

The t-test results showed a significance value of 0.000 ($p < 0.05$), indicating a significant difference between students' math scores before and after the intervention. The average increase of 3.45 points confirmed that the intervention had a positive impact on student learning outcomes. The free nutritious meal program (MBG) had a significant impact on improving students' math achievement. A healthy diet helps meet the essential nutritional needs required for brain development and cognitive function, which are crucial in the process of learning math. By obtaining adequate and balanced nutrition, students become more focused and have better memory, thus improving their academic achievement.

A study at SDS Maniamas Ngabang showed that after the implementation of the MBG program, there was a significant increase in students' math scores. This is in line

with the theory that good nutrition supports nerve function and increases energy during learning. Furthermore, the MBG program implemented in schools ensures that students' nutritious diets are better maintained and well-monitored. Not only does the MBG program provide academic benefits, it also has a positive impact on students' overall health, such as reducing the risk of disease and improving the immune system . The combination of good health and proper nutrition creates an optimal learning environment for children. Therefore, this free nutritious meal program is very important to continue to be promoted and developed as a strategy to improve the quality of education and children's health.

Conclusions and Suggestions

Based on the results of the data analysis and discussion that has been done, it can be concluded that the Free Nutritious Meals (MBG) program has a significant influence on students' mathematics learning achievement at SDS Maniamas Ngabang. The results of statistical tests show a significant increase in students' average scores after they participated in this program. In detail, the conclusions of this study are as follows: Improved Learning Achievement: There is a significant increase in students' mathematics learning achievement scores after participating in the MBG program. This is indicated by an increase in the average score from 85.83 (before the program) to 89.28 (after the program). Hypothesis Test Results: The results of the paired t-test show a significance value of 0.000, which is smaller than 0.05. This proves that the difference in scores before and after the intervention did not occur by chance, but was caused by the treatment, namely the MBG program. Impact of the MBG Program: The MBG program, which aims to improve nutritional intake, has been empirically proven to be positively correlated with increased student academic achievement, especially in mathematics subjects

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