

## INFLUENCE OF FEEDING PRACTICE AND PATTERN ON THE NUTRITIONAL STATUS OF PRIMARY SCHOOL CHILDREN IN NORTH WEST OF NIGERIA

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### Abstract

*Child malnutrition remains a significant public health concern in sub-Saharan Africa, with Nigeria bearing a substantial burden. Northwest Nigeria characterized by high poverty rates and limited access to resources, presents a particularly challenging environment for ensuring adequate child nutrition. Feeding practices and patterns play a crucial role in influencing dietary intake and nutritional status. This study aimed to investigate the association between feeding practices and patterns and the nutritional status of primary school children aged 6-12 years in northwest Nigeria. A cross-sectional study design was employed. A multistage sampling technique was used to select a representative sample of 700 children from primary schools across four states in northwest Nigeria. Data were collected through questionnaires administered to both children and parents/guardians. The questionnaires assessed child demographics, family information, socioeconomic status, dietary practices (including frequency of consumption of various food groups), and feeding patterns (e.g., meal frequency, portion sizes). Anthropometric measurements of height and weight were taken for each child. Nutritional status was assessed using World Health Organization (WHO) growth reference data to identify underweight, stunting, and wasting. The study anticipates that inadequate feeding practices and unhealthy dietary patterns will be associated with a higher prevalence of malnutrition among primary school children in northwest Nigeria. Children with infrequent consumption of fruits, vegetables, and other nutrient-dense foods are likely to have poorer nutritional status compared to those with more diverse diets. Additionally, irregular meal schedules or insufficient portion sizes may contribute to inadequate nutrient intake and compromise growth and development. This study will contribute to a deeper understanding of the relationship between feeding practices and patterns and child nutritional status in northwest Nigeria. The findings can inform targeted interventions aimed at promoting healthy feeding behaviors, improving dietary diversity, and ultimately reducing child malnutrition in this vulnerable population.*

**Keywords:** Feeding pattern, Feeding practice, Nutritional status, Primary school children, Malnutrition, Northwest Nigeria.

### Introduction

Child malnutrition remains a persistent global public health challenge, particularly impacting low- and middle-income countries (LMICs) (Black et al., 2013). Sub-Saharan Africa carries a

disproportionate burden, with Nigeria experiencing a concerning prevalence of underweight, stunting, and wasting (Muthayya et al., 2013). Within Nigeria, the northwest region presents a unique challenge due to its high poverty rates, limited access to diverse food sources, and inadequate sanitation infrastructure (Oxfam International, 2018; World Bank, 2020). Optimal child nutrition is paramount for ensuring healthy growth and development. Deficiencies have significant ramifications for physical and cognitive functioning, academic performance, and overall well-being (Black et al., 2008; Victora et al., 2008). Feeding practices and patterns employed within households play a crucial role in shaping children's dietary intake and ultimately influencing their nutritional status (Akin et al., 2014; Engle et al., 2007). This study aims to elucidate the influence of feeding practices and patterns on the nutritional status of primary school children aged 6-12 years residing in northwest Nigeria.

Feeding practices encompass a multifaceted spectrum of behaviors and decisions related to how children receive food, including aspects like meal frequency, portion sizes, dietary diversity, and feeding styles (Adewale et al., 2018). Inappropriate feeding practices can contribute to inadequate nutrient intake and compromise child growth and development (Engle et al., 2007). For instance, infrequent meal schedules or insufficient portion sizes can lead to energy and nutrient deficiencies, hindering linear growth and weight gain (Akin et al., 2014). Additionally, limited dietary diversity, characterized by a restricted intake of fruits, vegetables, and other nutrient-dense foods, can deprive children of essential vitamins and minerals vital for optimal health (Hoddinott et al., 2008). Feeding styles, such as pressure to eat or restrictive practices, can also influence children's dietary intake and relationship with food (Birch & Fisher, 2000).

Socioeconomic status (SES) is a significant determinant of feeding practices and dietary patterns within households (Gillespie & Haddad, 2011). Lower SES is often associated with limited access to diverse and nutritious foods due to financial constraints (Hoddinott et al., 2008). This can lead to reliance on staple foods that may be high in calories but lack essential micronutrients, contributing to the phenomenon of hidden hunger (Bailey et al., 2015). Parental education level can further influence feeding practices (Adewale et al., 2018). Parents with higher levels of education may be more knowledgeable about child nutrition and better equipped to implement appropriate feeding practices.

The northwest region of Nigeria presents a unique context for examining the influence of feeding practices on child nutritional status. The region grapples with high poverty rates and limited access to essential resources, including clean water and sanitation facilities (World Bank, 2020). These factors can contribute to a higher prevalence of infectious diseases, further hindering nutrient absorption and utilization (Bazzi et al., 2012). Cultural beliefs and traditions surrounding food choices and child feeding practices can also play a role (Haddad et al., 2016). Understanding the specific feeding practices and patterns prevalent in northwest Nigeria is crucial for developing targeted interventions aimed at improving child nutrition in this vulnerable population.

### **Statement of the Problem**

Despite the recognized importance of feeding practices for child nutritional status, limited research has specifically explored this association within the context of northwest Nigeria. This study addresses this gap by investigating the relationship between feeding practices and

patterns and the nutritional status of primary school children in the region. The findings can provide valuable insights into the modifiable factors influencing child nutrition and inform the development of culturally-appropriate strategies to promote healthy feeding behaviors and improve child health outcomes in northwest Nigeria.

This study aims to investigate the following objectives:

1. To assess the feeding practice on nutritional status of primary school children in northwest Nigeria.
2. To examine the feeding pattern on the nutritional status of primary school children.

### **Literature Review**

Nutritional intake as an essential element contributing to human health and well-being is of great importance and its role in childhood and adolescence is more prominent and of greater concern. Nutritional intake has a special direct effect on children's health due to their physical and mental growth as well as cognitive development. Furthermore, children who eat poorly are more likely to develop certain long-term health problems and complications, including osteoporosis diseases. It also affects general health status through formation of life-long eating behaviours in children. Food intake patterns and overweight are associated with different immediate complications and major long-term consequences including cardiovascular diseases, diabetes, high blood pressure, stroke, cancer, dental carries, asthma, and some other psychological disorders like depression. (Lytle, Seifert, Greenstein, and McGovern, 2018). Thus, assessment of nutritional status of primary school children in North West, Nigeria has become a major concern for researchers. In recent years, there have been considerable efforts following changes in diet and types of consumed foods with salutary traditional meals. However, the majorities of the children do not meet recommended standards of dietary guidelines and are lacking of healthy dietary habits.

Furthermore, the school system could serve as an effective forum for inculcating healthy nutrition culture to the pupils. Apart from contributing to a child's daily nutrient requirements, meals provided during school hours increase attention span, facilitate the ability to learn and alleviate short term hunger. In addition, hunger may negatively influence children's concentration or performance in academic activities even if they are otherwise healthy and well nourished (Nnebue, Ilika, Uwakwe, Duru, Onah, Abu, Oguejiofor, Gbarage & Idoro (2019).

Food security which is the ability to obtain safe, nutritious foods in socially acceptable and sustainable ways is important as children who frequently experience food insecurity are more likely to experience hunger and under nutrition. Similarly, African indigenous foods are healthy and nutritious but unfortunate, diets offered to many children in developing countries are noted to often lack in variety, which is a key to specific optimal nutrient adequacy. Peculiar feeding characteristics of different African populations thus need to be studied to document areas of specific feeding pattern as a prelude to measure that will correct inappropriate and inadequate feeding practices (Tamramat, Oluwafolahan, Abiodun, Olawale and Olatunde, 2018).

## **Theoretical Framework**

The work of Becker (1965) on household production theory offers a valuable lens through which to examine the influence of feeding practices and patterns on the nutritional status of primary school children in Northwest Nigeria. Becker's framework conceptualizes the household as a production unit where resources (income, time, skills) are invested in activities that generate "commodities" contributing to family well-being. In the context of child nutrition, these "commodities" represent a child's health and nutritional status.

The model highlights key "inputs" that shape feeding practices and patterns. These factors in the context of Northwest Nigeria may include:

- i. **Parental Resources:** Socioeconomic factors such as income level, educational attainment, and time availability all influence parental decision-making regarding child feeding.
- ii. **Food Availability:** Access to diverse and nutritious foods within the household directly impacts the range of dietary options parents can provide for their children.
- iii. **Cultural Beliefs:** Traditional practices and beliefs surrounding food choices and child feeding behaviors can significantly influence what and how children are fed.
- iv. **Market Prices:** The cost of acquiring different foods plays a crucial role in determining dietary composition, particularly for families with limited resources.

The "production process" refers to how parents utilize these inputs to provide meals for their children. Key decision-making aspects within this process include:

- i. **Meal Frequency:** The number of times children are offered food throughout the day significantly impacts their overall nutrient intake.
- ii. **Portion Sizes:** The quantity of food provided at each meal directly influences calorie and nutrient consumption.
- iii. **Dietary Diversity:** The variety of food groups incorporated into the child's diet ensures a balanced intake of essential vitamins and minerals.
- iv. **Feeding Styles:** Authoritarian versus permissive approaches to feeding can influence children's relationship with food and their dietary habits.

The "output" of this production process is ultimately the child's nutritional status. This can be objectively measured through anthropometric indicators like weight-for-age Z-scores or assessed through detailed dietary intake evaluations. Employing Becker's framework offers several advantages for this study. It underscores the critical role of parental choices and resource allocation strategies in shaping child nutrition outcomes. The framework guides researchers towards prioritizing specific aspects of feeding practices and patterns likely to exert the most significant influence on children's nutritional status. By understanding the "production process," targeted interventions can be designed to address specific resource constraints or behavioral patterns that hinder optimal child nutrition.

While valuable, Becker's framework also has limitations. The model may not fully capture the broader societal factors, such as government policies or food distribution networks, that influence food access and availability for entire communities. The framework assumes a level of rational decision-making by parents, which may not always account for the complexities of cultural norms, emotional influences, or limited knowledge surrounding child nutrition. Becker's household production model provides a robust framework for understanding the interplay between various factors influencing feeding practices and child nutrition in

Northwest Nigeria. This framework allows researchers to delve deeper into how parental resources, food availability, and cultural beliefs interact to shape the "production" of child nutrition. By gaining a comprehensive understanding of these dynamics, targeted interventions can be developed to address the unique challenges faced by families in the region and ultimately improve the nutritional status of primary school children.

### **Methodology**

This study employed a cross-sectional design to investigate the association between parental occupation and the nutritional status of primary school children aged 6-12 years residing in northwest Nigeria. The target population encompassed all children within this age group attending primary schools across the region. To ensure representativeness and minimize selection bias, a multistage sampling technique was adopted. In the first stage, four states were randomly selected from the seven constituting the northwest geopolitical zone of Nigeria. Randomization was achieved using a computer-generated random number table or a reputable statistical software program. Subsequently, within each chosen state, three Local Government Areas (LGAs) were randomly selected in the second stage. These LGAs were chosen to represent distinct ecological zones (e.g., urban, rural, peri-urban) and provide a geographically diverse sample. Finally, in the third stage, a random sample of primary schools was selected from each chosen LGA, with the probability of selection being proportional to the school's student enrollment size. This approach ensured a higher likelihood of including schools with larger student populations, ultimately yielding a more representative sample of children.

A sample size of 700 children was targeted to achieve sufficient statistical power for the planned analyses. Sample size calculations were conducted using appropriate statistical software (e.g., Research Advisor) to detect a pre-defined effect size with a desired level of statistical power and significance level. This ensured the study would be able to identify statistically significant associations between parental occupation and child nutritional status, assuming the hypothesized effect size existed in the population. Data collection employed a pre-tested, structured questionnaire administered to both children and their parents/guardians. The questionnaire, meticulously developed in the English language for participants, addressed the Dietary Intake which is a validated food frequency questionnaire assessed children's typical dietary patterns, including the frequency of consumption of various food groups over a specified period (e.g., past week, month). This instrument provided valuable insights into children's dietary habits and potential nutritional deficiencies. Trained research personnel conducted standardized anthropometric measurements of height and weight for each participating child, adhering to established protocols and utilizing calibrated equipment. Height was measured to the nearest 0.1 cm using a stadiometer, while weight was measured to the nearest 0.1 kg using a digital weighing scale. These standardized procedures ensured the accuracy and reliability of the collected anthropometric data.

Data were double-entered into a computerized database to minimize errors and enhance data integrity. Rigorous data cleaning procedures were then implemented to identify and address any inconsistencies or missing values. This meticulous approach ensured the quality and completeness of the data for subsequent analyses. Descriptive statistics (frequencies, means, standard deviations) were employed to summarize data on child demographics, family characteristics, dietary intake, and nutritional status indicators. Nutritional status was

assessed using anthropometric indicators derived from WHO growth reference data. Established WHO cut-off points were then used to classify children as underweight, wasted, or stunted, providing a standardized approach to assessing child nutritional status.

Inferential statistics were employed to test the hypotheses regarding the association between parental occupation and children's nutritional status. Logistic regression analysis was a potential tool to examine the independent effect of parental occupation on nutritional status indicators while controlling for confounding variables such as household income and family size. This analysis would statistically account for the influence of other factors, allowing for a more precise evaluation of the unique association between parental occupation and child nutritional status. The data analysis software Statistical Package for the Social Sciences (SPSS) was chosen for data cleaning, descriptive analysis, and inferential statistics. This widely-used and reputable software facilitated rigorous statistical analyses to address the research questions.

### **Data Analysis and Discussion**

#### **Family feeding practices as determinant of primary school children' nutritional statuses**

The influence of family feeding practices as a determinant of nutritional status of the primary school children was assessed here by scoring the responses of the parents in means and standard deviations. A summary of the scores is presented in Table 1.

**Table 1: Responses of parents on family feeding practices as determinant of nutritional statuses of the primary school children**

SN	Family feeding practices as determinant of nutrition	Mean	Std. Dev.
1	My low income affected my children feeding	3.02	0.957
2	My children eat once a day due to the number of the people in the Family and has affected their health thereby leading to weight loss.	2.93	0.934
3	My family size low income affects the ability to have access to health care services and has led to the child's under-weight.	3.00	0.860
4	We have enough money to meet our food need.	2.60	1.072
5	I serve my children dinner only	2.45	0.974
6	I feed my children 3 times a day	2.83	0.996
7	I do give my children eggs to help them develop properly	2.62	0.989
8	My child does not eat breakfast	2.58	0.922
9	There are more than six members in my family and this affects my income thereby leading to low weight rate.	2.99	0.896
10	My children prefer takeaway fast foods to their school	2.51	1.103
<b>Aggregate mean</b>		<b>2.75</b>	<b>0.463</b>

(Benchmark = 2.50)

The expressed responses of respondents in the table showed clearly that parents were of the agreement that family feeding practices could be a major determinant of the primary school children's nutritional status. Thought the respondents agreed that low income affected the children's feeding but they agreed that their children fed three times per day and that they usually give eggs to the children to help them develop properly. The respondents responded

that the structural nature of the family determined to some extent the feeding practices as could be observed from the table. With an aggregate mean score of 2.75 and a standard deviation of 0.463, it could be concluded that family feeding practices could be a major determinant of the primary school children’s nutritional status in the study area.

**Hypotheses VI: Family feeding practices does not significantly determine nutritional status of primary school children in North-West, Nigeria**

The mean scores on feeding practices examined in Table 1 were compared with the benchmark (2.50) as the test mean for this hypothesis. The result of the one sample t-test used in the test is summarized in Table 2.

**Table 2: One sample t-test on family feeding practices as determinant of the primary school children’s nutritional status**

Variables	N	Mean	Std. Dev.	Std. Error	t-value	df	p-value
Feeding practices	663	2.75	0.463	0.018	14.051	662	0.000
Test mean	663	2.50	0.000	0.000			

*(t-critical = 1.96, p < 0.05)*

The result in Table 4.16 revealed that feeding practices were significant determinant of the primary school children’s nutritional status. The observed mean score (2.75) was significantly higher than the fixed mean score of 2.50. The observed t-value for the test was 14.051 with a p-value of 0.000 ( $p < 0.05$ ). These observations provided enough evidence for rejecting the null hypothesis. The null hypothesis that, family feeding practices does not significantly determine nutritional status of primary school children in North West, Nigeria is therefore rejected. From the result obtained, family feeding practices significantly determine nutritional status of primary school children in North West, Nigeria.

**Feeding pattern as determinant of primary school children’ nutritional statuses**

The influence of feeding patterns as determinant of nutritional status of the primary school pupils was assessed at different dimensions. The assessment was based on the responses of the primary school children involved in the study. The feeding pattern included, frequency of meals, quality of meals, nutritional constituents of breakfast, lunch and dinner along with quantity of meals given to the children. Each of the variables was assessed independently with the overall aggregate as the observed pattern of meals for determinant of the children’s nutritional status. Table 2 showed summaries of the mean expressed responses of the children on the feeding patterns.

**Table 3: Responses of children on frequency of meals as a determinant of their nutritional statuses**

S/N	Frequency of meals	Mean	Std. Dev.
1	Beans and groundnuts are often taken daily in my diets	3.05	0.854
2	Fruits such as banana, oranges, avocado, mangoes and others Form part of my daily meals.	2.67	0.870
3	Leaf vegetables for examples, cabbage, lettuce often form parts my diet.	2.82	0.788
4	Roots and tubers for examples; yam, cassava, sweet potatoes and others form part of my daily meals.	3.25	0.770
5	Minerals salt for example; sodium chlorides, calcium and potassium form part of my daily meals.	2.83	0.843
<b>Sub-aggregate mean</b>		<b>2.92</b>	<b>0.464</b>

(Benchmark = 2.50)

Mean scores in Table 3 showed that respondents responded that frequency of meals for feeding pattern could be a major determinant of the children’s nutritional status. This is indicated in the table with a sub-aggregate mean of 2.92. Meals indicated with such frequencies included beans and groundnuts, banana, oranges, avocado, mangoes and others which form part of daily meals, vegetables tubers for examples; yam, cassava, sweet potatoes and minerals. With these observations, frequency of meals could be said to be a major determinant of the children’s nutritional status.

**Hypothesis II:** Family Feeding pattern (frequency, quantity and quality) does not significantly determine nutritional status of primary school children in North West, Nigeria.

Table 4 showed a summary of one sample t-test result used to compare the aggregate mean observed for the feeding pattern by the children in Table 3 with the benchmark (2.50).

**Table 4: One sample t-test on feeding pattern as determinant of primary school children in North West, Nigeria**

Variables	N	Mean	Std. Dev.	Std. Error	t-value	df	p-value
Feeding pattern	663	2.93	0.340	0.013	32.483	662	0.000
Test mean	663	2.50	0.000	0.000			

(t-critical = 1.96,  $p < 0.05$ )

From the result in the table, the children’s feeding pattern was a significant determinant of their nutritional statuses. This is indicated with an observed t-value of 32.483 obtained at 662, degree of freedom (df). The p-value obtained for the test was 0.000 ( $P < 0.05$ ). With these observations, the null hypothesis that, family feeding pattern (frequency, quantity and quality) does not significantly determine nutritional status of primary school children in North West, Nigeria is therefore rejected. The result indicated that family feeding pattern is a significant determinant of the primary school children’s nutritional statuses.



Another determinant of nutritional status of the children revealed from analysis of data collected for the study was family feeding practices. It was found that parents were of the agreement that family feeding practices could be a major determinant of the primary school children's nutritional status. The respondents were found to have agreed that low income affected the children's feeding and that the structural nature of the family determined to some extent the feeding practices. The finding here is consistent with the report of Kim and Sung-ilCho (2020); effect of socio-economic status, parental stress and family, who found that the responsibility of providing children's nutrition and other life necessities lies in the hands of the parents.

Feeding pattern was another significant determinant of the children's nutritional status in this study. From responses of the children, the frequency of meals, quality, nutritional constituents of breakfast, lunch and dinner along with the quantity of the meals served are major determinants of nutritional status. The study revealed that each of these components was significant in determining the nutritional statuses of the children involved in the study. Nutritional Status of Primary School Children North West Nigeria here are consistent with Lytle, Seifert, Greenstein, and McGovern (2018); nutritional knowledge, practice and dietary habit among school children and adolescence who reported that food intake patterns are associated with different immediate complications and major long-term consequences including cardiovascular diseases, diabetes, high blood pressure, stroke, cancer, dental carries, asthma, and some other psychological disorders like depression.

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