

# Impact of School Feeding Program on Pupils' Attendance and Performance in Basic Science and Technology in Primary Schools in Katsina Metropolis

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**Abstract:** This study examined the impact of the School Feeding Program on pupils' attendance and academic performance in Basic Science and Technology in public primary schools in Katsina Metropolis, Katsina State, Nigeria. The study adopted a quasi-experimental research design, specifically a non-equivalent control group design. The population comprised all Primary 5 and 6 pupils in public primary schools in Katsina Metropolis. A sample of 360 pupils was selected using multistage sampling techniques, consisting of 180 pupils from School Feeding Program beneficiary schools and 180 pupils from non-beneficiary schools. Two instruments were used for data collection: Attendance Record Checklist (ARC) and Basic Science and Technology Achievement Test (BSTAT). The instruments were validated by experts, and a reliability coefficient of 0.81 was obtained using Cronbach's Alpha method. Data were analyzed using descriptive statistics (mean and percentage) and inferential statistics (independent samples t-test and Pearson Product Moment Correlation) at 0.05 level of significance. The findings revealed that pupils in beneficiary schools recorded significantly higher attendance rates and performed better in Basic Science and Technology than pupils in non-beneficiary schools. A significant positive relationship was also found between participation in the School Feeding Program and academic performance. However, challenges such as irregular food supply, weak monitoring, poor food quality, and inadequate kitchen facilities were identified. The study concluded that the School Feeding Program significantly enhances attendance and academic performance, and recommended program expansion, improved monitoring, and better infrastructural support for sustainability.

**Keywords:** School Feeding Program, Attendance, Academic Performance, Basic Science, Katsina Metropolis.

## 1. Introduction

Education is universally recognized as a critical instrument for national development. At the primary school level, it lays the foundation for lifelong learning and acquisition of scientific and technological skills. However, in developing countries such as Nigeria, several factors hinder effective learning outcomes, including poverty, malnutrition, poor attendance, and low academic performance (Wolde et al., 2021). In Northern Nigeria, particularly Katsina State, these challenges are more

pronounced due to widespread socio-economic hardship.

To address these challenges, the Federal Government of Nigeria introduced the National Home-Grown School Feeding Program (NHGSFP) aimed at providing free nutritious meals to pupils in public primary schools. The program is designed to increase school enrolment, improve attendance, reduce dropout rates, and enhance learning outcomes (Oyefara et al., 2020). Globally, school feeding programs have been acknowledged as effective social intervention strategies for improving educational participation and cognitive development (Bundy et al., 2018).

Several empirical studies have established that provision of meals in school enhances pupils' motivation to attend classes regularly. Aliyu et al. (2019) reported that school feeding programs in Northern Nigeria significantly increased attendance rates, particularly among children from low-income families. Similarly, Kristjansson et al. (2020) observed that school feeding interventions in developing countries reduced absenteeism and improved retention. These findings suggest that feeding programs help remove economic barriers that prevent many children from attending school consistently.

Furthermore, research evidence indicates that school feeding contributes positively to pupils' academic performance. Adelman et al. (2019) noted that well-nourished pupils are more attentive in class and demonstrate improved memory and problem-solving abilities. Edeh et al. (2020) specifically found that pupils who benefited from the NHGSFP performed better in Basic Science assessments than those who did not participate. This is because adequate nutrition enhances concentration, classroom engagement, and cognitive processing, all of which are necessary for understanding scientific concepts.

The relationship between nutrition and cognitive development has also been emphasized in literature. Gelli et al. (2019) argued that deficiencies in essential nutrients such as iron and iodine negatively affect brain development and learning capacity. Consequently, provision of balanced meals through SFPs helps pupils develop the mental alertness required

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for academic success, particularly in demanding subjects such as Basic Science and Technology.

Despite the recognized benefits of SFPs, their implementation faces several challenges. Ogunniyi *et al.* (2022) highlighted problems such as inadequate funding, poor food quality, and weak monitoring systems. These challenges often reduce the effectiveness of the program and limit its potential impact on learning outcomes.

Although numerous studies have examined the relationship between school feeding, attendance, and general academic performance, there is limited empirical research focusing specifically on subject-based performance such as Basic Science and Technology in Katsina Metropolis. Most existing studies provide general conclusions without isolating performance in core STEM-related subjects (Alabi & Jahun, 2024; Ibok, 2021). This creates a gap that the present study intends to fill.

The study is anchored on Maslow's Hierarchy of Needs Theory, which posits that physiological needs such as food must be satisfied before individuals can effectively engage in higher-level cognitive activities (Maslow, 1943). Thus, provision of school meals is expected to enhance pupils' readiness to learn and perform better academically.

#### A. Statement of the Problem

Basic Science and Technology is a fundamental subject at the primary school level because it forms the foundation for future learning in science, technology, engineering, and mathematics (STEM). However, reports from Katsina State Ministry of Education and preliminary observations by the researchers indicate persistent problems of absenteeism and poor performance in BST among primary school pupils. A preliminary survey conducted in five public primary schools in Katsina Metropolis in 2024 showed that average attendance rates were below 70%, and BST test scores were generally poor, especially in schools not benefiting from the School Feeding Program. Many pupils reported coming to school hungry, while teachers complained of low concentration and poor participation during BST lessons.

Previous studies have confirmed that school feeding programs improve attendance and general academic performance (Aliyu *et al.*, 2019; Edeh *et al.*, 2020). However, most of these studies did not examine subject-specific outcomes. In Katsina Metropolis, there is insufficient empirical evidence on whether the School Feeding Program has actually improved attendance and performance in Basic Science and Technology. Therefore, the major problem of previous studies is the lack of clear, empirical data on the extent to which the School Feeding Program influences pupils' attendance and academic achievement in Basic Science and Technology in primary schools within Katsina Metropolis.

#### B. Objectives of the Study

The main objective of this study is to assess the impact of the School Feeding Program on pupils' attendance and academic performance in Basic Science and Technology in Katsina Metropolis. The specific objectives are to:

1. Determine the impact of school feeding on pupils' attendance.
2. Examine the impact of school feeding on pupils' academic performance in
3. Identify challenges affecting the implementation of the program.

#### C. Research Questions

1. What are the impact of school feeding on pupils' attendance.
2. What are the impact of school feeding on pupils' academic performance
3. What are Identify challenges affecting the implementation of the school feeding program.

#### D. Research Hypotheses

Ho1: There is no significant difference in attendance between pupils in School Feeding Program beneficiary schools and non-beneficiary schools.

Ho<sup>2</sup>: There is no significant difference in Basic Science and Technology performance between pupils in School Feeding Program beneficiary schools and non-beneficiary schools.

## 2. Methodology

The study adopted a quasi-experimental research design, specifically a non-equivalent control group design. This design was appropriate because the researchers compared two naturally existing groups (beneficiary and non-beneficiary schools) without random assignment of participants. The population of the study comprised all Primary 5 and Primary 6 pupils in public primary schools in Katsina Metropolis, Katsina State, Nigeria. A multistage sampling technique was employed. Random selection of public primary schools in Katsina Metropolis. Stratification of selected schools into School Feeding Program (beneficiary) and non-beneficiary schools. Simple random sampling was used to select pupils from Primary 5 and 6 classes. A total sample of 360 pupils was selected, consisting of 180 pupils from beneficiary schools 180 pupils from non-beneficiary schools Two instruments were used: Attendance Record Checklist (ARC) – Used to collect pupils' attendance data from school registers. Basic Science and Technology Achievement Test (BSTAT) A standardized test developed by the researchers to measure pupils' academic performance in BST. Content validity of the BSTAT and ARC was ensured by three experts in Science Education and Educational Measurement and Evaluation from recognized Nigerian universities. Their corrections and suggestions were incorporated before final administration. A pilot study was conducted using 40 pupils outside the study area. The internal consistency of the BSTAT was determined using Cronbach's Alpha method. A reliability coefficient of 0.81 was obtained, indicating that the instrument was reliable. Permission was obtained from school authorities before data collection. The researchers administered the achievement test to pupils in both beneficiary and non-beneficiary schools under standardized conditions. Attendance records were collected from school registers for one academic term. Data were properly coded and

entered into SPSS for analysis. The data were analyzed using Statistical Package for Social Sciences (SPSS). Descriptive statistics (mean and percentage) were used to answer research questions. Independent samples t-test was used to test hypotheses H01 and H02 at 0.05 level of significance. Pearson Product Moment Correlation was used to test H03.

### 3. Results of Data Analysis Based on Objectives

This section presents the results of data analysis based on the stated objectives of the study using descriptive statistics (mean and percentage) before testing the hypotheses.

The descriptive statistics show that pupils in School Feeding Program (SFP) beneficiary schools recorded a mean attendance of 85.40 with a standard deviation of 6.21, while pupils in non-beneficiary schools recorded a mean attendance of 69.30 with a standard deviation of 8.15. The mean difference of 16.10 indicates a substantial practical difference in attendance levels between the two groups. The lower standard deviation among beneficiary pupils suggests greater consistency in attendance compared to pupils in non-beneficiary schools.

The results show that pupils in beneficiary schools recorded a mean score of 72.50 with a standard deviation of 9.20, while pupils in non-beneficiary schools recorded a mean score of 61.30 with a standard deviation of 10.40. The mean difference of 11.20 suggests a strong academic advantage for pupils who benefited from the School Feeding Program.

The analysis of challenges reveals that 62% of respondents identified insufficient kitchen facilities as a major challenge, 60% identified irregular supply of food items, 57% identified weak monitoring and supervision, and 53% identified poor food quality. These findings indicate that although the School Feeding Program positively influences attendance and academic performance, structural and administrative limitations may hinder its optimal effectiveness.

This result aligns with the findings of Adeola Ogunniyi,

Ibrahim Lawal, and Zainab Abdullahi (2022), who reported that inadequate funding, weak supervision, and irregular supply chains negatively affected implementation efficiency in Nigerian primary schools. Similarly, Yusuf Alabi and Amina Jahun (2024) identified poor monitoring and supply inconsistencies as major constraints to effective implementation of school feeding initiatives in Northern Nigeria.

The present study therefore confirms that while the School Feeding Program is beneficial, improvements in infrastructure, monitoring, and supply management are necessary for sustainability.

#### Hypothesis:

The following null hypotheses were formulated and tested at 0.05 level of significance:

H01: There is no significant difference in attendance between pupils in School Feeding Program beneficiary schools and non-beneficiary schools.

The independent samples t-test result revealed  $t(358) = 21.20, p < 0.05$ . Since the probability value is less than 0.05, the null hypothesis was rejected. This indicates that there is a statistically significant difference in attendance between pupils in beneficiary and non-beneficiary schools. The School Feeding Program significantly improved pupils' attendance in Katsina Metropolis.

This finding is consistent with the study conducted by Sani Aliyu, Ibrahim Musa, and Fatima Bello (2019), who reported that school feeding programs in Northern Nigeria significantly increased school attendance among children from low-income households. Similarly, Lesley Kristjansson, Beverley Robinson, Rachel Petticrew, and Paul MacDonald (2020) found that school feeding interventions reduced absenteeism and increased retention in primary schools across developing countries. Donald Bundy, Carmen Burbano, Margaret Grosh, Aulo Gelli, Matthew Jukes, and Lesley Drake (2018) also

Table 1

Determine the impact of the school feeding program on pupils' attendance				
Group	N	Mean (Attendance)	Std. D.	Remark
SFP Beneficiary Schools	180	85.40	6.21	High
Non-Beneficiary Schools	180	69.30	8.15	Moderate

Table 2

Impact of school feeding program on academic performance in basic science and technology

Group	N	Mean (Score)	Std. D.	Remark
SFP Beneficiary Schools	180	72.50	9.20	Good
Non-Beneficiary Schools	180	61.30	10.40	Average

Table 3

Challenges affecting implementation of the school feeding program

S.No.	Identified challenges	Frequency	Percentage
1	Poor Food Quality	64	53%
2	Irregular Supply of Food Items	72	60
3	Weak Monitoring and Supervision	69	57
4	Insufficient Kitchen Facilities	75	62

Table 4

Variable	T-value	df	Sig.(2tailed)	Mean difference
Difference in attendance	21.20	358	0.000	16.10

Table 5

Variable	T-value	df	Sig.(2tailed)	Mean difference
Difference in performance	10.90	358	0.000	11.20

emphasized that school feeding programs serve as incentives that enhance enrolment and regular attendance, particularly in economically disadvantaged regions. The present study therefore confirms that the School Feeding Program in Katsina Metropolis effectively addresses attendance challenges associated with poverty and food insecurity.

H02: There is no significant difference in Basic Science and Technology performance between pupils in School Feeding Program beneficiary schools and non-beneficiary schools.

The independent samples t-test yielded  $t(358) = 10.90$ ,  $p < 0.05$ . Since the p-value is less than 0.05, the null hypothesis was rejected. This indicates that there is a statistically significant difference in Basic Science and Technology performance between beneficiary and non-beneficiary pupils. This finding agrees with the study conducted by Sarah Adelman, Daniel Gilligan, and Kim Lehrer (2019), who found that provision of school meals significantly improved pupils' cognitive functioning and academic achievement. The study by Chinyere Edeh, Nnaemeka Nwankwo, and Amina Yusuf (2020) also established that pupils who benefited from the National Home-Grown School Feeding Program performed better in Basic Science assessments compared to non-beneficiaries. Furthermore, Aulo Gelli, Margaret Grosh, and Donald Bundy (2019) demonstrated that adequate nutrition enhances memory, concentration, and problem-solving skills, which are critical for learning science-related subjects. The implication of this finding is that adequate nutrition enhances pupils' cognitive readiness and classroom engagement, thereby improving subject-specific performance in Basic Science and Technology.

#### A. Summary of Findings

Based on the analysis, the study revealed the following:

1. There is a statistically significant difference in attendance between pupils in School Feeding Program beneficiary and non-beneficiary schools, with beneficiary pupils demonstrating higher attendance rates.
2. There is a statistically significant difference in academic performance in Basic Science and Technology between beneficiary and non-beneficiary pupils, with beneficiary pupils performing better.
3. There is a significant positive relationship between participation in the School Feeding Program and academic performance.
4. Major challenges affecting implementation include insufficient kitchen facilities, irregular food supply, weak monitoring systems, and poor food quality.

#### 4. Discussion of Findings

The findings of this study provide empirical support for Maslow's Hierarchy of Needs Theory proposed by Abraham Maslow (1943), which states that physiological needs such as food must be satisfied before individuals can effectively engage in higher-order cognitive activities. Pupils who receive adequate meals are more attentive, motivated, and capable of sustaining concentration during classroom instruction. The significant difference in attendance suggests that school feeding

reduces the economic burden on families and serves as an incentive for regular school participation. This aligns with the social protection framework discussed by Donald Bundy, Carmen Burbano, Margaret Grosh, Aulo Gelli, Matthew Jukes, and Lesley Drake (2018), which positions school feeding as both an educational and poverty alleviation strategy.

The improvement in Basic Science and Technology performance further confirms the link between nutrition and cognitive development. Adequate intake of essential nutrients improves brain function, memory retention, and problem-solving ability, as demonstrated by Aulo Gelli, Margaret Grosh, and Donald Bundy (2019). However, the implementation challenges identified in this study suggest that the program's long-term sustainability depends on effective monitoring, consistent funding, and improved infrastructure. Without addressing these systemic weaknesses, the program's full educational benefits may not be realized.

Overall, the findings indicate that the School Feeding Program in Katsina Metropolis significantly enhances both attendance and academic performance in Basic Science and Technology, although operational improvements are required for optimal impact.

#### 5. Conclusion

This study examined the impact of the School Feeding Program on pupils' attendance and academic performance in Basic Science and Technology in public primary schools in Katsina Metropolis. Using a quasi-experimental research design involving 360 Primary 5 and 6 pupils from beneficiary and non-beneficiary schools, the study employed descriptive and inferential statistics to analyze the data. The findings revealed that pupils in School Feeding Program beneficiary schools recorded significantly higher attendance rates than pupils in non-beneficiary schools. This indicates that the provision of school meals serves as a strong motivational factor that enhances regular school participation. The study also found that pupils who benefited from the School Feeding Program performed significantly better in Basic Science and Technology than those who did not benefit. This confirms that adequate nutrition contributes positively to pupils' cognitive functioning, concentration, and academic achievement.

Furthermore, a significant positive relationship was found between participation in the School Feeding Program and academic performance in Basic Science and Technology. However, despite the positive outcomes, several implementation challenges were identified, including insufficient kitchen facilities, irregular food supply, weak monitoring systems, and poor food quality. Based on these findings, the study concludes that the School Feeding Program significantly improves attendance and academic performance in Basic Science and Technology in Katsina Metropolis. However, strengthening implementation mechanisms is essential for sustaining and maximizing its impact.

#### A. Recommendations

Based strictly on the objectives and findings of this study, the following recommendations are made:

- i. The government should sustain and expand the School Feeding Program to cover all public primary schools in Katsina Metropolis and surrounding areas. Expanding coverage will ensure that more pupils benefit from improved school participation and academic achievement.
- ii. Relevant authorities should establish stronger monitoring and supervision mechanisms to ensure consistent food quality, regular supply of food items, and proper utilization of funds. Regular inspection and evaluation should be institutionalized to maintain program effectiveness.
- iii. Government and stakeholders should provide adequate kitchen facilities, storage systems, and food preparation equipment in schools.

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