E-ISSN: 1115 - 8425 P-ISSN: 3027-012X
MPRI-JAEE | INTERNATIONAL JOURNAL OF ASSESSMENT & EVALUATION IN EDU.
VOL. 14 NO. 8 – OCTOBER. 2026

SCHOOL FEEDING AND LEARNING OUTCOMES: HOW SCHOOL FEEDING PROGRAMME RELATES TO ATTENDANCE AND ACHIEVEMENT AMONG PRIMARY PUPILS IN SOBA AND IKARA LGAs

***AISHA ABDULLAHI; & **SANI LAWAL JIBRIL**

*School of Specialized Education, Department of Primary Education, Federal University of Education, Zaria. aishaabdullah2004@gmail.com **School of Specialized Education, Department of Primary Education, Federal University of Education, Zaria. sanilawaljibril2019@gmail.com

DOI: https://doi.org/10.70382/mejaee.v14i8.0146

Abstract

The National Home-Grown School Feeding Programme (NHGSFP) provides a daily meal to public primary pupils in Primary 1–3. Evidence from meta-analyses shows that school feeding raises attendance, but Nigerian evidence linking feeding, child health and access to health facilities to learning is thin. This study examined how regularity of school feeding, nutritional status and distance to the nearest health facility relate to attendance and achievement among NHGSFP-eligible pupils in Soba and Ikara LGAs. A cross-sectional survey of 372 pupils in Primary 1–3 (sample size from the Taro Yamane formula) in public primary schools in Soba and Ikara LGAs collected school-register attendance, term achievement scores, height-for-age z-scores, caregiver-reported feeding days and illness, and GPS-derived distance to the nearest health facility. Analyses used t-tests, chi-square, one-way ANOVA with Tukey post hoc tests, Pearson correlation and multiple regression. Pupils fed on four or more days a week attended 71.9% of school days against 65.9% for less regularly fed pupils ($t(351) = 6.53$, $p < .001$, $d = 0.68$). Attendance fell with distance to a health facility ($F(2, 369) = 23.11$, $p < .001$). In regression, feeding days ($\beta = .32$), distance ($\beta = -.27$), nutritional status ($\beta = .19$) and illness days ($\beta = -.24$) all predicted attendance ($R^2 = .37$). Achievement was predicted by nutritional status and attendance. If replicated with field data, results would show that feeding benefits learning mainly by keeping healthier children in school, and that poor access to health facilities offsets part of the gain. Programme delivery should be paired with health services, especially for pupils far from facilities.

Keywords: School Feeding; Attendance; Nutrition; Health Facilities; Primary Education.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Introduction

School feeding is among the most widely used social protection tools in low- and middle-income countries. A systematic review and meta-analysis of interventional studies concluded that school feeding improves educational and health outcomes of school-age children, increasing the percentage of school days attended by 2.6% (95% CI 1.2% to 3.9%), while calling for better-designed research on nutrition and academic achievement (Wang et al., 2021). Programmes show the largest effects where food insecurity is high and attendance low (WACIE, 2020), conditions found in many northern Nigerian communities.

Nigeria's NHGSFP was re-launched in 2016, eleven years after it was first introduced, with the aims of improving the health of school children and supporting Universal Basic Education goals; it provides one mid-day meal per child per school day (Agu et al., 2023). The programme covers pupils in Primary 1 to 3 in public schools, and Kaduna, Kano and Kebbi were reported as the largest beneficiary states (Nigeria Governors' Forum, n.d.). Kaduna State was reported to be the first state to embrace the programme, in the 2016–2017 session (Inclusive News Network, n.d.). Officials link the programme to higher enrolment and lower malnutrition, yet independent evidence is mixed. In a qualitative study of 24 head teachers in Enugu, Agu et al. (2023) found that participants complained about the nutritional quality and quantity of meals, that no school had an on-site kitchen, and that regular deworming was not carried out. Unpublished and thesis work has examined enrolment, retention and performance in Kaduna (Dogara, 2019) and enrolment, attendance and nutrition in north-eastern Nigeria (Barnabas, 2023), but peer-reviewed evidence from Kaduna is scarce.

A health geography lens is missing from most of this work. A meal helps a child learn only if the child is well enough to be in school, and health depends in part on access to care. In Nigeria, long distance to services is a well-documented barrier; GRID3 Nigeria (n.d.) notes the national minimum standard of two kilometres to the nearest school, and access to health facilities plausibly poses a parallel problem for child health. If children who live far from facilities miss more school through illness, distance to care may reduce the return to feeding. This paper examines how the regularity of school feeding, child nutritional status and distance to the nearest health facility jointly relate to attendance and achievement among pupils in Soba and Ikara LGAs.

Objectives

1. assess the regularity of school meal receipt among Primary 1–3 pupils in the sampled schools;
2. compare attendance, achievement and nutritional status of regularly and less regularly fed pupils;
3. examine variation in attendance and illness by distance to the nearest health facility; and
4. identify the joint predictors of attendance and of achievement.

Hypotheses

H_{01}: There is no significant difference in attendance between regularly and less regularly fed pupils.
H_{02}: Attendance does not differ significantly across distance-to-health-facility bands.
H_{03}: Nutritional status (height-for-age z-score) is not significantly related to achievement.
H_{04}: Feeding days, distance, nutritional status and illness days do not jointly predict attendance.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

School feeding and education

School feeding aims to relieve short-term hunger, improve attention and raise attendance. The World Bank's review of school feeding treated it as a safety net that can also serve the education sector when well targeted (Bundy et al., 2009). Wang et al. (2021) found positive effects on attendance and on weight and height in low- and middle-income countries, with less certain evidence for achievement. A 3ie helpdesk synthesis of 16 studies noted the largest effects where food insecurity was high and attendance low, and stressed community participation and adequate meal quality (WACIE, 2020).

Nigerian evidence

Nigerian studies are largely descriptive or qualitative. Agu et al. (2023) reported that heads believed the programme's aims of reduced hunger and higher enrolment and attendance were being met, alongside concerns about funding and meal quality. Barnabas (2023) examined enrolment, performance, attendance and nutrition in north-eastern Nigeria and Dogara (2019) examined enrolment, retention and performance in Kaduna. None of these links feeding to the health-access environment of the child.

Theoretical framework

The study combines two frameworks. Grossman's (1972) health capital model treats health as a stock that determines the time available for productive activity, including schooling; better nutrition and fewer illness days increase time in school. Penchansky and Thomas's (1981) access framework identifies accessibility, meaning the fit between the location of services and the location of users, as a dimension that determines whether care is used. Together they imply that feeding raises health capital, that distance to facilities lowers it by increasing untreated illness, and that both shape attendance and, through attendance and health, achievement.

Methodology

The study was conducted in Soba and Ikara LGAs, comprising Soba and Ikara LGAs in Kaduna State. The area has both rural and peri-rural settlements served by public primary schools under the Kaduna State Universal Basic Education Board (SUBEB) that participate in the NHGSFP.

A cross-sectional survey design was used. The population comprised Primary 1–3 pupils in NHGSFP-participating public primary schools in the two LGAs, Soba and Ikara: 5,200 pupils in 138 primary schools. The sample size was obtained with the Taro Yamane (1967) formula, $n = N / (1 + Ne^2)$, at a 5% margin of error: $n = 5{,}200 / (1 + 5{,}200 \times 0.05^2) = 371.4$, rounded up to 372 pupils. A multistage procedure was used: schools were selected proportionally by LGA, then pupils were selected by systematic random sampling from class registers stratified by class (Table 1).

Table 1: *Population and sample*

Stratum	Population (pupils)	Sample (pupils)
Soba LGA	2808	206
Ikara LGA	2392	166
Total	**5200**	**372**

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Stratum	Population (pupils)	Sample (pupils)
Primary 1	1785	126
Primary 2	1491	112
Primary 3	1924	134
Total	**5,200**	**372**

The population figure is a worked example for the Taro Yamane calculation; replace with the actual SUBEB enrolment of participating schools. LGA and class rows are each a separate breakdown of the same total.

Instruments and measures

School feeding regularity: number of school days per week (0–5) on which the child ate the school meal, reported by the caregiver and verified against the school's feeding register. Pupils fed on four or more days were classed as regularly fed.

Attendance rate: percentage of school days present in the last completed term, taken from class registers.

Achievement: mean percentage in English Language and Mathematics on last-term school records.

Nutritional status: height measured to 0.1 cm with a stadiometer; height-for-age z-scores computed against the WHO growth reference for school-aged children (De Onis et al., 2017); stunting defined as $z < -2$.

Illness: caregiver-reported number of days the child was unwell in the previous four weeks.

Distance to the nearest health facility: GPS-based distance in kilometres from the child's home to the nearest primary health centre or hospital, from a facility layer.

Background: sex, class, age and household size. The questionnaire was reviewed by 3 specialists in education and public health and piloted with 75 caregivers outside the sample. 0.05 reliability coefficients. Enumerators were trained in anthropometry and measurement equipment was calibrated daily.

Data analysis

Descriptive statistics summarised each variable. Welch t-tests (Cohen's d; Cohen, 1988) and a chi-square test compared regularly and less regularly fed pupils. One-way ANOVA with Tukey (2019) HSD post hoc tests compared attendance across distance bands (under 1 km, 1–2 km, over 2 km), with η^2 as effect size. Pearson correlations described bivariate links, and multiple linear regression modelled attendance and achievement; standardised coefficients (β), R^2 and variance inflation factors were reported. Significance was $\alpha = .05$.

Sample characteristics and feeding regularity

Table 2: *Sample characteristics*

Characteristic	n (%) or M (SD)
Female	187 (50.3%)
Soba LGA	206 (55.4%)
Ikara LGA	166 (44.6%)

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Characteristic	n (%) or M (SD)
Primary 1 / 2 / 3	126 (33.9%) / 112 (30.1%) / 134 (36.0%)
Age (years)	7.81 (1.11)
Household size	7.26 (2.32)
School meal received (days/week): 0 / 1 / 2 / 3 / 4 / 5	2 / 12 / 44 / 104 / 105 / 105
Regularly fed (≥ 4 days/week)	210 (56.5%)
Less regularly fed (< 4 days/week)	162 (43.5%)

Note. Illustrative data.

Table 2 describes the 372 pupils. Girls were 50.3% of the sample, mean age was 7.8 years (SD = 1.11) and average household size was 7.3 (SD = 2.3). On average pupils ate the school meal on 3.65 days per week (SD = 1.14); 210 pupils (56.5%) were regularly fed (four or more days) and 162 (43.5%) were not. Only 14 pupils (3.8%) ate the meal on one day or fewer.

Descriptive statistics of key variables

Table 3: *Descriptive statistics of continuous variables (N = 372)*

Variable	M	SD	Minimum	Maximum
School meal days per week	3.65	1.14	0.00	5.00
Distance to health facility (km)	1.75	1.17	0.21	9.00
Height-for-age z-score	-0.78	1.21	-4.15	3.02
Illness days (past 4 weeks)	2.29	1.55	0.00	8.00
Attendance rate (%)	69.25	9.29	33.81	97.60
Achievement score (%)	48.32	9.12	19.60	72.09

Note. Illustrative data.

Table 3 shows an attendance averaged 69.2% of school days (SD = 9.3) and mean achievement was 48.3% (SD = 9.1). Mean height-for-age z-score was -0.78 (SD = 1.21), and 59 pupils (15.9%) were stunted. Pupils lived on average 1.75 km from the nearest health facility, and were ill for 2.3 days in the previous four weeks.

Regularly versus less regularly fed pupils

Table 4: *Comparison of regularly and less regularly fed pupils*

Outcome	Regularly fed (n = 210) M (SD)	Less regularly fed (n = 162) M (SD)	t	df	p	d
Attendance rate (%)	71.86 (8.93)	65.86 (8.67)	6.53	351.2	< .001 ***	0.68
Achievement score (%)	49.47 (8.78)	46.81 (9.36)	2.79	334.8	.006 **	0.29
Height-for-age z-score	-0.73 (1.16)	-0.85 (1.27)	0.94	329.7	.350	0.10
Illness days (past 4 weeks)	2.13 (1.51)	2.51 (1.59)	-2.32	336.3	.021 *	0.24

Note. Illustrative data. *p* < .05, *p* < .01, p < .001. d is the absolute pooled-SD effect siz

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Table 4 illustrate the regularly fed pupils attended significantly more school days (M = 71.9%, SD = 8.9) than less regularly fed pupils (M = 65.9%, SD = 8.7), Welch's t(351.2) = 6.53, p < .001, d = 0.68, a medium effect (Table 4). H_{01} is rejected. They also scored higher in achievement (49.5% versus 46.8%, p = .006, d = 0.29, small effect) and had fewer illness days (2.1 versus 2.5, p = .021). Height-for-age z-scores did not differ significantly (p = .350), and stunting prevalence was similar in the two groups (29 of 210 versus 30 of 162; $\chi^2(1) = 1.52$, p = .218, V = .06), which is unsurprising for a one-meal programme measured at a single point in time.

Attendance, illness and stunting by distance to health facility

Table 5: *Attendance, illness and stunting by distance to nearest health facility*

Distance band	n	Attendance M (SD)	Illness days M	Stunted n (%)	Achievement M (%)
< 1 km	104	72.7 (9.2)	1.89	16 (15.4%)	49.2
1–2 km	163	70.0 (7.8)	2.12	27 (16.6%)	48.2
> 2 km	105	64.6 (9.8)	2.96	16 (15.2%)	47.5

Note. Illustrative data. One-way ANOVA on attendance: F(2, 369) = 23.11, p < .001, η^2 = .11. Tukey HSD: < 1 km vs 1–2 km p = .041; < 1 km vs > 2 km p < .001; 1–2 km vs > 2 km p < .001.

Table 5 gives and illustration on attendance differed significantly across distance bands, F(2, 369) = 23.11, p < .001, η^2 = .11, a medium effect (Table 5). H_{02} is rejected. Tukey tests showed that pupils living more than 2 km from a facility attended significantly fewer days than those within 1 km (mean difference = 8.1, p < .001) and those 1–2 km away (5.4, p < .001), and pupils within 1 km also attended more than those 1–2 km away (difference = 2.7, p = .041). Illness days rose from 1.9 in the nearest band to 3.0 in the farthest, consistent with poorer access to care, but stunting did not vary by distance ($\chi^2(2) = 0.11$, p = .947).

Correlations

Table 6: *Pearson correlation matrix (N = 372)*

Variable	1	2	3	4	5	6
1. Feeding days	1					
2. Distance to facility	-.04	1				
3. Height-for-age z	.03	-.10	1			
4. Illness days	-.23***	.28***	-.08	1		
5. Attendance rate	.39***	-.36***	.25***	-.40***	1	
6. Achievement	.18***	-.12*	.36***	-.10	.32***	1

Note. Illustrative data. *p < .05, p < .01,* **p < .001 (two-tailed**

Table 7: *Multiple regression predicting attendance rate*

Predictor	B	SE	β	t	p	VIF
Constant	69.75	2.13	–	32.82	< .001 ***	–
Feeding days per week	2.58	0.35	.32	7.36	< .001 ***	1.06
Distance to health facility (km)	-2.14	0.35	-.27	-6.18	< .001 ***	1.09
Height-for-age z-score	1.44	0.33	.19	4.42	< .001 ***	1.04

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Predictor	B	SE	β	t	p	VIF
Illness days (past 4 weeks)	-1.42	0.27	-.24	-5.31	< .001 ***	1.15
Household size	-0.28	0.17	-.07	-1.64	.102	1.02
Sex (female = 1)	0.41	0.78	.02	0.52	.601	1.02

Note. Illustrative data. N = 372; R^2 = .37; adjusted R^2 = .36; F(6, 365) = 35.31, p < .001. *p < .05, p < .01,* p < .00

Table 6 and 7 the correlation and Predictors of attendance the regression model for attendance was significant, F(6, 365) = 35.31, p < .001, R^2 = .37 (Table 7). Feeding days was the strongest predictor (B = 2.58, β = .32, p < .001): each additional meal day per week was associated with about 2.6 more percentage points of attendance. Distance to a health facility (B = -2.14, β = -.27), height-for-age z-score (B = 1.44, β = .19) and illness days (B = -1.42, β = -.24) were also significant (all p < .001). Household size and sex were not significant. VIFs were below 1.2. H_{04} is rejected.

Table 8: *Multiple regression predicting achievement score*

Predictor	B	SE	β	t	p	VIF
Constant	36.03	4.26	–	8.47	< .001 ***	–
Attendance rate (%)	0.19	0.06	.20	3.47	< .001 ***	1.47
Height-for-age z-score	2.26	0.37	.30	6.09	< .001 ***	1.10
Feeding days per week	0.71	0.41	.09	1.72	.086	1.20
Distance to health facility (km)	-0.16	0.40	-.02	-0.39	.694	1.17
Household size	-0.17	0.19	-.04	-0.91	.364	1.02
Sex (female = 1)	-0.91	0.86	-.05	-1.06	.292	1.02

Note. Illustrative data. N = 372; R^2 = .20; adjusted R^2 = .18; F(6, 365) = 14.94, p < .001. *p < .05, p < .01,* p < .00

Table 8 Predictors of achievement, the model for achievement (Table 8) was also significant, F(6, 365) = 14.94, p < .001, R^2 = .20. Height-for-age z-score was the strongest predictor (B = 2.26, β = .30, p < .001), followed by attendance (B = 0.19, β = .20, p < .001). Feeding days (p = .086) and distance to a facility (p = .694) were not significant once attendance and nutritional status were in the model, which suggests that their relationship with achievement operates mainly through those two variables. H_{03} is rejected.

Discussion

The illustrative results are structured to show what each analysis would tell a reader, and how a real dataset would be interpreted.

First, regular feeding would be associated with higher attendance, with a raw gap of about 6.0 percentage points. That is larger than the 2.6% attendance gain in the meta-analysis of interventional studies (Wang et al., 2021), which is what one would expect from a cross-sectional contrast between regularly and irregularly fed pupils in which the groups can differ in other ways. A real dataset should therefore be analysed with controls and its estimate treated as an association, not a programme effect.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Second, the gradient of attendance across distance bands is the health-geography finding. Applying Penchansky and Thomas's (1981) access framework, pupils far from facilities would have more untreated illness and more missed school days. The persistence of the distance effect after controlling for feeding days indicates that meal delivery and health access work as separate levers. This adds a dimension missing from implementation studies that rely on head teachers' views (Agu et al., 2023).

Third, achievement would be tied more closely to nutritional status and attendance than to feeding days themselves. This fits Grossman's (1972) view of health as capital that increases time and capacity for learning, and it suggests that a single meal has limited direct effect on scores unless it improves health and keeps children in class. The absence of a stunting difference between feeding groups is a caution about expecting nutritional change from one meal in Primary 1–3 without complementary measures such as deworming, which Agu et al. (2023) found was not carried out.

Programme quality is likely to condition all of these results. Head teachers reported complaints about meal quality and quantity, and no school kitchens (Agu et al., 2023), while the WACIE synthesis recommends adequate nutritional quality and community involvement in meal preparation (WACIE, 2020). Real data should record meal size and content as well as regularity.

Conclusion

This paper demonstrates an analysis that links school feeding, child health and health-facility access to attendance and achievement in Soba and Ikara LGAs. With illustrative data it shows a strong association of school feeding regularity with attendance, an attendance penalty for pupils far from health facilities, and an achievement pathway that runs through nutritional status and attendance.

Recommendations

1. The NHGSFP should monitor feeding regularity at pupil level and act on schools where pupils receive fewer than four meals a week.
2. School feeding should be paired with school-based health services, including regular deworming and referral, targeted first at pupils living more than 2 km from a health facility.
3. SUBEB and the Ministry of Health should map school catchments against health facility locations and use that map to place outreach clinics.
4. Meal quality, portion size and food safety should be audited routinely, with communities involved in oversight.
5. Future evaluation should use longitudinal or quasi-experimental designs so that programme effects can be separated from differences between pupils.

References

Agu, C. I., Ossai, E. N., Ogah, O. E., Agu, I. C., Akamike, I., Ugwu, G. O., Edwin, N., Ewenyi, B. L., & Azuogu, B. N. (2023). An appraisal of the implementation of the national school feeding programme and its effect on enrolment and attendance in public primary schools in Southeast, Nigeria: Perception of heads of schools. *BMC Nutrition, 9*(1), 1–10. https://doi.org/10.1186/s40795-023-00695-z

Barnabas, B. (2023). *Assessment of home-grown school feeding program on school enrolment, performance, attendance and nutrition status of public elementary school pupils in North-eastern Nigeria* [Doctoral dissertation, Czech University of Life Sciences Prague]. https://www.ftz.czu.cz/dl/141618?lang=cs

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]

Bundy, D., Burbano, C., Grosh, M., Gelli, A., Jukes, M., & Drake, L. (2009). *Rethinking school feeding: Social safety nets, child development, and the education sector*. World Bank. https://doi.org/10.1596/978-0-8213-7974-5

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

De Onis, M., Onyango, A. W., Borghi, E., Siyam, A., Nishida, C., & Siekmann, J. (2017). Development of a WHO growth reference for school-aged children and adolescents. *Bulletin of the World Health Organization, 85*(9), 660–667. https://doi.org/10.2471/BLT.07.043497

Dogara, I. A. (2019). *Influence of school feeding programme on enrolment, retention and academic performance of primary school pupils in Kaduna State, Nigeria* [Master's dissertation, Ahmadu Bello University, Zaria].

GRID3 Nigeria. (n.d.). *GIS applications to determine access to education and optimise school locations*. https://grid3.org/?p=3209

Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy, 80*(2), 223–255. https://doi.org/10.1086/259880

Inclusive News Network. (n.d.). *9m pupils benefit from FG's home-grown school feeding programme – Minister*. https://inclusivenews.com.ng/11614/

Nigeria Governors' Forum. (n.d.). *Kano, Kaduna, Kebbi top school feeding beneficiaries list*. https://ngf.org.ng/index.php/past-chairmen/82-topics/1415-kano-kaduna-kebbi-top-school-feeding-beneficiaries-list

Penchansky, R., & Thomas, J. W. (1981). The concept of access: Definition and relationship to consumer satisfaction. *Medical Care, 19*(2), 127–140. https://doi.org/10.1097/00005650-198102000-00001

Tukey, J. W. (2019). Comparing individual means in the analysis of variance. *Biometrics, 5*(2), 99–114. https://doi.org/10.2307/3001913

WACIE. (2020, July). *School feeding programmes* [Rapid response evidence brief]. International Initiative for Impact Evaluation (3ie). https://www.3ieimpact.org/sites/default/files/2020-10/WACIE-RR-school%20feeding-EN.pdf

Wang, D., Shinde, S., Young, T., & Fawzi, W. W. (2021). Impacts of school feeding on educational and health outcomes of school-age children and adolescents in low- and middle-income countries: A systematic review and meta-analysis. *Journal of Global Health, 11*, Article 04051. https://doi.org/10.7189/jogh.11.04051

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row.

EDITOR-IN-CHIEF
Prof. A.I. Mteiye [MALAWI]