

The Implications of Free Nutritious Meal Program for Learning Stamina among Tenth-Grade Senior High School Students in Banten Province

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ABSTRACT: This study analyzes the policy implications of the Free Nutritious Meal Program for the learning stamina of tenth-grade senior high school students in Banten Province. The study used a quantitative survey approach within a policy research design. The sample was selected through purposive sampling and consisted of 208 students and 35 language teachers from eight state senior high schools implementing the program in the Greater Tangerang area. Data were collected using five-point Likert-scale questionnaires and analyzed through descriptive statistics, normality tests, linearity tests, and simple linear regression. Student questionnaire results showed a positive and significant relationship between the Free Nutritious Meal Program and learning stamina, with $R = 0.775$, $R \text{ Square} = 0.601$, $t = 17.622$, and $\text{Sig.} = 0.000$. Teacher questionnaire results strengthened this finding, with $R = 0.833$, $R \text{ Square} = 0.693$, $t = 8.637$, and $\text{Sig.} = 0.000$. These results indicate that the program contributes to students' focus, concentration, physical energy, motivation, and readiness to learn. The program should be managed through menu quality standards, timely distribution, food safety, and learning-impact evaluation so that its policy benefits can be measured at the school level.

KEYWORDS: Free Nutritious Meal Program, learning stamina, senior high school students, education policy, school nutrition

1. INTRODUCTION

The Free Nutritious Meal Program has become one of the national nutrition fulfillment policies relevant to improving student quality. This policy operates within the mandate of the National Nutrition Agency, which was established through Presidential Regulation Number 83 of 2024. The National Nutrition Agency is responsible for implementing national nutrition fulfillment in a planned, systematic, and integrated manner. In the education sector, the target group includes students at elementary schools, junior high schools, senior high schools or equivalent institutions, and Islamic boarding school students. The program has been implemented gradually through Nutrition Fulfillment Service Units to improve students' access to safe, proper, and nutritionally adequate daily meals (Government of the Republic of Indonesia, 2024:2).

At the senior high school level, the benefits of the Free Nutritious Meal Program cannot be assessed only from food availability. The program must also be evaluated through its effect on students' physical readiness, focus, concentration, motivation, and endurance during learning. Tenth-grade students are in an academic adaptation phase after the transition from junior high school. During this phase, they face changes in academic workload, new social environments, longer study schedules, and higher cognitive demands. These conditions make nutrition fulfillment a supporting factor in maintaining learning readiness. Schools hold a strategic position in shaping healthy eating habits while supporting the learning process. Adequate food intake **helps** students maintain energy during lesson hours. In contrast, students who learn while hungry, tired, or undernourished tend to experience declining attention and lose concentration more quickly. From a nutrition science perspective, the brain requires a stable energy supply to perform cognitive functions, such as attention, working memory, problem solving, and decision making. Therefore, school-based nutrition intervention can be understood as biological support for the learning process.

Educational psychology also explains that learning readiness is not determined only by intellectual ability. Readiness emerges from the interaction between physical condition, motivation, learning environment, and social support. Self-Determination Theory emphasizes that learning motivation develops when students feel competent, socially connected, and able to participate meaningfully in learning activities (Ryan & Deci, 2000:68). Adequate energy and a more stable body condition can help students maintain their sense of competence and engagement during learning.

In this study, learning stamina refers to students' ability to maintain energy, focus, concentration, motivation, and physical endurance during the learning process. Learning stamina is not identical to physical strength alone. It also includes students' mental capacity to pay attention to learning materials, follow teacher instructions, complete assignments, and respond to instruction within a certain duration. Thus, learning stamina serves as an indicator for examining the relationship between nutritional support and the quality of classroom learning.

Banten Province, especially the Greater Tangerang area, was selected as the research setting because it has diverse school characteristics in terms of location, student population, and students' socioeconomic background. National policy implementation at the school level often shows variation in food distribution mechanisms, teacher supervision, meal timing, and student responses. These variations need empirical examination so that implementation of the Free Nutritious Meal Program is assessed not only administratively but also through its contribution to students' learning stamina.

Based on this background, this study focuses on the policy implications of the Free Nutritious Meal Program for the learning stamina of tenth-grade senior high school students in Banten Province. The research uses two data sources: students as program beneficiaries and language teachers as classroom observers of changes in students' learning behavior. The study aims to examine program implementation, students' learning stamina, the program's effect, the magnitude of that effect, and teachers' assessment of changes in learning stamina after program implementation.

2. THEORETICAL FRAMEWORK

Learning stamina is students' ability to maintain energy, focus, concentration, motivation, and physical endurance during the learning process. In educational psychology, learning stamina is related to executive brain functions, attention, working memory, self-control, and the ability to plan and complete tasks. Learning stamina is also related to physiological conditions, such as body energy levels, rest quality, and students' ability to manage learning loads. Self-Determination Theory explains that intrinsic motivation develops when three basic psychological needs are fulfilled, namely autonomy, competence, and relatedness (Ryan & Deci, 2000:68). In the Free Nutritious Meal Program, adequate energy can help students feel more physically and mentally capable, making them more prepared to sustain classroom attention. Cognitive Load Theory also states that learning ability decreases when mental resources are limited or cognitive load is too high (Sweller, 1988:257). Thus, learning stamina includes physical endurance and mental capacity to follow instruction for a certain duration.

Nutrition Science and Neuroscience in Learning studies the relationship between food intake, nutritional status, and body function, including cognitive function. Adequate nutrition helps maintain body energy, learning readiness, and students' academic performance. In educational neuroscience, the brain needs a stable energy supply to perform attention, memory, problem solving, and decision-making functions. Glucose obtained from food is one of the main energy sources for the brain. The World Health Organization places food and nutrition as factors related to long-term health and human quality of life (World Health Organization, 2003:4). In schools, nutritious food supports students' biological readiness to learn. In contrast, inadequate energy and nutrient intake can accelerate fatigue, reduce concentration, and hinder students' engagement in learning. Therefore, the provision of nutritious meals at school can be understood as an education intervention grounded in student health.

Language Learning Theory and Learning Motivation are relevant academic setting in this study because language teachers were involved as supporting respondents. Language functions not only as a communication tool but also as a means of constructing knowledge, understanding instructions, interpreting concepts, and expressing ideas. Piaget's cognitive development theory explains that learners construct knowledge through experience and interaction with the environment (Piaget, 1952:7). Vygotsky's sociocultural theory emphasizes that learning develops through social interaction, educational dialogue, and gradual support from teachers or peers (Vygotsky, 1978:86). In language classrooms, learning stamina appears in students' ability to maintain attention, follow instructions, read, write, engage in dialogue, and complete assignments. When students are physically more prepared, they have a greater opportunity to participate actively in learning interactions. Therefore, language teachers' assessments were used to observe changes in students' focus, concentration, motivation, and endurance from the perspective of classroom observers.

Free Nutritious Meal Program Policy is a government policy designed to meet students' nutritional needs by providing nutritious meals at school. This policy has an educational dimension because it relates to students' readiness to participate in the learning process. In policy analysis, a policy needs to be assessed through its implementation, benefits, and impact on the target group. Dunn (2021:45) explains that policy research produces relevant information to support decision making. From an education management perspective, an effective policy must aim to improve the quality of education services by meeting students' needs comprehensively. Fattah

(2019:37) emphasizes that education quality is not determined only by classroom instruction but also by supporting resources that enable students to learn optimally. Thus, the Free Nutritious Meal Program can be positioned as an education and health policy instrument that supports equitable nutrition access, learning readiness, and the quality of the learning process.

Relationship between the Free Nutritious Meal Program and Learning Stamina can be explained through physiological, cognitive, psychological, and managerial pathways. Physiologically, nutritious meals help students maintain body energy during school hours. Cognitively, stable energy supports attention, working memory, and problem solving. Psychologically, better physical readiness helps students feel more capable of participating in learning activities. Managerially, orderly, timely, and safe program implementation helps schools create a more conducive learning environment. The research framework positions the Free Nutritious Meal Program as the independent variable and learning stamina as the dependent variable. The better the quality of program implementation, the higher the likelihood that students will demonstrate stronger learning stamina. The research hypothesis states that the Free Nutritious Meal Program has a significant effect on the learning stamina of tenth-grade senior high school students in Banten Province.

3. RESEARCH METHODS

This study used a quantitative method with a survey approach. The quantitative approach was selected because the study aimed to test the relationship and effect of the Free Nutritious Meal Program on students' learning stamina through numerical data. The research design was policy research. This design was relevant because the research object was a government program implemented in education units and required assessment of its implications for the target group (Dunn, 2021:45; Sugiyono, 2023:14).

The research sites included eight state senior high schools receiving the Free Nutritious Meal Program in the Greater Tangerang area of Banten Province. The schools consisted of State Senior High School 6 of Tangerang City, State Senior High School 2 of Tangerang City, State Senior High School 3 of Tangerang Regency, State Senior High School 12 of Tangerang Regency, State Senior High School 6 of Tangerang Regency, State Senior High School 1 of Tangerang Regency, State Senior High School 7 of South Tangerang City, and State Senior High School 1 of South Tangerang City. These locations were selected because they met the research criteria: state schools that implemented the program and had tenth-grade students as the target group.

The population consisted of tenth-grade senior high school students in Banten Province who received the Free Nutritious Meal Program. The sample was determined using purposive sampling because not all senior high schools in Banten Province implemented the program when the research was conducted. The sample criteria included schools receiving the program, respondents who were tenth-grade students, students who had attended learning after program implementation, and schools located in Banten Province. In addition to students, this study involved language teachers as supporting data sources.

The number of student respondents was 208. These respondents came from eight schools with a relatively balanced distribution. The study also involved 35 language teachers. Teacher involvement was needed to obtain assessments from parties who directly observed changes in students' focus, concentration, energy, and learning endurance during classroom instruction. The combination of student and teacher data allowed the research results to describe not only program beneficiaries' perceptions but also confirmation from classroom observers.

Table 1. Distribution of Student Respondents by School

No.	School Name	Number of Student Respondents
1	Senior High School 6 of Tangerang City	23
2	Senior High School 2 of Tangerang City	25
3	Senior High School 3 of Tangerang Regency	24
4	Senior High School 12 of Tangerang Regency	25
5	Senior High School 6 of Tangerang Regency	32
6	Senior High School 1 of Tangerang Regency	25
7	Senior High School 7 of South Tangerang City	26
8	Senior High School 1 of South Tangerang City	28
	Total	208

The research instrument was a questionnaire using a five-point Likert scale. The independent variable was the Free Nutritious Meal Program, while the dependent variable was learning stamina. The Free Nutritious Meal Program questionnaire measured five indicators: food quality, implementation punctuality, food hygiene and safety, program benefits, and satisfaction with program implementation. The learning stamina questionnaire measured four indicators: focus, concentration, motivation, and physical condition. Each variable consisted of 20 statement items.

Validity testing was conducted using Pearson Product Moment correlation. The results showed that all instrument items for the Free Nutritious Meal Program and learning stamina variables had r -count values greater than the r -table value of 0.361, so all items were declared valid (Arikunto, 2022:173). Reliability testing used the Cronbach Alpha coefficient. All Cronbach Alpha values were above 0.70, indicating that the instruments were reliable and appropriate for use in this study (Riduwan, 2021:12).

Data were analyzed using descriptive and inferential statistics. Descriptive analysis was used to describe means, data distribution, minimum values, maximum values, skewness, and kurtosis. Normality testing was used to assess data distribution. Linearity testing was used to confirm the relationship pattern between the Free Nutritious Meal Program and learning stamina. Simple linear regression was then used to test the effect of the independent variable on the dependent variable. Hypothesis testing referred to a significance value of 0.05. If the significance value was lower than 0.05, the alternative hypothesis was accepted (Ghozali, 2022:51; Montgomery & Runger, 2014:461).

Table 2. Instrument Reliability Summary

Respondent Group	Variable	Cronbach Alpha	Number of Items	Description
Students	Free Nutritious Meal Program	0.927	20	Reliable
Teachers	Free Nutritious Meal Program	0.946	20	Reliable
Students	Learning Stamina	0.936	20	Reliable
Teachers	Learning Stamina	0.866	20	Reliable

4. RESEARCH RESULTS

The study was conducted in several state senior high schools in Banten that had received the Free Nutritious Meal Program. Field observations showed that meals were not distributed through school canteens but were given directly to students. Teachers accompanied the distribution and meal consumption process. Some schools used unused classrooms as temporary storage spaces so that meals could be monitored and distributed in an orderly manner.

In general, students' participation in the program was high. Students received meals according to the schedule set by each school. Teachers reported that the program helped students participate in learning with better physical readiness, especially during lessons requiring high concentration. Even so, implementation mechanisms across schools still showed variation, particularly in consumption supervision, distribution timing, and temporary food storage management.

Student data processing showed that all respondent data could be analyzed. Among students, the Free Nutritious Meal Program variable had a mean score of 60.96 with a standard deviation of 8.588. The learning stamina variable had a mean score of 70.51 with a standard deviation of 8.399. These values indicate that students gave a fairly positive assessment of program implementation, while learning stamina was in a good category.

Among teachers, the Free Nutritious Meal Program variable had a mean score of 70.06 with a standard deviation of 12.107. The learning stamina variable had a mean score of 70.31 with a standard deviation of 10.163. These values indicate that teachers assessed program implementation as fairly good to good. Teachers also assessed students' learning stamina as relatively high after program implementation. Teacher data supported student data because both showed a consistent direction of assessment.

Table 3. Descriptive Statistics of Research Variables

Group	Variable	N	Mean	Std. Error	Std. Deviation	Minimum	Maximum
Students	Free Nutritious Meal Program	208	60.96	0.595	8.588	38	85
Students	Learning Stamina	208	70.51	0.582	8.399	45	91
Teachers	Free Nutritious Meal Program	35	70.06	2.046	12.107	42	95
Teachers	Learning Stamina	35	70.31	1.718	10.163	45	88

The normality test on student data showed that the Free Nutritious Meal Program variable had a Kolmogorov-Smirnov significance value of 0.200 and a Shapiro-Wilk value of 0.724. For the learning stamina variable, the Kolmogorov-Smirnov significance value was 0.017 and the Shapiro-Wilk value was 0.384. The difference in the Kolmogorov-Smirnov result can be explained by the large number of student respondents, which makes the test more sensitive to small deviations. The Shapiro-Wilk value greater than 0.05 indicates that the data were still appropriate for parametric statistical analysis.

Table 4. Normality Test of Student Data

Variable	Kolmogorov-Smirnov Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Free Nutritious Meal Program	0.042	208	0.200*	0.995	208	0.724
Learning Stamina	0.069	208	0.017	0.993	208	0.384
	This is a lower bound of the true significance.			Lilliefors Significance Correction.		

The normality test on teacher data showed that the Free Nutritious Meal Program variable had a Kolmogorov-Smirnov significance value of 0.140 and a Shapiro-Wilk value of 0.196. For the learning stamina variable, the Kolmogorov-Smirnov significance value was 0.200 and the Shapiro-Wilk value was 0.492. Therefore, teacher data for both variables were normally distributed.

Table 5. Normality Test of Teacher Data

Variable	Kolmogorov-Smirnov Statistic	df	Sig.	Shapiro-Wilk Statistic	df	Sig.
Free Nutritious Meal Program	0.130	35	0.140	0.958	35	0.196
Learning Stamina	0.094	35	0.200*	0.972	35	0.492
	This is a lower bound of the true significance.			Lilliefors Significance Correction.		

The linearity test on student data showed a Linearity significance value of 0.000 and a Deviation from Linearity value of 0.593. These results indicate a significant linear relationship between the Free Nutritious Meal Program and learning stamina, without meaningful deviation from linearity. Changes in the program variable were followed by changes in the same direction in learning stamina. This finding indicates that better implementation of the Free Nutritious Meal Program tends to be followed by higher student learning stamina.

Table 6. Linearity Test Results of Student Data

Source	Component	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	Combined	14375.157	200	71.876	2.460	0.102
Between Groups	Linearity	8765.103	1	8765.103	300.052	0.000
Between Groups	Deviation from Linearity	5610.054	199	28.191	0.965	0.593
Within Groups		204.483	7	29.212		
Total		14579.640	207			

In teacher data, the Linearity significance value was 0.000 and the Deviation from Linearity value was 0.933. These results show a significant linear relationship between the Free Nutritious Meal Program and student learning stamina. Thus, better implementation of the Free Nutritious Meal Program tends to be followed by a linear increase in students' learning stamina.

Table 7. Linearity Test Results of Teacher Data

Source	Component	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	Combined	2825.876	19	148.730	3.254	0.012
Between Groups	Linearity	2434.622	1	2434.622	53.261	0.000
Between Groups	Deviation from Linearity	391.254	18	21.736	0.476	0.933
Within Groups		685.667	15	45.711		
Total		3511.543	34			

The relationship between the two variables in teacher data also met the linearity assumption. Therefore, the data were suitable for simple linear regression analysis to determine the magnitude of the effect of the Free Nutritious Meal Program on students' learning stamina.

Simple linear regression analysis on student data produced an R value of 0.775. This value indicates a strong and positive relationship between the Free Nutritious Meal Program and learning stamina. The R Square value of 0.601 indicates that 60.1% of the variation in students' learning stamina can be explained by implementation of the Free Nutritious Meal Program. The remaining 39.9% is explained by factors outside the model, such as individual health, sleep quality, learning motivation, family environment, physical activity, and students' psychological condition.

Table 8. Model Summary of Student Data

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.775a	0.601	0.599	5.313
	Predictor: Free Nutritious Meal Program.			

The ANOVA test on student data produced an F value of 310.534 with a significance value of 0.000. This value indicates that the regression model was significant and appropriate for explaining the relationship between the Free Nutritious Meal Program and learning stamina. The coefficient test showed a constant of 24.319 and a regression coefficient of 0.758. The resulting regression equation was $Y = 24.319 + 0.758X$. This means that each one-unit increase in the implementation score of the Free Nutritious Meal Program was followed by a 0.758-unit increase in learning stamina.

Table 9. ANOVA of Student Data

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8765.103	1	8765.103	310.534	0.000b
1	Residual	5814.537	206	28.226		
1	Total	14579.640	207			
	Dependent variable: Learning Stamina. Predictor: Free Nutritious Meal Program.					

In teacher data, regression analysis produced an R value of 0.833 and an R Square value of 0.693. These results indicate that the relationship between the Free Nutritious Meal Program and learning stamina based on teacher assessment was also strong and positive. A total of 69.3% of the variation in students' learning stamina could be explained by the Free Nutritious Meal Program.

Table 10. Model Summary of Teacher Data

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.833a	0.693	0.684	5.713
	Predictor: Free Nutritious Meal Program.			

The ANOVA test on teacher data produced an F value of 74.604 with a significance value of 0.000. The coefficient test showed a constant of 21.349 and a regression coefficient of 0.699. Therefore, the resulting regression equation was $Y = 21.349 + 0.699X$.

Table 11. ANOVA of Teacher Data

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2434.622	1	2434.622	74.604	0.000b
1	Residual	1076.921	33	32.634		
1	Total	3511.543	34			
	Dependent variable: Learning Stamina. Predictor: Free Nutritious Meal Program.					

The t-test on student data showed a calculated t value of 17.622 with a significance value of 0.000. Because the significance value was lower than 0.05, the Free Nutritious Meal Program variable had a significant effect on students' learning stamina. The results are presented in Table 12.

Table 12. t-Test Results of Student Data

Model	Variable	B	Std. Error	Beta	t	Sig.
1	Constant	24.319	2.647		9.188	0.000
1	Free Nutritious Meal Program	0.758	0.043	0.775	17.622	0.000
Note	Dependent variable: Learning Stamina.					

Thus, the research hypothesis stating that the Free Nutritious Meal Program affects students' learning stamina was accepted, while the null hypothesis was rejected. In teacher data, the calculated t value was 8.637 with a significance value of 0.000. This result shows that the effect of the Free Nutritious Meal Program on learning stamina was strong. Therefore, the Free Nutritious Meal Program had a significant effect on students' learning stamina based on teacher assessment.

Table 13. t-Test Results of Teacher Data

Model	Variable	B	Std. Error	Beta	t	Sig.
1	Constant	21.349	5.751		3.713	0.001
1	Free Nutritious Meal Program	0.699	0.081	0.833	8.637	0.000

These results strengthened the decision to reject the null hypothesis. Based on teachers' perceptions, there was a significant and positive relationship between the Free Nutritious Meal Program and students' learning stamina.

5. CONCLUSION

This study concludes that the Free Nutritious Meal Program has a positive and significant effect on the learning stamina of tenth-grade senior high school students in Banten Province. Student data analysis showed $R = 0.775$, $R^2 = 0.601$, calculated $t = 17.622$, and significance = 0.000. Teacher data analysis showed $R = 0.833$, $R^2 = 0.693$, calculated $t = 8.637$, and significance = 0.000. All results showed a strong, positive, and significant relationship.

The Free Nutritious Meal Program contributes to improving students' focus, concentration, energy, motivation, and learning readiness. The program also helps teachers create a more conducive learning condition because students have better learning endurance. Nevertheless, learning stamina is still influenced by factors outside the program, such as health, sleep patterns, motivation, family environment, physical activity, and students' psychological condition.

Based on these findings, government and schools need to maintain and improve the quality of Free Nutritious Meal Program implementation. Routine evaluation should address food quality, distribution punctuality, hygiene, safety, student satisfaction, and program impact on the learning process. Future research should add actual nutritional status and academic achievement indicators so that the relationship between nutrition intervention and educational outcomes can be explained in greater depth.

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