

REVIEW

## Assessing diet diversification and pupils' attitudes toward school feeding program

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School feeding programs play a crucial role in addressing malnutrition and improving educational outcomes among school-age children. This study covered children's perceptions of the school-based meal and changes in their diet. The study examined how a state-sponsored school feeding program was influenced by gender and the location of the school. Two research topics and two hypotheses guided the studies. In this study, the Diet Diversifications and Pupil's Attitudes Scale (DDPAS) was used as a tool to collect data. Face validation of the instrument was performed by four professionals, including a test and measurement assessment lecturer and three from the vocational education department. The reliability indices of DDPAS were calculated using Cronbach's alpha ( $\alpha$ ). The instruments were administered through a direct delivery and retrieval method. A total of 1,200 learners and 58 educators were chosen based on a systematic random sampling approach. To achieve the study objectives, descriptive and inferential statistics were deployed in the analysis of the data obtained. The main findings of this study revealed that pupils had a positive attitude toward the feeding program, particularly regarding the taste of the food provided. The findings from this study have implications for policymakers, educators, and nutritionists involved in the design and implementation of school feeding programs. These findings contribute to the growing body of knowledge on school feeding programs and offer practical recommendations for improving their nutritional impact and overall acceptance among pupils.

**Keywords:** diet diversifications, pupil, attitudes, school, feeding program

### 1. Introduction

A well-known program called school feeding supports education, health, and community development while reducing hunger among pupils. It is a well-known developmental intervention that can take many shapes based on the precise goals, program's layout, and institutional approval. The program stipulated that if children showed up to class regularly, they would get a dry food allocation to take home at the end of each school day, monthly, or termly, as well as a meal or snack to eat in school (1). Also, the school feeding program is a planned activity that gives a certain group of individuals enough nourishment and a balanced diet. There is a set timetable for when a school should feed the kids in order to improve learning and other activities (2).

The socioeconomic condition of the household has an impact on how students eat. Pupils from rural regions with poor socioeconomic positions may have erratic eating habits that include junk food and one imbalanced meal each day, which may lead to them developing a bad attitude about food (3). In order for students to grow up to be healthy adults who can then instruct their own pupils, their attitude toward food has to be directed. So, their diets should be varied to include things they enjoy and to make up for those they do not like. To guarantee the appropriate consumption of vital nutrients that promote good health and enhance education, diet diversification enhances the range of meals across and within food categories. Hence, one significant element that impedes the success of schooling at the primary school level is malnutrition. In developing nations, malnutrition has been a

public health issue because of how poorly the socioeconomic situation there continues to interact with malnutrition (4). Indeed, earlier research has shown that undernutrition had an impact on school pupils' cognitive development (5).

Pupils who are malnourished have major learning disabilities. Pupils who are in school have a nutritional status that affects their health, cognition, and ultimately their academic success. The cognitive development of school-age pupils who are ill or undernourished is likely to be stunted, either physiologically or through limiting their capacity to engage in learning activities, or both (6). Another significant obstacle to pupils' education has been hunger. As a result, many school-age pupils in communities with food insecurity choose not to attend. The school feeding program is a mechanism that helps kids all around the world to go to school. Millions of kids in wealthy nations receive benefits from long-running school feeding programs. The benefits of the school feeding program are assessed by indices of cognitive and physical growth in underprivileged pupils (7). School feeding may increase enrolment, dropout rates, and attendance rates in addition to lowering undernutrition. However, the effects of diet diversifications and pupils' attitudes toward school feeding program are still under debate.

Given that the governments may have spent so much money on the program, information obtained from parents, teachers, and students may be helpful to the governments. Giving the information to the government would improve the program. Checking and balancing any shortcomings to improve on the program for the best of outcomes and therefore spreading it all across the Primary Schools in the States for others to gain from. Also, if a kid is fed while classes are in session, they will engage, making the instruction engaging for both the teachers and the students. As the pupils' nutritional condition will be monitored, the instructors will not need to worry about the students' health on a regular basis, which will improve their overall well-being and academic performance.

## 2. Research questions

This study addressed the following research inquiries:

1. What variations exist in the diet of the school feeding program between urban and rural areas?
2. How do pupils perceive the school feeding program?

## 3. Hypotheses

The research hypotheses in this study were evaluated with a significance level of 0.05 and are presented as follows:

*HO1: There is no noteworthy disparity in the diet diversification of the school feeding program between urban and rural areas in the study location.*

*HO2: There is no significant distinction in the attitudes of male and female pupils toward the school feeding program.*

## 4. Literature review

### 4.1. Diet diversification

Dietary diversification initiatives have the potential to alter eating habits at the family level, particularly by increasing the consumption of animal-based foods. In resource-limited areas where meat, dairy, fruits, and vegetables are minimally available, starch-based meals tend to be preferred. The goal of dietary diversification is to enhance the variety and intake of foods rich in micronutrients, while reducing deficiencies, especially those caused by animal-based meals (8, 9). Social and behavior change campaigns are often employed to achieve this objective. Therefore, dietary diversification revolves around the simple idea of consuming a range of foods to guarantee sufficient consumption of different macro- and micronutrients, leading to a healthy lifestyle (10). A balanced diet does not have to be costly or exclusive. Incorporating diversity can be achieved by consuming traditional foods and opting for local choices, which can enhance nutrient intake without significant additional expenses.

Families are largely responsible for the nutritional health of school-aged pupils. However, the educational system, especially for students in primary school, has not adopted a passive attitude toward the health and nutritional state of students. Improving the pupils' general health and nutritional status is the main objective of the elementary school's health and nutrition program. With the numerous nutritional issues impacting school pupils, it is important to enhance the meal combinations provided to the recipients (pupils) such that the activity aims to cover both energy shortfalls and nutrient deficiencies, such as those in iron and vitamin (11). To enhance the health of the impacted pupils, it may be required in some circumstances to offer nutritional supplements and other services.

This is because supplying school meals was essential to achieving and preserving a level of health that is ideal for the growth of students in classrooms. Proteins, carbs, lipids, vitamins, water, and roughage must all be given to the body in proper amounts and quantities (12). As was previously said, proper organ growth, maintenance, and development are necessary for tissues to work at their best. Nevertheless, nutritional deficiencies occur when the body does not receive enough necessary nutrients. Typically, diet diversity is assumed to be identical to diet quality. One of

the two indicators of food quality in a recent contribution by Rashid et al. (13), for instance, is diet variety.

The variety of foods or food categories ingested throughout a specific time frame is referred to as diet diversification. Increased dietary diversity across and within groups is justified as ensuring appropriate consumption of vital nutrients that support good health. In fact, it is noted that there is a significant link between adequate nutrition and diet diversification (14). According to Umoru (15), food variety increases the supply of vital micronutrients, which improves health, cognitive function, and job efficiency. As they are so straightforward, single-item or food category counts are commonly employed as indicators of nutritional diversification in underdeveloped nations. In none of the research from underdeveloped nations examined in Ruel (14) was the dietary diversification based on dietary recommendations taken into account. Hence, this study was needed.

## 4.2. Pupils' attitude toward school feeding program

Every successive level of education builds on a child's primary education as its basis. Most people agree that food is important for everyone's physical and mental development, from infancy to old life (16). Regarding pupils' health, it is crucial to comprehend pupils' eating attitudes and behaviors. New food acceptability is a slow process, especially in the early school years (ages 3–6 years). While introducing new meals to pupils might be frightening to them, persistence is crucial. Pupils favor meals that they have already experienced. Also, their parents, instructors, and peer groups can help them refine their eating preferences.

Pupils are more likely to have food phobias. Neophobia, which is defined as the "fear of the unknown," expresses itself as a preference for familiar meals over novel ones. This attitude is frequently seen by certain pupils, especially those from rural regions who have little awareness of the many types of food. As a result, in class, they reject the meal with a disapproving expression. The eating habits of students are directly significant as they affect not only their academic performance and cognitive development but also their overall health. Several studies demonstrate the significance of nutrition and its direct influence on cognition, behavior, and immunological function, as well as on the ability to attend school (17). During the years of growth, food remains a crucial element in the development of the entire person. It is closely related to emotions, and pupils from all socioeconomic backgrounds view a child's acceptance or rejection of it as intensely personal.

The process of creating a healthy eating habit is ongoing, and each year adds to the work that has been done before. Meals should be provided promptly in a welcoming setting. The young person has to be relaxed and sit at a table. Much

like adults, kids like eating meals that are colorful. Their appetites change daily, and just like adults, toddlers have strong reactions to meals that are too big. Serving less food than the pupil is likely to consume, and allowing him or her to request more is much preferable (18). Inherited preferences for salty and sweet flavors and a dislike of sour and bitter flavors influence how children eat. There is proof that there is an automatic internal process that controls hunger. If a large selection of simple meals is available, babies' energy intake management is successful between the ages of 1 and 3 years.

With simple meals, kids may pick their own diet and experience steady growth without adult direction. Pupils' dietary choices are of direct interest not only because of their impact on health but also because they have an impact on their cognitive development and academic performance. Pupils are predisposed to being neophobic about food, especially toward the second year of life, which coincides with an important period of transition of an adult diet (19). Furthermore, a child's food is important as it can have an immediate impact on their capacity to learn, in addition to playing a part in the development of preferences and habits. Significant nutritional deficits caused by a poor diet can harm academic performance and have a negative impact on cognitive development (19).

## 5. Materials and methods

A descriptive ex-post facto design was followed in the study, the method is employed when the dependent variable has already been influenced by the independent variable, and no variables are manipulated. The population for this study consisted of students and instructors in primary 1–3 in public primary schools. There was a total of 578 instructors and 12,400 students in attendance. A sample of 1,240 students and 58 instructors, representing 10% of the total student and teacher population participating in the school feeding program in the research area, was selected from primary 1–3. The sampling method used was systematic random sampling. Ten schools were randomly chosen, with five from urban areas and five from rural areas. Urban areas were classified based on the sites of local government offices, while other areas were classified as rural. The instruments were validated by four experts and were subsequently updated based on their feedback.

To evaluate the dependability of the tool, a preliminary examination was carried out. Sixty duplicates of the examination were administered to both students and instructors, with 30 participants from urban regions and 30 from rural areas. The preliminary test was split into two equivalent sections, and the outcomes from each section were compared to establish the internal reliability employing Cronbach's alpha statistics. The preliminary study revealed that the coefficient value ( $r$ ) was 0.74, indicating strong reliability and appropriateness for the investigation. The

main tool used in the study was the Diet Diversifications and Pupil's Attitudes Scale (DDPAS), a structured questionnaire. The questionnaire consisted of different sections, including questions on student demographics such as gender and school location. Section C collected data on students' attitudes, while Section B gathered information on dietary diversifications. A total of 1,298 questionnaires were shared manually across the selected schools with the help of research assistants and classroom instructors.

The study examined the research subjects utilizing tallying frequencies, percentages, averages, and standard deviations. The threshold on the utilized scale was established at 2.50. Mean scores equal to or greater than 2.50 were deemed consensus, while scores less than 2.50 were deemed discordance. Hypotheses were assessed employing *t*-tests with a reliability threshold of 0.05.

## 6. Results

Based on the study's research objectives and assumptions, the results that had been gathered for it were examined.

**TABLE 1 |** The demographics of the pupils.

Variable	Freq.	%
<b>Gender</b>		
Male	578	46.61
Female	662	53.70
<b>Age (years)</b>		
4–6	349	28.14
7–9	434	35.00
10–12	389	31.37
Above 12	68	5.48
<b>School location</b>		
Rural	356 (24)	28.70
Urban	884 (34)	71.29

Source: Field Work, 2014, Note: Figures in bracket are for the respondents who are teachers.

**TABLE 2 |** Mean responses of pupils on the diversification of diets associated with school feeding (*N* = 1240).

S/N	Item	X	SD	Comment
1	Corn pudding with pap(akamu)	3.42	0.57	Agreed
2	Beans pottage with fish	3.90	0.83	Agreed
3	Yam pottage	3.11	0.74	Agreed
4	Fish vegetable stew with rice	4.13	0.55	Agreed
5	Fish or meat vegetable soup with Eba	3.22	0.86	Agreed
6	Coco drink	2.43	0.78	Agreed
7	Egg stew with yam or cocoyam	3.67	0.66	Agreed
8	Others	3.46	0.68	Agreed

SD, standard deviation; X, mean.

According to **Table 1**, there were more female respondents (53.70%) than male participants (46.61%). A total of 58.18% of the students were between the ages of 7 and 9 years, 28.14% were between the ages of 4 and 6 years, 31.37% were between the ages of 10 and 12, and 5.48% were over the age of 12 years. Urban regions housed 71.2% of the schools, while rural areas held 28.7% of the schools.

**Research Question 1:** What variations exist in the diet of the school feeding program between urban and rural areas?

The result presented in **Table 2** showed that all but one item had a mean range of 2.43–4.13. A total of 53 items had mean scores (2.43) below the cutoff point of 2.50. According to the instructors' and students' comments, the school feeding program in the schools was linked to diet diversity. The responses provided by the participants were similar to one another as adjudged from a slight variation of SD from 0.57 to 0.86.

**Research Question 2:** How do pupils perceive the school feeding program?

**Table 3** reveals that the mean range for all six items was between 2.53 and 4.10. The means were higher than the 2.50 cutoff criterion. This suggested that the students had a favorable opinion of the school meal program. The participants' responses exhibited a high level of similarity, as indicated by the small changes in standard deviation values ranging from 0.70 to 1.02.

**Hypothesis 1:** *HO<sub>1</sub>: There is no noteworthy disparity in the diet diversification of the school feeding program between urban and rural areas in the study location.*

The *t*-test evaluation of the average response obtained from students in urban and rural schools is presented in **Table 4**. At the significance level of 0.05, the calculated *t*-value

**TABLE 3 |** Mean responses of pupils' attitudes toward the school feeding program (*N* = 1240).

S/N	Statement item	Mean	SD	Remark
9	You enjoy the taste of the meals	4.10	1.02	Agreed
10	You like the foods given to you at school	3.45	0.73	Agreed
11	The ration of food in school is satisfying	2.53	0.95	Agreed
12	I will encourage others to eat the food provided by the school	3.45	0.84	Agreed
13	I like to go to school because of the food provided	3.67	0.70	Agreed
14	I like the food given at school because the environment where the food is cooked and served is clean	3.45	0.75	Agreed

**TABLE 4** | The *t*-test examination performed to analyze the average responses of students attending urban and rural schools regarding dietary variation in the school meal program.

Location	N	X	SD	<i>t</i> -value	<i>t</i> -tab	Decision
Rural	356	3.09	0.59	1.78	1.96	Accepted
Urban	884	3.78	0.73			
<b>Total</b>	<b>1240</b>					

**TABLE 5** | The *t*-test examination conducted to analyze the average responses regarding the attitude toward the school feeding program.

Gender	N	Mean	SD	<i>t</i> -value	<i>t</i> -tab	Decision
Males	578	3.45	0.69	1.87	1.96	Accepted
Females	662	4.00	0.83			
<b>Total</b>	<b>1240</b>					

(1.78) is smaller than the tabulated *t*-value (1.98) in terms of dietary variety. As a result, the null hypothesis is accepted. This indicates that there is no significant disparity in the students' mean evaluations of food diversity in the school meal program between urban and rural schools.

**Hypothesis 2:** *HO<sub>2</sub>: There is no significant difference in the attitude of male and female pupils on the school feeding program.*

With a significance level of 0.05 in **Table 5**, the calculated *t*-value (1.87) was smaller than the tabulated *t*-value (1.98). As a result, the null hypothesis is accepted, indicating that there is no significant difference in the mean assessments between male and female students regarding the school meal program.

## 7. Discussion of findings

The outcome in **Table 2** showed that the school feeding program gave students a variety of nourishing meals to satisfy their daily nutritional needs. The results supported Rashid et al.'s (13) assertion that diet diversification involves consuming a range of various foods or food categories during a certain reference period. Also, Ruel's results from 2002, which claimed that increasing dietary diversity across and within groups provides appropriate consumption of important nutrients that support good health, were used to corroborate the conclusions. As a result, Umoru's (15) judgment was in agreement with the findings that diet variety increases the availability of crucial micronutrients, improving health, cognitive function, and job efficiency. As they are so

straightforward, single-item or food category counts have been widely utilized as indicators of dietary diversification in underdeveloped nations.

The outcome in **Table 3** showed that the students' attitudes regarding the feeding program were favorable. The majority of the meals served to the students were enjoyed by them. This result is consistent with that of Ludbrook et al. (20) who found that students' attitudes toward school meals are both positive and negative. They are positive when the food has the preferred appetizing color, taste, and shape, but negative when it is unappealing and they are forced to eat it. Belot and James (19) claimed that diet has a large and direct influence on behavior, concentration, and learning function, as well as on the immune cells and the capability to return to school. This claim was backed by other studies. During the years of growth, food remains a crucial element in the development of the entire person. The findings of Umoru (15), who advocated that meals should be provided at set times in a nice setting, were also used to support this conclusion. The young person has to be relaxed by sitting at a table. Like adults, kids prefer colorful food. Their appetites change daily, and just like adults, toddlers have strong reactions to meals that are too big. Serving less food than the pupil is likely to consume, and allowing him or her to request more is much preferable. The eating habits of pupils are shaped by inherited preferences for foods with sweet and salty flavors as well as aversions to bitter and sour flavors. These outcomes are in line with Meyer and Gast (21) conclusions that students' eating habits should be modified with an emphasis on milk, dark green leafy vegetables, deep yellow vegetables, full grains, and enriched bread and cereals in order to build a more balanced eating pattern.

## 8. Conclusion

This study provides valuable insights into the impact of a school feeding program on diet diversification and pupils' attitudes. The findings demonstrate that the program has a positive effect on improving the nutritional quality of students' diets by promoting greater diversification and a balanced intake of essential nutrients. The results also indicate a generally favorable attitude among pupils toward the school feeding program, with the majority expressing satisfaction with the meals provided. The study emphasized the role of the public, including parents and guardians, in enhancing students' academic activities by supporting the school feeding program. These findings have raised awareness among the public about the importance of supporting local school feeding programs.

The implications of this research are significant for policymakers, educators, and nutritionists involved in designing and implementing school feeding programs. By understanding the positive impact of such programs on diet

diversification and considering pupils' attitudes, stakeholders can further optimize the nutritional benefits and effectiveness of these initiatives. This study contributes to the growing body of knowledge on school feeding programs, providing practical recommendations for improving their nutritional impact and overall acceptance among pupils. Overall, the findings highlight the vital role of school feeding programs in addressing malnutrition and enhancing educational outcomes. By providing nutritious meals and fostering positive attitudes toward healthy eating, these programs contribute to the well-being and academic performance of pupils. Future research should continue to explore innovative strategies for improving the nutritional quality, sustainability, and long-term impact of school feeding programs, ultimately benefiting the health and development of the next generation.

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