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Nutritional status of children under five years old in the northern region of Ghana

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Abstract
The study evaluated the nutritional status of the under five-year-old child in the Northern Region of Ghana and specifically on the dietary patterns and intra-household conditions that affect child nutrition. The data were collected using a cross-sectional descriptive design that was mixed-method based. Multistage random sampling was used to select five high malnutrition-rate districts and a total number of 400 households were included as the sample. Measures of quantitative data were obtained through standardized questionnaires, anthropometric measurement, 24-hour recall and food frequency questionnaires. The information of a qualitative nature was received after two focus group discussions and one-on-one interviews on the district nutrition officers. SPSS (v.22.0) with descriptive statistics, chi-square tests and multiple linear regression was used to analyse quantitative data, and the qualitative data were analysed through content analysis. It was found that grains were the main constituent of young children diet with 79.5 percent inclinations regularly consuming; there was uneven consumption of fruit and vegetables and low consumption among the dairies. Sixty percent of the children took protein foods but not every day (37.3 percent). Anthropometric data showed prevalence of stunting and wasting among 55.5 percent of the children, 18.3 percent were overweight and 0.5 percent were underweight. The frequency of meals was more or less sufficient, but the dietary composition of the diet was poor. Intra-household eating procedures demonstrated that adults did not intervene and that majority of children ate without distraction. The research comes to the conclusion that the dietary diversity should be enhanced, and under-diagnosis and newly emerged over-diagnosis of malnutrition should be called to attention. A suggestion on strategies to be taken by the Ministry of Health and Ghana Health Service is to engage in community-based nutrition education programmes, incorporate nutrition counselling in maternal and child health services, partner with the local food producers to introduce better access to nutrient-dense foods, and increase the school feeding programme with locally available ingredients.

Keywords: Child malnutrition, intra-household dynamics, nutritional status and Ghana

Introduction
Childhood malnutrition or under-five malnutrition is a longstanding public health problem in most parts of the world especially in low- and middle-income countries (LMICs) such as Ghana. Nevertheless, millions of children are still affected by undernutrition, stunting, wasting, and other cases of malnutrition despite the progress in agriculture and health promotion, as this phenomenon undermines their current and future health and development levels (Sharma, Dwivedi & Singh, 2016 [41]; WHO, 2022). At the lower end, the lure of a better life and the right to immigration has meant that malnutrition in Africa has touched about 21 percent of the population with severe consequences to the physical development, cognitive development, and immunity of children (Dukhi, 2020 [12]; Mwene-Batu *et al*., 2020) [12, 29].

Ghana, similar to other nations in sub-Saharan Africa, has shown a little success on minimizing child malnutrition. But the issue is still very common, particularly in the north where there is poverty, insecurity of food, and poor accessibility to healthcare. According to Ghana Statistical Service and Ghana Health Service (2019 [15, 16], there is a stunting percentage of 18 percent, underweight of 11 percent, and waste of 7 percent of children under the age of five across the country.It is especially worrying in the Northern Region. According to the most recent Ghana Demographic and Health Survey (GDHS), conducted in 2019, rates of children under age five who are stunted are higher in North Ghana than the national average by placing at 33 per cent almost twice the national rate. There is also a non-insignificant number of 8.1 being wasted alongside 21.4 being underweight and this shows

severe nutritional deficiencies in the short-term and long-term. These numbers provide further evidence of the increased susceptibility of children in Northern Ghana to the negative consequences of malnutrition, such as low immunity, susceptibility to infectious diseases and associated higher rates of mortality (Bhutta *et al*., 2017; Gondivkar *et al*., 2019) [17].

These unhealthy nutrition results are caused by various factors among them being chronic poverty, low levels of maternal education, improper diet diversity, and lack of enough food during the season of the year (Nkegbe, Abu, & Issahaku, 2017) [30]. The COVID-19 pandemic has exacerbated food insecurity and financial problems because the nutritional issues in the area have reached the next level (FAO & UNICEF, 2020). The intra-household level of decision-making power, food accessibility, and communication patterns are other important factors influencing the nutritional outcomes of children, but this study area is under-represented in studies conducted in Ghana (Shibata, Cardey & Dorward, 2020 [42]; Zingwe, Manja & Chirwa, 2023) [49].

Consider the high incidences of under nutrition and socio-economic conditions in Northern Ghana; the nutritional status of children under the age of five years in the region should be given high priority by determining their level of under nutrition. This type of study is critical as it informs specific interventions and policies to mitigate malnutrition and design health and development outcomes in children.

Justification of the Study

Child health is one of the most important aspects of the public health situation and the socio-economic progress of the countries based on the nutritional status of children under five. The prevalence of stunting, wasting, and being underweight of children is a menace to human capital building and the genetic success between generations in a region like Northern Ghana where poverty and food insecurity is endemic. The country level interventions have attempted to curb the problem of under nutrition, but there still seems to be a very big gap in the different regions in the country with Northern Ghana being left behind. It is critical to know the exact nutritional status of the children under the age of five years in this area in order to come up with a locally acceptable and culturally friendly strategy and action plans to address them. Besides, there is an insufficient representation of the community- and household-level factors, including food access and dietary diversity as well as caregiving practices that largely influence child nutrition outcomes. The study is thus well founded since it endeavors to give the current, context-oriented evidence applicable to enable stakeholders (government, NGOs, health workers, and community leaders) to formulate viable measures to address the issue of child malnutrition in Northern Ghana. Moreover, the paper can be of benefit to the academic literature, as the paper will support the discussion on how nutrition, poverty, and intra-household interactions overlap in a setting in which people are particularly vulnerable. Addressing this knowledge gap in the Northern Region and in line with national and international initiatives to ensure a Sustainable Development Goal 2: Zero Hunger, it will have a significant impact in this critical area of knowledge.

Methodology

The research was carried out in Northern Region which included five districts of Ghana, Savelugu Municipal, Zabzugu, Kpandai, Nanumba North Municipal, Tolon District. These districts were purposely chosen because they had a prevalence of child malnutrition, with the prevalence of stunting comprising 21.1 and 23.7 percent in each district (GHS, 2019). The climate is unimodal with rains being that typical of the Guinea and Sudan savanna ecological zones where the annual rainfall ranged between 800mm and 1100mm and temperatures between 25 C to 40 C. Economies are mostly farming based and families experience seasonal food insecurity, which has a major impact on children nutrition.

Research Design and Approach, Sampling Techniques, Data Collection and Analysis

The mixed-methods research design was applied, combining quantitative and qualitative research methods to collect in-depth data. The research design followed a descriptive cross-sectional survey where the nutritional status of children less than the age of five years was evaluated and the influence of intra-household dynamics and communication on the outcomes of child nutrition was investigated.

The target group was caregivers or parents of children between the age of 0-59 months in the selected households that were found in the five districts. According to the source provided by the Ghana Statistical Service (2022), the Northern Region was estimated to have a population of about 2.3 million inhabitants with the average household size being eight. With 95 percent confidence level, 5 percent margin of error, and an estimated 60 percent prevalence rate of households with children less than five years, a sample size of 369 households was determined and rounded to 400 households to take care of non-responses.

The method of multistage sampling was applied. The first step consisted of the purposive selection of five districts that had high rates of malnutrition. Five communities were randomly sampled in each of the districts then. In the final stage, we used simple random sampling where a lottery technique was used to sample the households with children aged less than five making use of community health centre records and vital statistics.

Structured questionnaires, focus group discussions (FGDs), and in-depth interviews were used as a method of collecting primary data. Morbidity patterns, culture beliefs and food distribution patterns within FGDs were done in Savelugu and Tolon districts where 2 FGDs including 12 participants each were conducted, focusing on household communication patterns, cultural beliefs and food allocation dynamics. Two opinions of district nutrition officers were studied through in-depth interviews providing expert knowledge on caregiver education and the local issues on nutrition.

The SPSS version 22.0 was used to analyze the quantitative data, and the results were processed with descriptive statistics (frequencies and percentages), associations (Chi-squares test), and a multiple linear regression where the relationships between the intra-household variables and child nutrition outcomes were estimated. The nutrition status was determined by anthropometric measures (height-for-age, weight-for-age and weight-for-height) and WHO standards. The records of the dietary characteristics of children were collected by use of 24-hour dietary recall and food frequency questionnaires. Content analysis was used to

analyze qualitative data through its FGD and interviews. Audio files were transcribed and where necessary translated into English and classified into themes that captured power relationships, communication patterns of people, gender issues and cultural beliefs that influence nutrition. Triangulation of findings enabled the data to be reliable to allow understanding the socio-cultural context of child nutrition in the region at greater depths.

Results and Discussion

This section presents the results and discussion of the nutritional status and eating habits of children under the age of five in the Northern Region of Ghana. It also identifies the types of food consumed by children, the frequency with which children consume food and the different nutritional status of children under the age of five.

Food consumption and frequency of food consumption

The results regarding the dietary habits of children below five, who already have distinct food tastes and requirements, are contained in Table 1. The frequent consumption of grains, 79.5 of its children reported consuming grains frequently and of them 57.5 reported consuming grains daily, suggests that grains form one of the staple food of young children. The results are consistent with other authors like Ramya and Patel (2019 [37] that had reported similar results whereby grains became the most consumed food by kids in similar contexts. Grains are inherently accessible and related to the cuisine of the culture and thus form one of the most widely consumed foods by the children (Yahia *et al*., 2019). Although the number of those children that consume vegetables is relatively high and equals 59.3%, the level of consumption varies since only 16 percent of children consume vegetables infrequently. This agrees with the research conducted by Parikh *et al*. (2022 [32] who have found that although vegetables are suggested in the diets, there may be various impediments towards the intake of vegetables, including the availability of vegetables and culture. The fact that almost half of all children do not consume vegetables daily, however, suggests that it might have other possible problems, including cost, supply, and popularity, pointed out by Poutanen *et al*. (2022 [34]. The fruit intake will be a more gruesome trend as opposed to the other foods. Although there is low prevalence of fruit consumption amongst the children, as many as 53 percent of the respondents stated that they occasionally consumed fruits even though the majority of the children ate fruits (50.2 percent). This complies with the study of Ajmera, Tarvade, and Patni (2015 [2] who observed that there is low intake of fruits by young Indians of low income households because fruits are expensive and seasonal. Since fruits are recommended as a source of vitamins and fiber (WHO, 2021; Harvard Chan School of Public Health, 2021) [18], this nutritional deficiency can potentially have long term effects on the health of the child, particularly the immune system, growth and development at such a young age, such as indicated by UNICEF (2020).

Also varied is the protein intake, with 61.3 percent of children consuming protein foods and 37.3 percent of them consuming protein foods on a daily basis. It is referred to the fact that the intake of the protein is variable thus being significant in growth and development. The same irregularity of protein intake in children in Ghana was observed by Aboagye *et al*. (2020 [1], who also indicated that it could be attributed to economics and the high cost of protein rich food. The rare frequency of consumption by 28.7 percent of kids will pose a threat of protein deficiency, a grave cause of malnutrition which has been noted by Wallace *et al*. (2021). With a low prevalence dairy and dairy alternatives, where only 36.3 percent of children consume dairy products and 47 percent consume them rarely, this should be a great area of concern in terms of calcium deficiency. This may prove fatal to the bones and development of the child as illustrated by Ravenscroft *et al*. (2018 [38]. The reason as to why this population does not consume dairy so much may either be due to the price or the lactose intolerance that is a prevalent issue with most societies in Africa as indicated by Ayseli and Ayseli (2016 [4].

Interestingly, 98.3 percent of children consume water and other drinks like Sobolo on a daily basis implying that such children are well hydrated. This agreement follows Samant *et al*. (2021) [39] who observed that effective hydration plays a major role in optimizing the health of children. The first factor may be the rare consumption of fats and oils, in addition to sweets and desserts, which can be due to the rising awareness of the necessity of a healthy diet, according to Jarman, Edwards, and Blissett (2022 [19]. Health promotional feeding patterns, which are focused on cutting the intake of sugars and fats in accordance with the WHO (2021) nutritional classifications, may also be reflected by this. The frequency of consumption of herbs and spices is low, 53.5 percent of children occasionally used herbs and spice and more probably as a seasoning ingredient than the conventional thinking that they form food items. This concurs with the observations made by Snetselaar *et al*. (2021) [43] that the consumption of the herbs and spices in the diets of children is typically low and mostly the children add herbs and spices to enhance the flavour in other foods.

Table 1: Food consumption and frequency of food consumption

Types of Food	Consumed (%)	Frequency of consumptions			
		Daily (%)	Weekly (%)	Monthly (%)	Rarely (%)
Fruits	50.2	24.5	20.5	2.0	53.0
Vegetables	59.3	45.8	37.0	1.3	16.0
Grains	79.5	57.5	32.0	8.0	2.5
Protein Foods	61.3	37.3	23.8	10.3	28.7
Dairy and Alternatives	36.3	38.8	7.0	7.2	47.0
Fats and Oils	31.3	46.0	0.0	0.0	54.0
Sweets and Desserts	4.5	46.0	0.0	2.0	52.0
Beverages	100.0	98.3	1.8	0.0	0.0
Herbs and Spices	9.5	43.3	3.3	0.0	53.5

Source: Field Data (2023)

Meal consumption patterns and dietary variety among of children under five years

The data presented in Table 2 the key aspects of meal consumption patterns and dietary variety among children under five years old.

Frequency of Meals Consumed Per Day

The trends in daily meals consumed indicates that frequent eating patterns dominate but with a striking proportion of 73. 3% of the children taking over four meals per day. This portrays a possible focus on avenues of sufficient food opportunities that may foster growth and development among the young kids. Contrary, a mere 2.0 percent take 2

meals in a day, which may imply the meal frequency to be in line with the nutritional guidelines of eating multiple small meal options to fulfill the child energy and nutritional requirements (Pourrostami *et al*., 2020) [33]; Marshall *et al*., 2022 [25].

Types of Meals Consumed

The diversity of meals consumed reveals a rich cultural context in children's diets. Rice emerges as the most commonly consumed meal at 40.5%, followed by T.Z., a traditional dish, at 32.0%. This preference for staple foods aligns with findings from Rakha *et al*. (2022 [36] and Gaikwad *et al*. (2023 [14], who noted that staple foods are often the backbone of children's diets in many regions. Porridge, at 19.7%, also plays a significant role, providing a nutritious option for young children. However, the lower consumption rates of beans (2.7%) and other items like yam and light Kenkey (both at 2.7%) suggest that while staples dominate, there is room for improvement in diversifying protein sources and including more legumes, as emphasized by Monterrosa *et al*. (2020 [27].

Fruits and Vegetables Consumption

The data shows that 100% of children consume fruits and vegetables regularly, which is a positive indicator of dietary habits. This aligns with recommendations from the World Health Organization (WHO, 2021) [47] for increasing the intake of fruits and vegetables among young children to ensure adequate vitamin and mineral intake, supported by the findings of Muyonga *et al*. (2020 [28]. The absence of children who rarely consume these items is encouraging, suggesting that parents or caregivers are making efforts to include these essential food groups in their diets.

Variety of Fruits and Vegetables Consumed

In terms of the variety of fruits and vegetables consumed, bananas (18.0%) and the category "Other," which includes a range of items such as Aleafu, Cabbage, and Garden Eggs (49.3%), dominate the intake. This variety is crucial, as a diverse range of fruits and vegetables can provide a broader spectrum of nutrients, which is essential for the growth and development of children (Mahmood *et al*., 2021) [24]; Chow *et al*., 2022 [11]. However, the lower percentages for individual fruits like mango (1.3%) and watermelon (9.3%) indicate that there might be a limited selection of seasonal fruits available or accessible to these families, reflecting economic or geographic barriers to food diversity (Cena & Calder, 2020) [10].

A 24-hour dietary recall by children

The result in **Table 3**, presented outlines the consumption of various food groups over the past 24 hours, revealing insights into dietary habits that can influence overall health and nutrition. Each food group plays a critical role in providing essential nutrients necessary for growth, development, and overall well-being.

Fruits

The consumption of 3 servings of fruits is a positive indicator, reflecting adherence to dietary recommendations that advocate for at least two servings of fruit per day (WHO, 2021). Fruits are rich in vitamins, minerals, and fiber, contributing to the prevention of chronic diseases and promoting healthy digestion (Baye & Hirvonen, 2020) [6]. The inclusion of a variety of fruits such as apples, oranges, and mangoes can enhance dietary quality, providing diverse phytonutrients beneficial for health.

Table 2: Meal consumption patterns and dietary variety among of children under five years

Attribute	Frequency	Percentage (%)
Frequency of Meals Consumed Per Day		
2 meals per day	8	2.0
3 meals per day	24	6.0
4 meals per day	75	18.8
More than 4 meals per day	293	73.3
Total	400	100.0
Types of Meals Consumed		
Beans	11	2.7
Porridge	79	19.7
Light/Kenkey	9	2.2
Yam	11	2.7
Rice	162	40.5
T.Z. (Traditional dish)	128	32.0
Total	400	100.0
Fruits and Vegetables Consumption		
Consume fruits and vegetables regularly	400	100.0
Rarely consume fruits and vegetables	0	0.0
Total	400	100.0
Variety of Fruits and Vegetables Consumed		
Banana	72	18.0
Kenaf	35	8.8
Ayoyo	31	7.8
Okra	39	9.8
Tomato	24	6.0
Watermelon	37	9.3
Mango	5	1.3
Other (Aleafu, Cabbage, Garden Eggs)	197	49.3
Total	400	100.0

Source: Field Data (2023)

Vegetables

2 servings of vegetables are reported, which aligns with the recommendation of including at least three servings daily (Mahmood *et al*., 2021) [24]. While this intake is a good start, increasing the consumption of vegetables, particularly leafy greens and colorful varieties, could enhance the intake of critical nutrients such as folate, vitamin C, and antioxidants. The low number may indicate potential barriers such as accessibility or preference that could be explored further (Gaikwad *et al*., 2023) [14].

Grains

The intake of 4 servings of grains suggests a strong base of energy sources, particularly from whole grains, which are essential for providing dietary fiber and B vitamins (Savage & Llewellyn, 2020) [40]. Consuming whole grains, such as oats and whole-grain bread, is encouraged, as they support digestive health and can help reduce the risk of heart disease (Pourrostami *et al*., 2020) [33]. However, it's important to assess whether the grains consumed are primarily refined or whole, as this impacts overall health outcomes.

Protein Foods

With 2 servings of protein foods, including meat, fish, eggs, and dairy, the consumption meets basic dietary needs but

could be improved. Protein is essential for growth, muscle development, and immune function. The type of protein sources matters; incorporating more fish and plant-based proteins can provide additional health benefits (Marshall *et al*., 2022) [25].

Dairy and Alternatives

The consumption of 1 serving of dairy and alternatives is somewhat low, considering recommendations for 2-3 servings daily (Cena & Calder, 2020) [10]. Dairy products are important sources of calcium and vitamin D, crucial for bone health, particularly in children. If dairy intake is limited due to lactose intolerance or dietary preferences, fortified alternatives should be considered to ensure adequate nutrient intake.

Fats and Oils

The intake of 1 serving of fats and oils is appropriate, as healthy fats are necessary for hormone production and nutrient absorption. Incorporating sources such as olive oil and nuts provides essential fatty acids that contribute to heart health and overall wellness (Chow *et al*., 2022) [11]. However, monitoring the types of fats consumed is important, as saturated and trans fats should be limited.

Sweets and Desserts

With 1 serving of sweets and desserts, this level of consumption is moderate and reflects a balanced approach to indulgence (Megersa, Haile & Kitron, 2021) [26]. While it is important to enjoy sweets in moderation, excessive consumption can lead to health issues such as obesity and dental problems. Education on the impacts of sugar intake is essential for promoting healthier choices.

Beverages

5 glasses of beverages, predominantly water and "Sobolo," suggest adequate hydration, which is vital for overall health. Hydration is crucial for maintaining bodily functions and enhancing cognitive performance (Muyonga *et al*., 2020) [28]. Ensuring that children and families prioritize water intake over sugary drinks is essential for reducing obesity risk and promoting good health.

Herbs and Spices

Herbs and spices used in food preparations are interesting even though it is not categorized as a traditional food group. They can help to augment flavor and have fewer calories, and most of their herbs and spices have other health advantages as they contain antioxidants and anti-inflammatory characteristics (Rakha *et al*., 2022) [36]. These results align with existing guidance today by health agencies including the World Health Organization (WHO), (2021) [47], who recommend a balanced diet with fruits, vegetables, whole grains, lean proteins, and dairy or dairy substitutes so that children can achieve optimum growth and development and general health. The focus on consuming nutrient-containing foods and paying less attention to consuming added sugar fits into the purpose of ensuring that all people practice good eating habits and only have a small likelihood of becoming chronically ill during their childhood and later in life.

Table 3: A 24-hour dietary recall by children

Food Group	Examples	Consumption in the Past 24 Hours
Fruits	Apples, oranges, bananas, berries, mangoes, grapes, etc.	3 servings
Vegetables	Leafy greens, carrots, bell peppers, tomatoes, cucumbers, etc.	2 servings
Grains	Rice, oats, wheat, whole-grain bread, etc.	4 servings
Protein Foods	Meat (beef, poultry), fish, eggs, dairy products (milk, yogurt)	2 servings
Dairy and Alternatives	Milk, yogurt, cheese, fortified plant-based milk alternatives (soy milk, almond milk)	1 serving
Fats and Oils	Olive oil, shea nut oil, nuts, seeds	1 serving
Sweets and Desserts	Cookies, cakes, ice cream, sweetened beverages	1 serving
Beverages	Water, "Sobolo"	5 glasses
Herbs and Spices	Not a traditional food group, but they can add flavor	Sprinkled in cooking

Source: Field Data (2023)

Anthropometric indicators of nutritional status

Table shows a child body mass index (BMI) and other related nutritional aspects of children below the age of five years. The study indicates that 44.5 percent of the children are normally developed as they do not portray the symptoms of stunting. Despite this outcome being lower than half dependability to normal growth, it shows that many children have difficulty in developing normally due to persistent nutrition. According to their findings which involve the study of vulnerable populations, Karimi, Little, and Mokhtari (2021) [21] identified comparable stunting rates.

Based on the outcome of the research, wasting occurs in 35.3 percent of the children as it is a sign of acute malnutrition. The prevalence of this condition is associated with the findings of Baye and Hirvonen (2020 [6] that examined dysfunctional areas that lacked resources, and in this case, significant wasting issues in children below the age of five were reported. According to Awuchi, Igwe and Amagwula (2020) [3], there is an opportunity to intervene against wasting because of the high risk of death and illness. The study reveals that the immediate intervention in nutrition must aim at improving accessibility to food security in addition to the provision of diets. According to the data, 18.3 percent of children are overweight fulfilling the criteria so that the malnutrition of excessive and insufficient nutrition occurs simultaneously in a combination with undernutrition is present. This finding is also supported by the work of Pai and Bahadur (2020) [31] and Khan *et al.* (2022) [22], which reveal that rising prevalence of overweight children exposing low- and middle-income countries suffers. This new trend arouses apprehension since it might depict a shift in diet to high energy as well as nutrient-lacking food that could lead to severe health issues in future.

Childhood obesity is a serious issue as 1.5 percent of children are categorized as overweight and this exposes

them to risk of contracting non-communicable diseases at some point in their adulthood. According to Buoncristiano *et al*. (2021) [9], low amounts of overweight children present a sizeable health issue to the community, and it demands urgent preventive measures to unhealthy eating behaviors. The percentages of underweight children are low and are 0.5 percent. The very low figures in the number of underweight children signify the existence of under nutrition that leads to severe growth and developmental problems. This finding is affirmed by studies conducted by Savage and Llewellyn (2020) [40] since they demonstrate that significant proportions of underweight children need treatment regarding the long-term health risks.

Table 4: Body Mass Index of Children under five years

Nutritional Indicators	Frequency	Percentage
No Stunting	178	44.5
Wasting	141	35.3
Overweight	73	18.3
Overweight	6	1.5
Underweight	2	.5
Total	400	100.0

Source: Field Data (2023)

Eating protocols observed by the child during mealtime at home

Table 5 contains the results which indicate that most of the children, 255(63.7%) were using individual plate or bowl to serve food when alone. This signifies some independence and self-control when it comes to having meals and children can then focus on the food that they want and the quantity of what they consume. Moreover, consuming meals sitting on a separate table by using personal dishes is an indicator of self-regulation and independence on the level of meal consumption according to research conducted by Jones (2021) [20]. Independence can present several advantages to the diet of the children and eating behaviour. Children can only concentrate on their particular food choice and portion, hence absence of external influence enables children to reflect deeper on their diet. Moreover, serving kids with separate plates or bowls enables them to make their personal choices concerning food intake, thus letting them feel a sense of control of their diet. This observation agrees with other findings in earlier studies examining the role of autonomy on the eating behaviour of children. According to Balantekin *et al*. (2020) [5], independence in meals can contribute to the better eating habits children can learn and establish a positive attitude towards food.

The greatest part of the children, i.e. 272 (68.0%) did not use TV or listen radio/music during the time of eating. Conversely, 128 (32.0%) children confessed to listening to radio/music and TV during meal time. Distractors like screen time during food consumption can be avoided and this can be tied to the idea of mindful eating that implies that children give attention to the food and the senses that accompany the eatables. It has been found that this exercising improves digestion and also makes the meals tastier. In addition, avoiding distracting the children with the things they enjoy such as screens during the mealtime also means that they are likely to focus on their food and eating. That contributes to easier digestion and appreciation of foods. According to a study conducted by Long (2020) [23], children that watched TV as they ate would consume more portions, and more unhealthy foods than children who did not watch TV. This means that the use of distractions during mealtime could contribute to the mindless eating behaviour that is typified by ignorance about what one eats.

In addition, findings show that many children ate without adults and 84.3 of them indeed ate without the influence of adults and 65.3 of them reported eating without breaking any silence. Such findings may be explained by cultural or family factors that might impact upon the food preferences and childographical monitoring. This should be compared with the results of a research conducted by Rahimah and Koto (2022) [35] whose findings revealed similar trends of the independent eating among urban children.

Moreover, cultural practices or influence of media on the practice of eating habits have the effect of avoiding silence in meals. Depending on the culture, going to the table without talking means respect in that culture, or attentiveness to the food. Nevertheless, with more digital devices and media to entertain children, conversation during meals will be reduced because children can be more interested in the screens rather than the talk. Conversely, a study conducted among Speirs *et al*. (2020) [44] revealed that fewer children in rural communities were exposing their meals to adult supervision, which could mean variations in the family or norms in the community. Also, it was discovered that a considerable number of children, i.e. 56.0 percent of the sample, i.e. 224 out of 400 involved individuals, stated that they did not struggle during eating. Conversely, 176 children (44.0%) responded that they played during the meals. This observation depicts that there is a stark contrast in the manner that children conduct themselves at mealtime. Though most of the sample populations do not play with their food, a high percentage still indulge in playing. The amenability or indifference to play at mealtimes bears consequences on the eating process of children and the all inclusive dining experience in children. It has been determined that playing or watching TV during a meal brings about the lack of focus on dietary signals of hunger and satiety (Tabares-Tabares *et al*., 2022) [45].

Table 5: Eating protocols observed by a child during mealtime at home

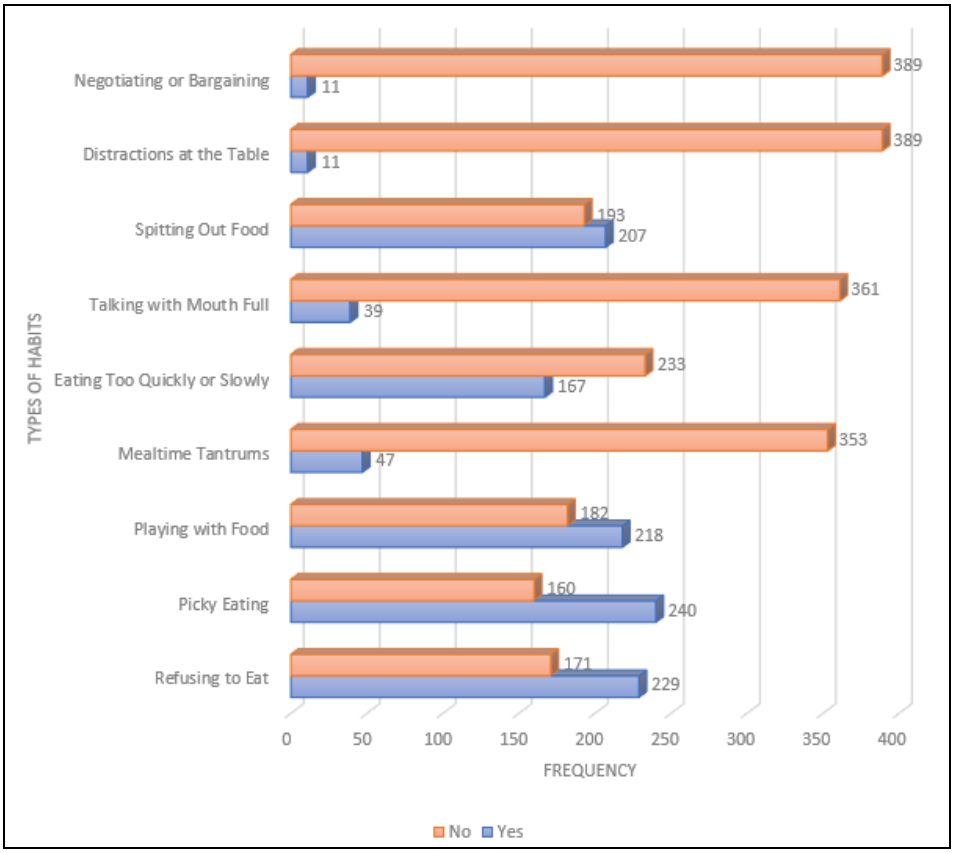
Types of eating protocols	Frequency	Percentage
Child eats alone (single plate/bow per child): Yes No	 255 145	 63.7 36.3
Not watching TV or listening to radio/music while eating: Yes No	 272 128	 68.0 32.0
Child eating in a group with grownups: Yes No	 63 337	 15.8 84.3
Child observing silence during eating: Yes No	 261 139	 65.3 34.8
No playing while eating with food: Yes No	 224 176	 56.0 44.0
Total	400	100.0

Source: Field Data (2023)

Bad eating behaviours children exhibit during mealtime at home

This section explores eating behaviours with children during meals in order to distinguish various eating behaviours. The statistics provided in Figure 1 have indicated that 57.3 percent of children occasionally refused to eat at the table, and this predisposes the parents to the inability to provide children with adequate nutrition. The study reveals that 60.00 percent of children exhibit picky eating behaviour and this denotes that the behaviour is common and may impact on their eating and nutritional health.

The findings of the research demonstrate that during the mealtime, the children are involved in food play events in 54.5 percent of the cases, which results in poor intake of food and its loss. In terms of per cent, the study reveals that 11.8 per cent of children have tantrums at the table. Nevertheless, the occurrence of this behaviour is not as common as that of other behaviours observed in the study. The rate at which children eat their meals belongs to two categories: 41.8 percent are too fast or too slow, and this could interfere with their digestion patterns and the memories of a meal. The research discloses that 9.8 percent of children babbles when they have food in their mouths, but the reason is that it happened only occasionally. The research indicates that 51.7 percent of children when at meals spit out some food implying that they do not like some food textures or types. The analysis found that table distractions during meals are not a common habit since very few children (2.8 per cent) engage in this aspect and negotiating or bargaining behavior.



Source: Field Data (2023)

Fig 1: Bad eating behaviours children exhibit during mealtime at home

Conclusion and Recommendation

In conclusion, the study highlights key insights into the nutritional status and eating habits of children under five in the Northern Region of Ghana. The findings indicate that while meal frequency is generally adequate, dietary diversity remains limited, with a heavy reliance on staple grains and an inadequate intake of fruits, protein-rich foods, and dairy products. Vegetables are moderately consumed, but accessibility and affordability issues may influence intake levels. The high consumption of water and traditional beverages suggests proper hydration, yet the low intake of nutrient-dense foods raises concerns about deficiencies in essential vitamins and minerals. Protein consumption is inconsistent, with economic constraints playing a role in limiting access to quality protein sources. The study also reveals that while some children consume a variety of fruits and vegetables, the selection is often restricted by seasonal availability and cost. Traditional meals remain a dominant feature in children's diets, reinforcing cultural food preferences but also highlighting a need for greater nutritional education and intervention.

To improve the nutritional status and eating habits of children under five in the Northern Region of Ghana, the Ministry of Health and Ghana Health Service should implement community-based nutrition education programs. These programs should focus on promoting dietary diversity, encouraging the consumption of protein-rich foods, fruits, and dairy products, and addressing common barriers such as cost and seasonal availability. Collaborating with local farmers, markets, and food vendors can help increase the accessibility and affordability of nutrient-dense foods. Additionally, integrating nutrition counseling into maternal and child health services at healthcare facilities will ensure that caregivers receive practical guidance on

providing balanced meals for young children. Strengthening school feeding programs with locally sourced nutritious foods can also play a crucial role in improving dietary intake and overall child health outcomes.

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