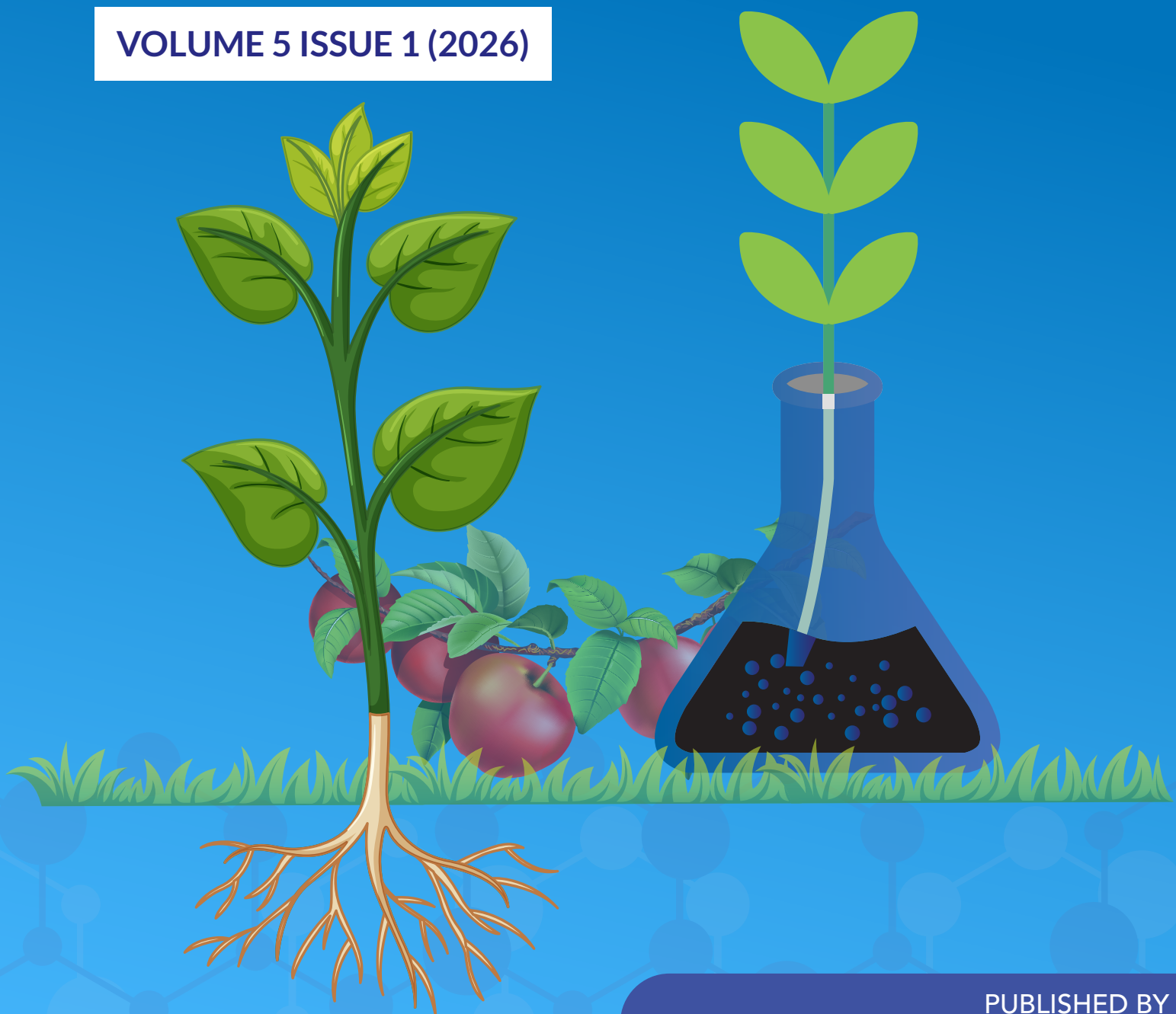




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Assessing the Influence of Caterers' Nutrition Knowledge on the Dietary Behaviours of Children in Selected Primary Schools in Ghana

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ABSTRACT

This study examines the dietary behavior of primary school children and the nutrition knowledge of caterers in selected schools in Ghana. Focusing on the beneficiary and non-beneficiary schools of the National School Feeding Programme (NSFP), the research investigates how school meal programmes influence children's eating habits and the role caterers' nutrition knowledge plays in providing balanced meals. Data were collected from 174 pupils and 10 caterers using questionnaires and diet history. Results reveal that children in beneficiary schools were likelier to consume breakfast, lunch, and supper at the recommended times than their peers in non-beneficiary schools. Caterers in beneficiary schools demonstrated a good understanding of nutritional concepts, with 60% of them scoring above moderate in nutrition knowledge. The study highlights the critical role that school feeding programmes and informed caterers play in improving children's dietary habits, with implications for policy improvement in school meal planning and caterer training programmes.

INTRODUCTION

Primary school-aged children are receptive to health messages and behavioral modifications that may last throughout adolescence and adulthood (Santos *et al.*, 2023). Because of this, nutrition interventions aimed at this age group are most likely to have long-term good impacts, such as better nutrition-related habits, a decrease in nutrition-related issues like obesity, overweight, and undernutrition, as well as a decrease in chronic illnesses associated with nutrition (Hargreaves *et al.*, 2022). Overweight and obese students are becoming more common in elementary schools around the globe, including Ghana. The way that children eat has a big impact on how healthy and developed they are generally, especially in the early school years when their nutritional demands are more intense. In Ghana, school meals frequently account for a sizable amount of kids' daily food intake, so it is critical to make sure they are healthy and balanced. However, a variety of factors, such as food preferences, financial level, and the caliber of meals served by the school, have an impact on children's dietary habits. Research indicates that unhealthy eating habits, such as consuming a lot of processed foods and few fruits and vegetables, can result in malnutrition and associated conditions including obesity and stunting (Aryeetey, 2020). To improve children's nutrition and academic performance, it is important to comprehend the eating habits of primary school students.

Due to their responsibility for meal planning, preparation, and food safety, caterers have a significant influence on how children behave when eating in school environments. The caterers' expertise in nutrition directly impacts the

quality of meals provided to children. The National School Feeding Programme (NSFP) in Ghana attempts to feed students in public schools with wholesome meals; nevertheless, studies show that caterers frequently do not know enough about fundamental nutrition concepts, which might lead to meals that are not balanced (Amoah *et al.*, 2022). This lack of knowledge can make school feeding programmes less successful and make it more difficult to fight childhood hunger. To fill up the gaps and raise the nutritional content of school meals, caterers' nutrition expertise must be evaluated.

The association between the food behaviour of children in Ghanaian elementary schools and the nutrition understanding of caterers has not been well studied. There is a knowledge gap about how caterers' skill affects what children eat at school because the majority of studies in this field tend to concentrate either on the nutrition knowledge of caregivers at home or on wider school feeding programme results (Alhassan *et al.*, 2019). The purpose of this study is to evaluate the nutritional behaviour of children as well as the caterers' level of nutrition knowledge in a subset of primary schools in Ghana. This will help create school nutrition programmes that are more successful in addressing meal quality and food choices. The study seeks to address the following research questions: (1) what is the dietary behaviour of the children in the selected schools? (2) what is the level of knowledge among the caterers of the selected schools when it comes to nutrition?

LITERATURE REVIEW

Dietary behaviour of the children

One of the most important factors affecting

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children's growth, development, and long-term health consequences is their eating habits. Numerous factors, including the influence of their families, their social situation, the availability of nutritious food, and the school environment, all have an impact on their eating habits (Scaglioni *et al.*, 2018). According to studies, children's diets frequently fall short of the recommended amounts of fruits, vegetables, and whole grains. Instead, they frequently consume large amounts of processed foods that are heavy in sugar, fat, and salt (Beckers *et al.*, 2021). These unhealthy eating practices can exacerbate childhood obesity, malnourishment, and a host of other conditions like diabetes and heart disease.

Obesity is a persistent societal health problem that has lasted for several decades. Developing healthy eating habits early in life is one of the major keys to establishing healthy lifestyles and preventing and treating obesity (Bray *et al.*, 2017). Despite our current efforts to reduce the rate of obesity in children, trends project that more children and adolescents will be affected by obesity than previously seen. Children's eating behaviours are greatly influenced by their families and parents. When parents provide balanced meals, set an example for their children, and promote regular mealtimes, their chances of their children developing good eating habits are increased. Conversely, bad eating habits can be brought on by irregular meal schedules, a preference for fast food, and a lack of knowledge about nutrition (Costa & Oliveira, 2023). Children's eating choices are also influenced by the family's socioeconomic situation and the availability of healthful food alternatives in the household. It might be difficult for low-income families to buy wholesome, fresh food, which makes them rely more on processed foods that are less expensive.

A further significant element influencing children's eating habits is their educational environment. Children's daily nutritional intake is frequently mostly met by school meals, particularly in environments like Ghana. These meals improve kids' overall diets when they are balanced and nutrient-dense. Nonetheless, a lot of schools provide food that is poor in vital nutrients and heavy in calories. Programmes for nutrition education in schools can contribute to a greater public understanding of healthy eating practices; however, further work is required to guarantee that these initiatives are successful and that the meals served to satisfy the nutritional requirements of developing children (Zadka *et al.*, 2019).

Ihotu and Etim (2024) investigated the nutritional and functional properties of soybean-fortified carbohydrate diets using millet, cassava, and yam. Results indicated that soybean fortification significantly enhanced protein content, with the highest increase observed in the millet-soybean blend (29.81%). Cassava exhibited the highest water absorption capacity, while millet had the best gelation properties. The study concluded that incorporating soybeans into carbohydrate-rich diets improves their nutritional value and functional properties, making them more versatile for food applications.

Paul *et al.* (2023) formulated a high-nutritional composite flour using various ratios of wheat and Sologold sweet

potato flour (SSPF) to enhance bakery products. The best composite flour blend, B6 (40% wheat, 60% SSPF), was selected based on its highest desirability index (0.65164). The blend exhibited improved nutritional attributes, including moisture (10.12%), crude fiber (3.21%), protein (5.80%), oil extract (5.20%), and significant levels of calcium (2.08 mg/g), potassium (2.14 mg/g), vitamin A (24.6 µg/g), and beta-carotene (27.5 µg/g). Comparative analysis with existing composite flours demonstrated that B6 had added nutritional advantages. The study concluded that the developed composite flour offers health benefits to consumers.

Nutritional knowledge of caterers

The exposure of caterers to nutritional knowledge is considered one crucial element that cannot be neglected when the discussion on the impact of nutritional programmes to enhance the nutritional status among pupils is raised. In the views of Chin *et al.* (2023) the caterer's lack of knowledge on what makes up a healthy eating habit is one of the key threats to the progress of such policies. The nutritional needs of pupils are constantly changing hence the need for caterers to also update themselves on issues of nutrition through nutrition education. According to Tusiime (2019), the nutritional knowledge of caterers begins with their ability to identify their client's nutritional needs and requirements (pupils). Identifying the nutritional status gaps of the pupils will assist the caterer in planning and implementing a menu that resolves the gaps. MacDonald (2021) also adds that planning the menu for school children must align with their nutritional needs which can only be identified through the ability of the caterer better to understand the nutritional needs of his or her pupils. He further adds that; the caterer must constantly be enlightened on the changing needs of the pupil through nutrition education. Empirically, research around the globe has shown that most caterers cannot often better understand the nutritional needs of their clients. In the study of Annoh (2019), it was seen that only 17% out of the 60 caterers who were engaged in her study were capable of identifying the nutritional gaps of their clients. In the study, it was seen that the majority of the caterers plan their menu without giving key consideration to the fact that the menu should align with the nutritional requirements of their clients (pupils). The study of Akabanda *et al.* (2017) also showed a similar trend. In that study, only 9% out of the 124 caterers who were engaged in the study had received the relevant nutrition education to plan their menu around the nutritional requirements of the school children.

Stephen (2019) also adds that the nutritional knowledge of caterers is also hinged on their ability to adopt the best cooking, preservation and hygienic practices to limit the exposure of food they prepare to disease-causing pathogens. Caterers who are often seen as the primary handlers of food for school children and the general public play an important role in the prevention of food poisoning and other related food-borne diseases. According to Gallo *et al.* (2020), people often

carry bacteria to contaminate the food they eat daily. It is therefore recommended that, primary handlers of food who are often regarded as caterers practice the best hygienic lifestyle in order to avoid the exposure of the food they prepare for their clients from germ and other pathogenic infections.

Kamala and Kumar (2018) suggest that the commensal flora on the hands of people who often prepare food for others often consists of staphylococci which usually cling to the skin surfaces and survive in hair follicles. Balali *et al.* (2020) in agreement with Kamala and Kumar (2018) recommend that food handlers especially caterers must wash their hands thoroughly before they touch the food they prepare to stop the transmission of food-borne diseases to their clients. Balali *et al.* (2020) further recommend that the food for preparation must be washed thoroughly to destroy any pathogens that have come in contact with the food.

Sharna *et al.* (2024) assessed malnutrition among children aged 6-59 months in rural Dinajpur, Bangladesh, using a community-based cross-sectional design with anthropometric measurements and face-to-face interviews. Key determinants included parental education, family income, diet, and breastfeeding practices, with fish, egg, and cow milk consumption significantly reducing stunting risks. Binary logistic regression identified nuclear

families, lower incomes, and lower paternal education as major contributors to malnutrition. The study concluded that targeted nutritional education and dietary improvements are crucial for combating childhood malnutrition in rural Bangladesh.

MATERIALS AND METHODS

The study was carried out in the Dormaa East District in the Bono Region. Dormaa East is one of the 27 districts in the region. The study through a quantitative research design sampled 174 pupils from 4 schools that consisted of 2 beneficiary basic schools and 2 non-beneficiary schools of school feeding programme as well as 10 caterers. Systematic random sampling, which is regarded as a scientific and probability sample procedure, was utilized to choose study participants since the study is driven by the quantitative research strategy. A quantitative questionnaire with structured questions was used to collect the data. Information elicited included demography, weight, height, knowledge and perception of malnutrition. Dietary data was also collected using diet history. Data was analysed with the help of IBM's SPSS v. 20.

RESULTS AND DISCUSSION

Demography of pupils and dietary behaviour of the pupils

Table 1: Demography of Pupils and Dietary Behaviour of the Pupils (n=174)

	School	Age		Breakfast				Lunch				supper				
		Category (years)	Freq.	YES			NO	YES				NO	YES			No
				A	B	C		A	B	C	D		A	B	C	
SFP	WRS	5-7	17	4	9	3	1	17					2	14	1	
		8-10	14	3	7	2	2	14						13	1	
		11-13	18	3	11		4	18						17	1	
			49	10	27	5	7	49					2	44	3	
						42	7				49				49	
	PPS	5-7	19	4	11	1	4	19					5	12	2	
		8-10	17	6	8	1	2	17					2	14	1	
		11-13	12	3	5	1	3	12					2	9	1	
			48	13	24	3	9	48					9	35	4	
						40	9				48				48	
NFS P	APS	5-7	17		1	2	14	1	2	8		6		3	14	
		8-10	13	1	1	2	9	2		5		6	1	4	8	
		11-13	15	1		5	9	1	1	2		11	3	5	7	
			45	2	2	9	32	4	3	15		23	4	12	29	
						13	32				22	23			45	
	SPS	5-7	9			1	8	1	1	1		6	2	2	5	
		8-10	21	1	1	5	14	5		5		11	1	6	14	
		11-13	2				2					2			2	
			32	1	1	6	24	6	1	6		19	3	8	21	
						8	24				13	19			32	
		174	26	53	23	72	107	4	21		42	18	99	57		
					102	72			132		42			174		

Key: SFP: School Feeding Program, NSFP: Non-School Feeding Program, WRS: Wamfie R/C School, PPS: Presby. B Primary School, APS: Anglican Primary school, SPS: S.D.A. Primary School, M: Male, Cat.: Category, Freq.: Frequency, F: Female
Breakfast: A: 6:00-7:00 am, B: 7:00-8:00 am, C: After 10:00 am
Lunch: A: 12:00-1:00 pm, B: 1:30-2:30 pm, C: 2:30-3:30 pm, D: 3:30-4:00 pm
Supper: A: 4:00-5:00 pm, B: 5:30 – 6:30 pm, C: After 6:30 pm

The study revealed that a greater number of respondents came from schools participating in the school feeding program, while the least respondents were from S.D.A Primary School, a non-beneficiary school. Pupils in beneficiary schools were significantly more likely to consume breakfast, with about 85% taking breakfast compared to 27% in non-beneficiary schools. Additionally, 62% of pupils in beneficiary schools consumed breakfast between 7:00 and 8:00 am, the recommended time, while 71% of those from non-beneficiary schools ate breakfast after 10:00 am.

All pupils from the beneficiary schools took lunch, while more than half (55%) of pupils from non-beneficiary schools skipped lunch. In beneficiary schools, lunch was consumed within the recommended time (12:00-1:00 pm), while only 44.16% of pupils from non-beneficiary schools ate lunch within this timeframe, with the majority eating much later. The time gap between breakfast and lunch in non-beneficiary schools exceeded the recommended 4-5 hour gap. Despite this, all respondents took supper, with 81% of pupils in beneficiary schools eating supper between 5:30 and 6:30 pm, whereas 65% of pupils in non-beneficiary schools had supper after 6:30 pm.

Pupils in beneficiary schools, who receive lunch at the recommended time, are more likely to eat supper on time as well, while those in non-beneficiary schools, who miss the recommended lunch timing, are more prone to late supper consumption.

In order to give a clearer presentation of the lunch intake of the pupils in non-beneficiary schools, Figure 1 is used to illustrate the timeframes that pupils enrolled in non-beneficiary schools take their lunch.

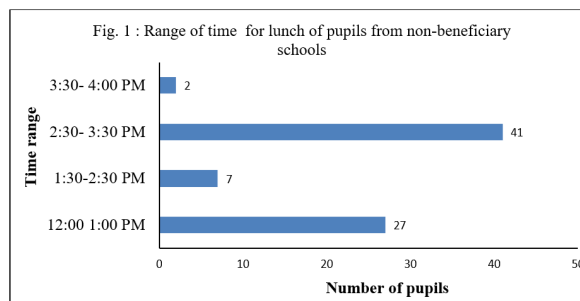


Figure 1: Timeframe for lunch of pupils from non-beneficiary schools.

The bar chart in Figure 1 displays the range of time for lunch consumption among pupils from non-beneficiary schools. The majority of pupils (41) took lunch between 2:30 - 3:30 pm, which is after the recommended lunchtime of 12:00 - 1:00 pm. A smaller group of pupils (27) managed to eat lunch within the recommended timeframe of 12:00 - 1:00 pm. Additionally, 7 pupils consumed lunch between 1:30 - 2:30 pm, while only 2 pupils had lunch as late as 3:30 - 4:00 pm. The data suggests that most pupils from non-beneficiary schools do not take lunch at the recommended time, with the majority having it later in the afternoon.

Demography of caterers

The age, educational background, and experience; which were measured in the number of years in practice, were taken into consideration. The data in this section is summarized in Table 2

About half (50%) of the population of respondents were

Table 2: Demography of caterers (n=10)

Gender	Age	Educational background	Experience in years		
			1-4	5-10	10+
Male	25-30	Basic/Secondary	1		
		Vocational		1	
	Diploma/HND		1		
	31-40	Basic/Secondary		2	2
		Vocational	1		
40+	Basic/Secondary			1	

within the age bracket of 31 to 40 years while 30% were within the ages of 25 to 30 years. Another 20% were above 40 years. Averagely 60% of the caterers had at least basic and secondary education, and respondents from all the given age groups were presented in this category. Approximately 20% had also received vocational education and training in catering. Respondents in this

category were within the age groups of 25-30 and 31-40. Only 20% of the respondents had attained diploma and Higher National Diploma certificates. This 20% were within the age groups of 25-30 and 31-40. About 40% of the caterers had practiced for more than 10 years and 40% had also practiced for about 5 to 10 years. Only 20% had practiced catering for about 1 to 4 years.

Table 3: Nutritional intake of pupils

Nutritional Intake of the Pupil (Indicator, type of dish taken for breakfast, Lunch & Supper)						
	Breakfast	Lunch		Supper		
	Dominant Dish	N=97	Dominant Dish	N=97	Dominant Dish	N=97
Beneficiary Schools	Porridge & Bread	47	Rice Dish & Stew	97	Fufu/Soup	78
	Milo & Bread/Egg	14	Ampesi & Stew	97	Banku/Soup/Stew	82
	Rice Dish & Stew	12	Kenkey & Fish	97	Kokonte/Soup	13
	Ampesi & Stew	11	Banku & Stew/Soup	97	Ampesi/Stew	45
	Kenkey & Fish	9	Kokonte/Soup	-	Rice Dish/Stew	19
	Banku & Stew/Soup	4	Gari & Beans/Egg	97	Rice Ball/Soup	11
	Dominant Dish	N=77	Dominant Dish	N=77	Dominant Dish	N=77
Non-Beneficiary Schools	Porridge & Bread	11	Rice Dish & Stew	42	Fufu/Soup	74
	Milo & Bread/Egg	7	Ampesi & Stew	15	Banku/Soup/Stew	57
	Rice Dish & Stew	59	Kenkey & Fish	72	Kokonte/Soup	21
	Ampesi & Stew	71	Banku & Stew/Soup	67	Ampesi/Stew	33
	Kenkey & Fish	49	Kokonte/Soup	47	Rice Dish/Stew	21
	Banku & Stew/Soup	33	Gari & Beans/Egg	71	Rice Ball/Soup	14

Table 3 shows which foods were most frequently consumed by the pupils who took part in the survey. While the majority of the children who are enrolled in beneficiary schools take light food such as porridge with bread as well as milo or beverage dish with bread with egg, majority of the children enrolled in non-beneficiary schools take heavy foods such as rice dish, Ampesi and Kenkey with fish as their breakfast. The data shows no significant variations in the dominant dishes that are taken during lunch and supper across the two categories of schools.

Nutritional knowledge of caterers

As part of the primary objective of the study, this section of the analysis sought to present the statistics on how well exposed the caterers who were engaged in the study were to the subject of nutrition.

Table 4: Nutritional knowledge of caterers

Indicators (Very Low, Low, Moderate, High, Very High)		
Variable	Frequency (N=10)	% (=100)
Very High	3	30
High	3	30
Moderate	2	20
Low	1	10
Very Low	1	10

About 60% of the 10 caterers who were engaged in the study had above moderate exposure to the subject of nutrition and its impact on the growth and development of the pupils, while only 20% had a below-moderate knowledge base on the subject under consideration in this section. In the analysis, the caterers were further asked to indicate their levels of agreement with some key statements that were denoted as nutritional facts on

which they as caterers must have some levels of exposure. The ranking was on a Likert scale of five (5) points. From

Table 5: Knowledge of caterers on key nutritional facts

Statement	Mean	Std. Dev.
A balanced diet is required for proper childhood development	4.90	0.31
Breakfast improves concentration in class	4.80	0.42
The right intake of protein is good for childhood development	4.70	0.48
Too much fat can cause obesity	4.60	0.70
Fruits and vegetables are required in the diet of pupils	4.40	0.69
Hygiene is essential in food preparation	4.10	0.99
Good nutrition is a requirement for pupils	4.40	0.84
Average mean	4.55	

Scale: 1.00-2.90-disagree, 3.00-3.40-neutral, 3.50-4.90-agree

Table 5, the average mean (4.55) indicates that the caterers generally had good knowledge of nutrition and its impact on the growth and development of the pupils. The mean score of 4.90 shows that caterers agree that a balanced diet is required for proper childhood development. This implies the caterers' awareness of the critical role nutrition plays in the growth and health of children. With a mean score of 4.80, caterers also agree that breakfast improves pupils' concentration in class. The mean score of 4.70 demonstrates that caterers agree that adequate protein intake is essential for children's growth and development. The caterers agree that too much fat can cause obesity with a mean score of 4.60.

Discussion

Dietary Behavior of Pupils

In the assessment of the dietary behavior of the pupils who were engaged in the study, the intake of breakfast, lunch, and supper were used as the primary indicators. The analysis covered the propensity of the children enrolled in beneficiary schools to take breakfast, lunch, and supper as against those who are enrolled in non-beneficiary schools. The analysis on this subject matter also took into consideration the eating times of breakfast, lunch and supper among the pupils who were enrolled in beneficiary schools and those enrolled in non-beneficiary schools. Similar to the study of Tagoe (2018), it was seen that children who are enrolled in schools that benefit from school feeding and nutrition programmes are more likely to take breakfast at the recommended time than those who are enrolled in non-beneficiary schools. In this study, it was seen that children who were enrolled in beneficiary schools were 84.45% more likely to have breakfast before class began than those in non-beneficiary schools (29.87%). In the study of Tagoe (2018), this situation was attributed to the fact that children who come from poor households are often given upkeep monies that are more likely to take care of one meal (preferably lunch) while they are in school. Tagoe (2018) in his study concluded that, because the money given to children is not adequate to provide them two meals while they are in school, they often prefer to have late breakfast during their first break. Similar patterns were seen in this study when it was discovered that 54 (70.1%) of the students participating in the study were more likely to have breakfast during the first break. The study of Kedze (2013) also realised that, because children from poor households are not given adequate money for two meals while they are in school, they often prefer to take heavy foods during breakfast in order to sustain themselves during school hours. This study also agrees with that of Kedze (2013) since the findings revealed that majority of the pupils enrolled from non-beneficiary schools were more likely to take heavy food as their breakfast.

Nutritional Knowledge of Caterers

The objective of the study sought to examine the levels of exposure that the caterers who were engaged in the study had regarding nutrition and its impacts on the growth and development of the pupils. This section was considered important since it was assumed to be one of the key factors that could predict the food preparation and menu selection for the school feeding programme. The findings of the study showed that majority that is between 60 to 80% of the caterers had better exposure on the knowledge on nutrition and its consequent effect on the growth and development of the pupils. The maximum percentage score of the variables that were used as the indicators of the nutritional knowledge of the caterers was recorded at 97.82% (that is the caterers' knowledge base on good nutrition as a requirement for the development of pupils). The average score among

the 7 variables was recorded at 91.55% which shows a very good level of knowledge base of the caterers across the 7 nutritional statements presented in table 5. A similar trend was seen in the study of Hashanuzzaman *et al.* (2020) when their study revealed a higher (87%) nutritional knowledge base of 127 caterers they used in their assessment of the effectiveness of school feeding programmes in Bangladesh. Jone (2013), found that caterers had a higher nutritional knowledge base due to the in-service training they receive regularly.

CONCLUSION

The substantial influence that school feeding programs have on Ghanaian primary school pupils' eating behaviours is highlighted by this study. The results show that pupils in National School Feeding Programme (NSFP)-advantaged schools are more likely than pupils in non-beneficiary schools to take meals at the specified times and to maintain healthy eating habits. In addition, caterers' understanding of nutrition is essential to guaranteeing that kids eat meals that are both balanced and nourishing. Given that more than 60% of caterers had a high degree of nutritional understanding, the study implies that ongoing nutrition education is crucial to raising the standard of school meals. To address childhood malnutrition and obesity, our findings emphasize the necessity of continued funding for school feeding programs and improved nutrition education for caterers. Enhancing these aspects can benefit students in Ghana's primary schools in terms of their health and academic performance.

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