

Knowledge and Attitudes Significantly Influence Consumption Behavior of the Free Nutritious Meals Program Among Students at High School

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ABSTRACT

The Free Nutritious Meals Program is a governmental initiative designed to improve the nutritional status of school-age children by providing daily nutritious meals. The effectiveness of this program depends not only on food availability but also on students' knowledge and attitudes toward healthy eating behaviors. This study aims to analyze the influence of knowledge and attitudes on consumption behavior related to the Free Nutritious Meals Program among students at State Senior High School 3 in Bima City. A cross-sectional design was employed involving a population of all students at the school, with a sample of 160 students selected through stratified random sampling. Data were collected using a structured questionnaire and analyzed using simple and multiple linear regression. A total of 124 students demonstrated insufficient knowledge, 102 students exhibited positive attitudes, and 119 students showed good consumption behavior related to the Free Nutritious Meals Program. Knowledge significantly influenced consumption behavior ($p < 0.001$), and attitude also had a significant effect ($p < 0.001$). When analyzed together, knowledge and attitude jointly influenced consumption behavior ($p < 0.001$). Attitude had a stronger effect ($B = 1.103$) compared to knowledge ($B = 0.258$). Both variables explained 27.0% of the variation in consumption behavior, while the remaining 73.0% was attributed to other factors not examined in this study. In conclusion, knowledge and attitude significantly influence students' consumption behavior related to the Free Nutritious Meals Program at State Senior High School 3 in Bima City.

Keywords: free nutritious meals; knowledge; attitudes; consumption behavior; high school students

INTRODUCTION

Nutritional problems among school-aged children remain a challenge in Indonesia because not all children are able to meet their nutritional needs optimally, even though this is a period of growth that requires adequate nutritional intake to support health, physical function, and intellectual ability [1]. High school students belong to the adolescent age group, which is in a transitional phase toward adulthood; therefore, the formation of dietary habits during this period is crucial for future health [2]. In this regard, schools play a strategic role in shaping adolescents' dietary habits, as the majority of their activities take place within the school environment [3].

According to the 2024 Indonesian Nutrition Status Survey, issues such as stunting, wasting, underweight, and overweight remain challenges in various regions across Indonesia [4]. At the global level, efforts to address child nutrition issues have been strengthened through the School Meals Coalition, established following the 2021 United Nations Food Systems Summit to ensure that every child receives nutritious meals at school by 2030 [5]. As a follow-up, the Indonesian government established the National Nutrition Agency and implemented the Free Nutritious Meals Program to improve nutritional intake among both educational and non-educational groups [6]. Since its implementation in 2025, this program has reached millions of beneficiaries through thousands of service units across various regions of Indonesia [7]. In West Nusa Tenggara, the program is implemented through Nutrition Service Units, including the Nutrition Service Unit Raba Rabadompu Barat 1, which serves State Senior High School 3 in Bima City as one of the program's beneficiaries [8,9].

Various studies show that school-based nutritious meal programs not only contribute to meeting nutritional needs but also support the development of students' cognitive abilities. A study on the implementation of the Nutrition Improvement Program in China found that school-based nutritious meal programs significantly improved the cognitive abilities of students living in poverty through improved health status, increased sense of belonging to school, and more positive expectations for the future. These findings reinforce the importance of nutritious meal programs as an investment in human resource development [10].

The Free Nutritious Meals Program itself is designed based on the principle of balanced nutrition to help meet students' daily nutritional needs [7]. However, the program's success is determined not only by food availability but also by students' level of knowledge and awareness regarding the importance of balanced nutrition. Good nutritional knowledge can increase acceptance of healthy foods and foster better eating habits [11]. Nevertheless, variations in students' acceptance of meals provided through the Free Nutritious Meals Program persist, with some students readily accepting and consuming the food, while others refuse or leave portions uneaten [12,13].

In addition to knowledge, attitudes also play a role in influencing consumption behavior because they reflect an individual's tendency to act [14]. Knowledge serves as the foundation for the formation of a person's attitudes and behavior [15]. This is consistent with the Guidelines for a Balanced Diet, which emphasize a varied diet, good hygiene, physical activity, and weight monitoring as efforts to maintain optimal nutritional status [16]. During school-age years, a high capacity to absorb information makes nutritional understanding a key factor in shaping consumption behavior [17].

Previous research findings indicate that knowledge and attitudes have a significant relationship with consumption behavior. Studies have shown that knowledge and attitudes are associated with fast-food consumption behavior among students [14,18]. Additionally, knowledge and attitudes also influence herbal medicine consumption behavior [19]. In line with this, knowledge and attitudes are known to influence breakfast consumption behavior [20]. However, studies specifically examining the influence of knowledge and attitudes on consumption behaviors related to the Free Nutritious Meals Program among high school students remain limited. Preliminary observations at State Senior High School 3 in Bima City indicate that some students still leave animal-based side dishes, plant-based side dishes, and vegetables on the menu provided through the Free Nutritious Meals Program because they are considered unappealing. These findings suggest that students' consumption behavior related to the Free Nutritious Meals Program is not yet optimal. Therefore, this study aims to analyze the influence of knowledge and attitudes on consumption behavior related to the Free Nutritious Meals Program among students at State Senior High School 3 in Bima City.

METHODS

The study was conducted at State Senior High School 3 in Bima City from May 4 to June 4, 2026. This research employed an observational analytical design with a cross-sectional approach, in which all variables were measured simultaneously at one point in time. The study population

consisted of all 266 students enrolled at State Senior High School 3 in Bima City. The sample size was determined using the Slovin formula with a precision level of five percent, resulting in a sample of 160 students selected through stratified random sampling.

The research involved three variables: knowledge, attitudes, and consumption behavior related to the Free Nutritious Meals Program. Primary data were collected using a structured questionnaire completed directly by respondents, while secondary data were obtained from the school regarding the number of students actively receiving free nutritious meals. The questionnaire had undergone validity and reliability testing prior to use. The knowledge variable measured understanding of the four pillars of balanced nutrition and the "My Plate" concept. The attitude variable assessed students' perceptions and tendencies toward consuming free nutritious meals. The behavior variable measured actual consumption practices related to the free nutritious meals provided at school. Validity testing showed that all questionnaire items were valid, with correlation coefficients ranging from 0.370 to 0.785 for the knowledge variable, 0.397 to 0.758 for the attitude variable, and 0.370 to 0.813 for the behavior variable (reference correlation value = 0.361). Reliability testing demonstrated that all instruments were reliable, with Cronbach's alpha values greater than 0.60, specifically 0.848 for knowledge, 0.650 for attitude, and 0.835 for behavior.

Data analysis consisted of three stages. First, classical assumption testing was conducted to ensure that the linear regression model met analytical requirements. Second, univariate analysis was performed to describe the distribution of each variable. Third, bivariate analysis was carried out to examine the relationship between independent and dependent variables and to address the research hypotheses and objectives.

RESULTS

The results of the study on the influence of knowledge and attitudes on the consumption of free nutritious meals (MBG) among students at State High School 3 in Bima City are as follows.

Classical assumption tests

Normality test

As can be seen from the Figure 1, the histogram shows a normal distribution pattern; therefore, the regression model satisfies the assumption of normality. As can be seen from the Figure 2, the data points are scattered around the diagonal line and follow its direction; therefore, the regression model satisfies the assumption of normality. After conducting a normality test, it was found that the p-value was >0.05, specifically 0.200. Therefore, it can be concluded that the residuals are normally distributed (Table 1).

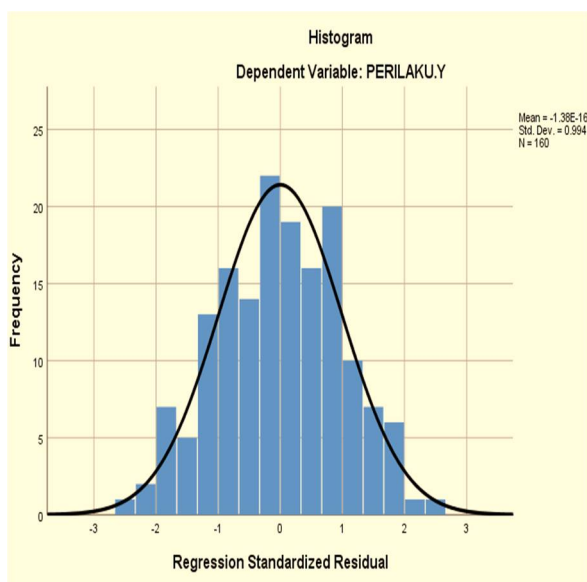


Figure 1. Histogram

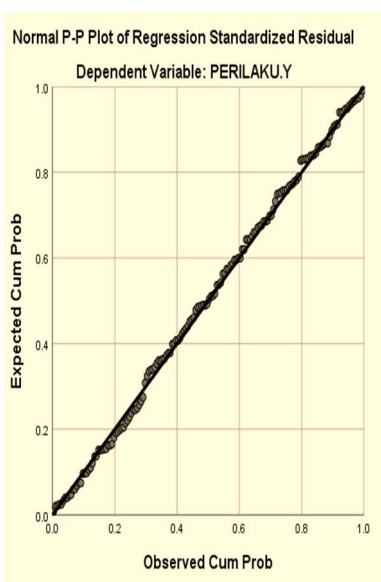


Figure 2. Probability plot

Table 1. The results of one-sample Kolmogorov-Smirnov test

		Unstandardized residual
N		160
Normal parameters ^{a,b}	Mean	0.0000000
	SD	5.06873424
Most extreme differences	Absolute	0.035
	Positive	0.030
	Negative	-0.035
Test statistic		0.035
p-value		0.200 ^{c,d}

a. Test distribution is normal
b. Calculated from data

Multicollinearity and heteroscedasticity test

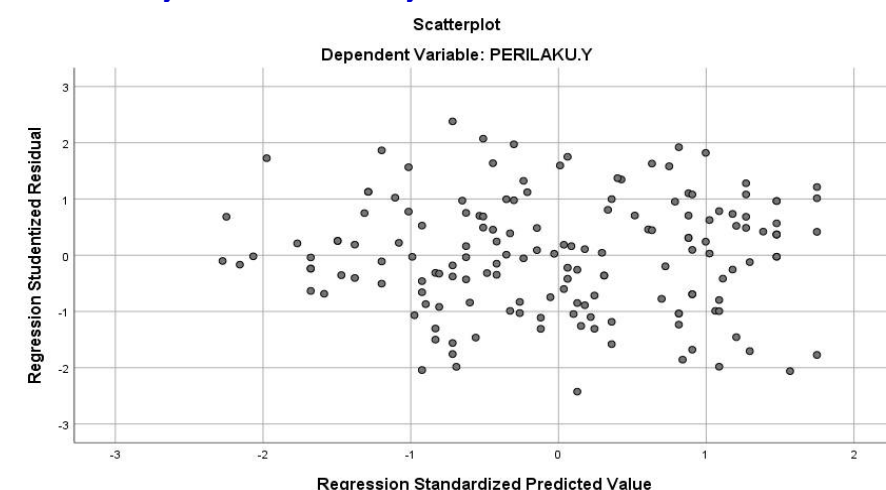


Figure 3. Scatterplot test

Table 2. The results of multicollinearity test

Model	Collinearity statistics	
	Tolerance	VIF
Knowledge	0.813	1.230
Attitude	0.813	1.230

Based on the Table 2, it can be seen that the VIF values for the knowledge and attitude variables are $1.230 < 10$ and the tolerance values are $0.813 > 0.1$; therefore, there is no multicollinearity in the data. Based on the results of the heteroscedasticity test using a scatterplot, it was found that the data points are randomly distributed, do not form any specific pattern, and are scattered both above and below the 0 mark on the Y-axis. Thus, it can be concluded that there is no heteroscedasticity in the regression model.

Respondent characteristics

Based on Table 3, it is evident that the majority of respondents were from 10th grade, totaling 92 students (57.5%); the majority of respondents were in the 15–16 age group, totaling 105 students (65.6%); and based on gender, there were more male respondents than female respondents, totaling 90 students (56.3%). The total number of respondents in this study was 160 students.

Based on Table 4, the data shows that the highest frequency of knowledge was among 124 people (77.5%) in the “insufficient” category, the highest frequency of attitude was among 102 people (63.7%) in the “positive” category, and the highest frequency of behavior was among 119 people (63.7%) in the “good” category.

The influence of knowledge on Free Nutritious Meal consumption behavior

Based on the results of the statistical test of the effect of knowledge on behavior in Table 5, a constant value of 27.779 was obtained with a significance value of $p < 0.001$. The knowledge variable has a regression coefficient (B) of 0.490, a standardized beta coefficient of 0.347, and a calculated t-value of 4.650. The significance value obtained was $p < 0.001$, indicating that the result was statistically significant ($p < 0.05$). These results indicate that knowledge has a significant effect on behavior. The positive regression coefficient indicates that the better the respondents knowledge, the better their behavior tends to be. Thus, knowledge has a positive and significant effect on the respondents behavior.

The influence of attitude on Free Nutritious Meal consumption behavior

Based on the results of the statistical test of the effect of attitude on behavior in Table 6, a constant value of 20.958 was obtained with a significance level of $p < 0.001$. The attitude variable had a regression coefficient (B) of 1.331, a standardized beta coefficient of 0.459, and a calculated t-value of 6.502. The significance value obtained was $p < 0.001$, indicating that the result was statistically significant ($p < 0.05$). These results indicate that attitude has a significant effect on behavior. The positive regression coefficient indicates that the more positive the respondents' attitudes are, the better their behavior tends to be. Thus, attitude has a positive and significant effect on the respondents behavior.

The influence of knowledge and attitude on Free Nutritious Meal consumption behavior

Based on the results of the statistical test of the influence of knowledge and attitude on behavior in Table 7, a constant value of 20.653 was obtained with a significance value of $p < 0.001$. For the knowledge variable, a regression coefficient (B) of 0.258 was obtained, with a standardized beta coefficient of 0.182 and a calculated t-value of 2.360. The significance value for the knowledge variable is 0.020, which is less than 0.05 ($p < 0.05$). These results indicate that knowledge has a significant influence on behavior. The positive regression coefficient suggests that as respondents knowledge improves, their behavior also tends to improve.

For the attitude variable, the regression coefficient (B) was 1.103, with a standardized beta coefficient of 0.381 and a calculated t-value of 4.926. The significance value for the attitude variable was $p < 0.001$, which is less than 0.05 ($p < 0.05$). These results indicate that attitude has a significant influence on behavior. The positive regression coefficient indicates that the more positive the respondents attitude, the better their behavior tends to be. Based on these results, it can be concluded that knowledge and attitude together influence the respondents behavior. Furthermore, the attitude variable has a greater influence than the knowledge variable, as evidenced by the higher standardized beta coefficient for the attitude variable.

Based on Table 8, the results show that the R-squared value is 0.238. This means that the variables of knowledge and attitude together account for 23.8% of the variation in students consumption behavior regarding the Free Nutritious Meals (MBG) program. Thus, 76.2% of the variation in MBG consumption behavior is influenced by other factors not examined in this study.

Table 3. Demographic characteristics of respondents

Demographic characteristics	Category	Frequency	Percentage
Class	10 th	92	57.5
	11 th	68	42.5
Age (years)	15-16	105	65.6
	17-18	55	34.4
Sex	Female	70	43.8
	Male	90	56.3

Table 4. Students knowledge, attitudes, and behavior regarding Free Nutritious Meal consumption

Variable	Category	Frequency	Percentage
Knowledge	Poor	124	77.5
	Good	36	22.5
Attitude	Negative	58	36.3
	Positive	102	63.7
Behavior	Poor	41	25.6
	Good	119	74.4

Table 5. Results of statistical analysis of the influence of knowledge on behavior

Model	Unstandardized coefficients		Standardized coefficients beta	t	p
	B	Std. Error			
(Constant)	27.779	0.996		27.901	<0.001
Knowledge	0.490	0.105	.347	4.650	<0.001

Table 6. Results of statistical analysis of the influence of attitude on behavior

Model	Unstandardized coefficients		Standardized coefficients beta	t	p
	B	Std. Error			
(Constant)	20.958	1.739		12.049	<0.001
Knowledge	1.331	0.205	0.459	6.502	<0.001

Table 7. Results of statistical analysis of the influence of attitude on behavior

Model	Unstandardized coefficients		Standardized coefficients beta	t	p
	B	Std. Error			
(Constant)	20.653	1.720		12.010	<0.001
Knowledge	.258	0.109	0.182	2.360	0.020
Attitude	1.103	0.224	0.381	4.926	<0.001

Table 8. Results of the simultaneous analysis of the coefficient of determination

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.488a	0.238	0.228	5.101

DISCUSSION

The influence of knowledge on Free Nutritious Meal consumption behavior

The research results indicate that there is a positive and significant effect of knowledge of the four pillars of balanced nutrition on the consumption behavior of the Free Nutritious Meals program among students at State Senior High School 3 in Bima City. Thus, the results of this study confirm the alternative hypothesis stating that "Knowledge influences the consumption behavior of the Free Nutritious Meal program among students at State High School 3 in Bima City."

The results indicate that the higher the level of knowledge, the better the behavior. Good knowledge can serve as a foundation for individuals to understand and adopt appropriate behaviors, thereby positively influencing their behavior. Although most respondents still have a low level of knowledge, increased knowledge still contributes to the development of better behavior. Thus, respondents with a higher level of knowledge tend to exhibit better behavior compared to those with a lower level of knowledge. This finding aligns with Lawrence Green's theory, which states that knowledge is a key factor in shaping an individual's beliefs and intentions regarding healthy behavior. In this theory, knowledge is classified as a predisposing factor—that is, a factor influencing an individual's tendency to act or behave in a healthy manner [21].

The results of this study are consistent with research on factors associated with the Free Nutritious Meal consumption behavior of students at SDN 131 in Jambi City, which was analyzed using the Chi-Square test and yielded a p-value of 0.001; indicating a significant relationship between knowledge and Free Nutritious Meal (MBG) consumption behavior among students at SDN 131 in Jambi City [22]. Other studies have also shown a significant relationship between the level of nutritional knowledge and the consumption of nutritious foods among elementary school students. These findings reveal that students with good nutritional knowledge tend to be more consistent in consuming healthy foods compared to students with low levels of nutritional knowledge [23].

Other studies have shown that there is a significant association between nutritional knowledge and adolescents eating behaviors in Kediri Regency. These findings indicate that nutritional knowledge plays a crucial role in shaping adolescents eating behaviors, particularly in determining the types and amounts of food consumed. The better one's nutritional knowledge, the better their eating behaviors [24].

The influence of attitude on Free Nutritious Meal consumption behavior

This study shows that there is a positive and significant relationship between attitudes toward the Free Nutritious Meals (MBG) program and consumption behavior regarding the Free Nutritious Meals (MBG) program among students at State Senior High School 3 in Bima City. Thus, the results of this study support the alternative hypothesis stating that "Attitude influences the consumption behavior of Free Nutritious Meals among students at State Senior High School 3 in Bima City." This indicates that the better a person's attitude toward consuming Free Nutritious Meals, the better their consumption behavior regarding Free Nutritious Meals (MBG) will be.

The findings of this study are consistent with health behavior theory, which states that attitudes are a key factor in shaping behavior. A positive attitude toward the Free Nutritious Meals Program (MBG) can encourage students to be more receptive to and consume the food provided, thereby fostering better eating habits. These attitudes are also influenced by students' understanding of the benefits of nutritious food, as well as support from the school environment through nutrition education provided by teachers and school administrators [22].

Research indicates a significant association between attitudes toward food selection and eating behaviors among adolescents in Kediri Regency [24]. In line with this study, another study also showed that attitudes have a significant relationship with Free Nutritious Meal consumption behavior among students at SDN 131 in Jambi City, with a p-value of 0.007 ($p < 0.05$). Risk analysis results indicate that students with positive attitudes are approximately twice as likely to exhibit good Free Nutritious Meal consumption behavior compared to students with negative attitudes [22]. The study results indicate a relationship between attitude and fruit and vegetable consumption behavior among fifth-grade students at SDN 101866 Batang Kuis with a p-value of 0.025; this means that students with positive attitudes tend to exhibit good fruit and vegetable consumption behavior [25]. Another study found that more than 95% of respondents had an interest in and a positive attitude toward seaweed consumption, yet only 41% consumed it regularly. These results indicate that attitudes can influence consumption behavior; the more positive a person's attitude toward a particular food, the greater the tendency to consume it [26].

However, this study contradicts research indicating that there is no significant association between attitudes and fruit and vegetable consumption among eighth-grade students at MTS N 2 Rokan Hulu. The findings of that study show that although the students have positive attitudes and are aware of the health benefits of fruits and vegetables, their consumption of these foods remains low [27].

The influence of knowledge and attitude on Free Nutritious Meal consumption behavior

This study shows that knowledge and attitude have a significant effect on behavior. This means that both knowledge and attitude influence students' behavior regarding the Free Nutritious Meals program. The attitude variable has a greater influence on behavior than knowledge. This is evident from the B value of 1.103, which means that every increase in attitude will increase behavior by 1.103 units. Meanwhile, knowledge has a B value of 0.258, which means that an increase in knowledge can also increase behavior, but its influence is smaller than that of attitude.

A constant value of 20.653 indicates that if knowledge and attitude remain unchanged, the behavioral score will remain at that level. Based on the standard Beta value, attitude also appears to be more dominant (0.381) compared to knowledge (0.182). From these results, it can be concluded that both students' knowledge and attitudes play a role in shaping behavior, but attitude has a stronger influence on behavior than knowledge. In other words, even if students have good knowledge, without a positive attitude, the desired behavior may not necessarily be fully established. Nutritional knowledge among adolescents is essential for meeting the body's nutritional needs; however, it does not always guarantee the development of healthy eating habits in line with balanced nutrition guidelines unless accompanied by strong motivation and self-awareness. Adolescents' eating habits are largely influenced by their attitudes toward selecting and choosing the foods they consume on a daily basis [24].

The results of this study are consistent with a study titled "The Influence of Nutritional Knowledge and Food-Choosing Attitudes on Adolescent Eating Behavior in Kediri Regency," which yielded a multiple correlation coefficient (R) of 0.005, indicating that there is an influence of nutritional knowledge and food-choosing attitudes on eating behavior among adolescents [24]. Another study also explains that the results of a bivariate analysis using the Chi-Square test indicate a relationship between knowledge and attitudes toward fast food consumption. Thus, it can be concluded that there is a significant relationship between knowledge and attitudes toward fast food consumption among 10th-grade students at the An Nuqthah Modern Islamic Boarding School in Tangerang [18].

Strengths and limitations of the study

The strength of this study lies in its examination of the Free Nutritious Meals Program, which is a current and important initiative in the field of nutrition. Furthermore, this study can illustrate the influence of knowledge and attitudes on Free Nutritious Meals Program consumption behavior among high school students. The number of respondents used is also sufficiently representative to reflect the conditions of students at State High School 3 in Bima City. However, a limitation of this study is that it only examines knowledge and attitude factors, whereas Free Nutritious Meals Program consumption behavior may be influenced by other factors not investigated. The use of a cross-sectional design also cannot prove a direct cause-and-effect relationship. Furthermore, the study was conducted at only one school, so the results have limitations regarding generalizability to a broader population.

Practical implications

Based on the research findings, it can be concluded that there is a need for ongoing collaboration between the Nutrition Service Units and schools in implementing nutrition education for students. Education can be conducted periodically through workshops on the four pillars of balanced nutrition and the "My Plate" concept to enhance students understanding of the importance of consuming a balanced, nutritious diet. This effort aligns with Decision of the Head of the National Nutrition Agency of the Republic of Indonesia No. 401.1 of 2025, which states that nutrition supervisors are tasked with providing nutrition education to beneficiaries. Through structured and continuous education, it is hoped that students knowledge and attitudes toward nutritious food will improve, thereby encouraging positive consumption behaviors, including increasing the acceptance, consumption, and completion of the Free Nutritious Meals menu provided.

CONCLUSION

Based on the description of the research findings, knowledge and attitudes have a significant influence, both individually and collectively, on the consumption behavior of the Free Nutritious Meal Program among students at State High School 3 in Bima City.

Ethical consideration, competing interest and source of funding

- Ethical considerations were thoroughly applied throughout the research process. All participants were provided with an explanation of the study's objectives, procedures, and voluntary nature before giving their consent to participate. This study did not collect personally identifiable information, and all data obtained were kept confidential and used solely for academic purposes. Furthermore, this study adhered to the principles of health research ethics, including autonomy, beneficence, non-maleficence, and justice, in accordance with applicable regulations.
- There is no conflict of interest related to this publication.
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