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BREAKFAST HABITS AMONG SCHOOL CHILDREN IN SELECTED COMMUNITIES IN THE EASTERN REGION OF GHANA

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SUMMARY

Background: Breakfast is considered the most important meal of the day, yet many people skip breakfast. Studies indicate that school age children who regularly skip breakfast are not likely to concentrate in class, thus affecting school performance. This study determined the breakfast habits and nutrient contributions of the breakfast meal to the days' nutrient intake.

Design: A cross sectional study was conducted among school children (n=359) between the ages of 6-19 years in Manya Krobo in the Eastern Region of Ghana. Questionnaires were used to collect information on background characteristics and breakfast consumption habits. The 24-hour dietary recall method was used to obtain information on the children's food intake. T-test was used to compare differences between means of variables of breakfast consumers and skippers.

Results: About 85.5% of the children had breakfast on the day of interview. More boys (87.8%) consumed breakfast compared to the girls (83.1%). For those who skipped breakfast, lack of food at home or lack of money (36.5%) was the main reason. Breakfast consumers had significantly higher energy and nutrient intakes than those who skipped breakfast (energy 2259 verses 1360 kcal, p=0.039; vitamin A 1534 verses 662 ug/RE, p=0.001; iron 22.9 verses 13.9 mg, p=0.017, zinc 9.9 verses 5.6 mg, p=0.034). The breakfast meal contributed between 32-41% of the day's energy intake, and between 30-47% of micronutrient intake.

Conclusion: Encouraging breakfast consumption among school children is a way to ensure that they meet their daily nutrient and energy intakes.

Keyword: Breakfast, School children, Energy, Nutrients, Ghana

INTRODUCTION

Breakfast is the first meal of the day and is typically taken no later than mid-morning. It is frequently branded as the most important meal of the day, owing to a number of benefits including prevention of overweight, obesity and reduction in risk of cardiovascular diseases.¹

Skipping breakfast is a common practice by people around the world. The 1999-2006 National Health and Nutrition Survey of the United States reported that between 20% and 30% of children and adolescents skipped breakfast frequently.² In India, the proportion of children skipping breakfast regularly was even higher (over 50%).³

Breakfast is important in meeting the day's nutritional needs. Children who consume breakfast are likely to meet their energy and overall nutrient requirement compared to those who do not have breakfast.^{4, 5, 6, 7, 8} In India, children between 10 and 15 years who consumed breakfast met about one quarter to one third of their daily energy and protein intakes from the breakfast meal.³ Breakfast consumption also contributes to increase intakes of other nutrients. In a longitudinal study among girls 9-19 years, in which energy intake was adjusted for, breakfast cereal consumption was related to increased consumption of fibre, calcium, iron, folic acid, vitamin C, and zinc, and a decrease in fat and cholesterol intake.⁹ Breakfast skippers in most cases are unable to compensate for the nutrients lost during the rest of the day.⁴

Breakfast meals contribute to improving cognition among school age children.^{10, 11} The amount of time between the consumption of the last meal of the day and breakfast the next morning is generally longer compared to the time interval between other meals such as breakfast and lunch or lunch and dinner.¹¹ The long-time interval results in metabolic changes that interfere with cognitive function and school performance.¹⁰ Among American children, 9-11 years old, those who took breakfast had higher mental arithmetic task performance, showed better creative thinking and improvement on performance of tasks involving processing of complex visual display.^{11, 12, 13} Other studies report improvements in tasks regarding memory function with the intake of breakfast.^{10, 13, 14}

Studies on breakfast habits among Ghanaian children are lacking. The objective of this study was to determine the breakfast habits of Ghanaian school children and to determine the contribution of the breakfast meal to the total energy and nutrient intake for the day.

METHODS

Subjects and study area

A cross-sectional design was used for this study. Primary school children (n=359) were selected from 10 public schools in the Upper and Lower Manya-Krobo Districts of the Eastern Region of Ghana. The schools were selected based on ease of access to the communities in which they are located.

The main economic activities in the district are farming, fishing and trading. In each school, children in classes one to six were eligible to participate. In each class a list of the children in the register was obtained and was stratified based on sex. Every third child on the list was selected. Permission to carry out the study in the schools was sought and obtained from the Ghana Education Service-School Health Education Program (SHEP).

Ethical clearance was obtained from the Institutional Review Board of Noguchi Memorial Institute for Medical Research of the University of Ghana, Legon. The Head of each school granted permission for the children's participation in the study. To be eligible, the child must be present on the day of interview and must be in a primary class (classes 1 to 6).

Data Collection

Breakfast Habits

A structured questionnaire was used to collect information on the breakfast habits of all the children. Specifically, they were asked whether they had consumed breakfast on the day of interview, the time of consumption, the number of times they consumed breakfast in the past one-week; if breakfast was skipped and the reasons for skipping was sought.

Dietary Intake

Dietary intake information was collected only on children in upper primary (class 4-6; n=181) because they can better recall foods eaten the previous day than the younger children. Using the 24 hour recall method, the children were asked to recall foods they had consumed over the past 24-hours. To aid in the recall and estimation of quantities of food eaten, household measures (such as cups, ladles, spoons,) and food models were used. The estimated quantities of food were weighed and converted into energy and nutrients using Food Composition Tables based on Ghanaian foods.¹⁵

Data analysis

Data were analysed using SPSS version 11.5. Student's *t*-tests were used to compare the mean nutrient intakes of children who consumed breakfast and those who skipped on the day of interview. Critical value for statistical significance was set at $p < 0.05$.

RESULTS

The background characteristics of the children are shown on Table 1. Of the 359 children 53.2% lived with their biological parents. The main occupation of the fathers/male guardians was farming (44.6%). Most of the children (95.0%) lived in the same household with their siblings.

Table 1: Background characteristics of study children (N=359)

Characteristic	Number of subjects (%)
Age (years)	N (%)
6-10	158 (44.0)
11-14	181 (50.4)
15-19	20 (5.6)
Child lives with;	
Biological Parents (both)	191 (53.2)
Mother only	55 (15.3)
Father only	23 (6.4)
Other relatives	90 (25.1)
Occupation of fathers/male guardians	
Farming	160 (44.6)
Trading	33 (9.2)
¹ Artisans	133 (37.0)
Unemployed	4 (1.1)
Don't know	29 (8.1)
Household size	
1-5	185 (51.5)
6-10	160 (44.6)
>10	14 (3.9)
Children who have siblings	
Yes	341 (95.0)
No	18 (5.0)

¹Artisans includes carpenters, masons, tailors etc

The results of the breakfast habits of the school children are presented in Table 2. A total of 307 (85.5%) children had breakfast on the day of interview. Most of them (87.6%) had their breakfast at home. About 97 of the children liked the breakfast served to them.

Table 2 Breakfast habits of Ghanaian school children (N=359)

Breakfast habit	Number of children (%)
Had breakfast on day of interview (Yes)	
Boys (n=181)	159 (87.8)
Girls (n=178)	148 (83.1)
Total	307 (85.5) [†]
Where breakfast was taken on day of interview (n=307)[†]	
Home	269 (87.6)
School /Way to school	38 (12.4)
Liked breakfast served on interview day (n=307)[†]	
Yes	297 (96.7)
No	10 (3.3)
Reasons for not having breakfast on day of interview (N=52)	
Not hungry	4 (7.7)
Too early	6 (11.5)
No time	8 (15.4)
No money/No food	19 (36.5)
Don't like breakfast	3 (5.8)
No reason	12 (23.1)
Frequency of having breakfast in the past one week (N=359)	
None	13 (3.6)
1-3 times	25 (6.9)
4-6 times	60 (16.7)
7 times	261 (72.7)

[†]Number that did not have breakfast on day of interview= 52 (14.5%)

Of those who did not have breakfast (14.5%), various reasons were given, the main reason being the lack of money or food for breakfast at home. Some of the children (3.6%) did not have any breakfast throughout the past one week.

Based on whether breakfast was consumed or not on the day of interview, the energy and nutrient intakes of the two groups of children (breakfast-consumers verses non-consumers) were compared (Table 3). Generally those who had breakfast on the day of interview had significantly higher intakes of energy, and most nutrients, (except for protein, riboflavin and calcium) compared to those who did not have breakfast.

Breakfast meals were mainly cereal based foods which included *banku* (dumpling from fermented maize dough) which was normally consumed with pepper and fish, *akasa or koko* (porridge from fermented maize dough), *hausa koko* (porridge from fermented millet dough), rice and sometimes beverage from cocoa powder. The porridges were sweetened with sugar and were usually eaten with white bread (Table 4).

Table 3 Comparison of energy and nutrient intakes between children who had breakfast and children who skipped breakfast on the day of interview (Upper primary children only (N=180))

Nutrient	Had breakfast (N=151) (Mean ±SD)	No breakfast (N=29) (Mean±SD)	P-value
Energy (kcal)	2259 ± 798	1360 ± 596	0.039*
Protein (g)	56 ± 22.2	32.7 ± 17.6	0.060
Vitamin A (ug/RE)	1534 ± 13.4	662 ± 819	0.001*
Thiamine (mg)	0.91 ± 0.45	0.53 ± 0.22	0.010*
Riboflavin (mg)	0.69 ± 0.28	0.41 ± 0.22	0.084
Vitamin C (mg)	127 ± 95.7	58 ± 42.0	0.007*
Iron (mg)	22.9 ± 10.5	13.9 ± 7.4	0.017*
Zinc (mg)	9.9 ± 4.3	5.6 ± 3.1	0.034*
Calcium (mg)	409 ± 237	237 ± 187	0.080

*significantly different at P-value of ≤ 0.05 t-test

The contribution of breakfast to the total daily energy and nutrient intake was determined (Table 5). The age categorizations used in Table 5 were based on age groupings used on Dietary Reference Intake recommendations (Estimated Average Requirements)¹⁶ for children.

The breakfast meal contributed to between 32% and 41.3% of the total daily energy and between 23.4% and 55.7% of the other nutrients. The percent contribution of breakfast meal to vitamin A intake ranged between 31.7%-55.7% (i.e. 361-846 ug RE). Breakfast meal contributed between 35.5-51.5% of iron and 35.1-45.6% of zinc intakes for all age categories (Table 5).

Table 4 Frequency of consumption of selected foods for breakfast in the past one week

Food group and food item	Not consumed by N (%)	Consumed once per week by N (%)	Consumed 2-4x per week by N (%)	Consumed >4 per week by N (%)	Food item not known by N (%)	Consumed at least once per week by N (%)
Porridges						
¹ Hausa koko	125 (70.2)	32 (18.0)	15 (8.4)	4 (2.2)	2 (1.1)	51 (28.6)
² Akasa	81 (45.5)	55 (30.9)	36 (20.2)	6 (3.4)	0 (0.0)	97 (54.5)
Tom brown	141 (79.2)	23 (12.9)	11 (6.2)	3 (1.7)	0 (0.0)	37 (20.8)
³ Oblayo	117 (65.7)	40 (22.5)	20 (11.2)	1 (0.6)	0 (0.0)	61 (34.3)
⁴ Ekuegbemi	141 (79.2)	24 (13.5)	12 (6.7)	0 (0.0)	1 (0.6)	36 (20.2)
Rice porridge	121 (68.0)	32 (18.0)	22 (12.4)	3 (1.7)	0 (0.0)	57 (32.1)
Oats	140 (78.7)	16 (9.0)	11 (6.2)	0 (0.0)	11 (6.2)	27 (15.2)
Beverages						
Cocoa	112 (62.9)	41 (23.0)	21 (11.8)	4 (2.2)	0 (0.0)	66 (37.0)
Tea	140 (78.7)	27 (15.2)	10 (5.6)	1 (0.6)	0 (0.0)	38 (21.4)
Coffee	154 (86.5)	16 (9.0)	7 (3.9)	0 (0.0)	1 (0.6)	23 (12.9)
Milk	112 (62.9)	42 (23.6)	21 (11.8)	3 (1.7)	0 (0.0)	66 (36.9)
Fruit juice	140 (78.7)	17 (9.6)	19 (10.7)	4 (2.2)	0 (0.0)	38 (21.4)
Coke/fanta	141 (79.2)	22 (12.4)	12 (6.7)	3 (1.7)	0 (0.0)	37 (20.8)
Breads						
Bread	74 (41.6)	55 (30.9)	37 (20.8)	12 (6.7)	0 (0.0)	104 (58.4)
⁵ Bofrot	138 (77.5)	26 (14.6)	11 (6.2)	3 (1.7)	0 (0.0)	40 (22.5)
⁶ Kose/akasa	146 (82.0)	18 (10.1)	13 (7.3)	1 (0.6)	0 (0.0)	32 (18.0)
Pie/chips	132 (74.2)	24 (13.5)	19 (10.7)	3 (1.7)	0 (0.0)	46 (25.9)
Biscuits	119 (66.9)	30 (16.9)	28 (15.7)	4 (0.6)	0 (0.0)	62 (33.2)
Main carbohydrate foods						
Banku	65 (36.5)	41 (23.0)	62 (34.8)	10 (5.6)	0 (0.0)	113 (63.4)
Kenkey	96 (53.9)	41 (23.0)	32 (18.0)	9 (5.1)	0 (0.0)	82 (46.1)
Rice	100 (56.2)	34 (19.1)	40 (22.5)	4 (2.2)	0 (0.0)	74 (43.8)
Gari and beans	123 (69.1)	31 (17.4)	20 (11.2)	4 (2.1)	0 (0.0)	55 (30.7)
Plantain	136 (76.4)	25 (14.0)	17 (9.6)	0 (0.0)	0 (0.0)	42 (23.6)
Yam	125 (70.2)	32 (18.0)	20 (11.2)	1 (0.6)	0 (0.0)	53 (29.8)
Cocoyam	129 (72.5)	29 (16.3)	17 (9.6)	3 (1.7)	0 (0.0)	49 (27.6)
Gari	136 (76.4)	25 (14.0)	17 (9.6)	0 (0.0)	0 (0.0)	42 (23.6)
⁷ Fufu	114 (80.9)	20 (11.2)	13 (7.3)	1 (0.6)	0 (0.0)	34 (19.1)
⁸ Kokonte	166 (93.3)	7 (3.9)	5 (2.8)	0 (0.0)	0 (0.0)	12 (6.7)
Sweet potatoes	153 (86.0)	16 (9.0)	9 (5.1)	0 (0.0)	0 (0.0)	25 (14.1)
⁹ Abolo	150 (84.3)	17 (9.6)	8 (4.5)	2 (1.1)	1 (0.6)	27 (15.2)
Protein foods						
Fish	61 (34.3)	47 (26.4)	46 (25.8)	24 (13.5)	0 (0.0)	117 (65.7)
Egg	118 (66.3)	38 (21.3)	20 (11.2)	2 (1.1)	0 (0.0)	60 (33.6)
Chicken	137 (77.0)	31 (17.4)	10 (5.6)	0 (0.0)	0 (0.0)	41 (23.3)
Beef	158 (88.8)	10 (5.6)	10 (5.6)	0 (0.0)	0 (0.0)	20 (11.2)
Condiments						
Groundnut paste	150 (84.3)	15 (8.4)	10 (5.6)	0 (0.0)	3 (1.7)	25 (14.1)
Cheese	162 (91.0)	6 (3.4)	5 (2.8)	0 (0.0)	5 (2.8)	11 (6.2)
Condensed milk	147 (82.6)	14 (9.0)	10 (5.6)	1 (0.6)	6 (3.4)	25 (15.8)
Margarine	139 (78.1)	26 (14.6)	11 (6.2)	2 (1.1)	0 (0.0)	39 (21.9)
Fruits						
Mango	153 (86.0)	16 (9.0)	8 (4.5)	1 (0.6)	0 (0.0)	25 (14.1)
Orange	125 (70.2)	27 (15.2)	24 (13.5)	2 (1.1)	0 (0.0)	53 (29.8)
Pineapple	154 (86.5)	13 (7.3)	11 (6.2)	0 (0.0)	0 (0.0)	24 (13.5)
Watermelon	158 (88.8)	14 (7.9)	6 (6.2)	0 (0.0)	0 (0.0)	20 (14.1)
Banana	128 (71.9)	22 (12.4)	27 (15.2)	1 (0.6)	0 (0.0)	50 (28.2)
Pawpaw	150 (84.3)	14 (7.9)	13 (7.3)	1 (0.6)	0 (0.0)	28 (15.8)
Apple	157 (88.2)	6 (3.4)	13 (7.3)	2 (1.1)	0 (0.0)	21 (11.8)
Sugar cane	156 (87.6)	15 (8.4)	7 (3.9)	0 (0.0)	0 (0.0)	22 (12.3)

¹Prepared from millet ²Prepared from fermented corn ^{3,4,9}Prepared from unfermented corn ⁵doughnut ⁶Prepared from beans ^{7,8}Prepared from casava/plantain.

Table 5 Percent contribution of breakfast meal to the total daily nutrient intake among upper primary school children who took breakfast (N=151)

Age in years	Sex	Energy Kcal	Prtein (g)	Fat (g)	CHO (g)	VIT.A (ug RE)	Thiamin (g)	Riboflavin (mg)	VIT. C (mg)	Iron (mg)	Zinc (mg)	Calcium (mg)
9-13 Y	Male N=57	^{BF} 715	20.4	17.5	122	559	0.28	0.20	30.5	7.8	3.3	119
24-hour ¹		2231	52.5	48.8	410	1501	0.85	0.64	126	22.0	9.4	359
% BF ²		32.0	38.1	35.9	29.8	37.2	32.9	31.3	24.2	35.5	35.1	33.1
9-13Y	Female N=53	^{BF} 756	20.0	17.3	134	510	0.35	0.24	30	9.0	3.6	161
24-hour ¹		1943	50.6	49.0	346.7	1342	0.79	0.63	104	20.7	8.9	393
% BF ²		38.9	39.5	35.3	38.7	38.0	44.3	38.1	28.8	43.5	40.4	40.9
14-19 Y	Male N=22	^{BF} 824	23.2	21.7	137	846	0.32	0.25	30.9	9.4	4.2	173
24-hour ¹		2237	56.4	52.1	402	1520	0.94	0.71	132	22.6	9.8	413.2
% BF ²		36.8	41.1	41.7	34.1	55.7	34.0	35.2	23.4	41.6	42.9	41.9
14-19 Y	Female N=19	^{BF} 895	21.6	14.6	170	361	0.44	0.25	32.7	10.6	4.1	147
24-hour ¹		2169	52.3	41.3	410	1138	0.93	0.66	103.8	20.6	9.0	377
% BF ²		41.3	41.3	35.4	41.5	31.7	47.3	37.9	31.5	51.5	45.6	38.9

^{BF} Figures on that row represent mean nutrient intake at breakfast, ¹24-hour dietary recall nutrient consumption on the day of interview, ²percentage contribution of breakfast to total daily nutrient intake

DISCUSSION

This study shows that the breakfast meal contributes significantly to the total energy and nutrient intakes of Ghanaian school children. Majority (72.7%) of the children in the study consume breakfast regularly. In the USA between 69-80% of children were reported to have breakfast.² Another study among children in Netherlands reported a prevalence of 95% breakfast consumption.¹⁷ A review of studies on breakfast habits reported that breakfast skipping among children was between 10-30% for European children. American children were the worst breakfast skippers.¹⁸ Consistent with other studies^{5,19}, more Ghanaian girls (16.9%) than boys (12.2%) in our study skipped breakfast.

The probable explanation is that girls especially adolescents are more concerned about their weight and therefore more likely to skip their breakfast with the intention of keeping their weight under control. However, some studies have shown that skipping breakfast may not result in weight loss.^{20,21} The reasons being that skipping breakfast resulted in poor eating habits such as inappropriate snacking on high fat and high sugary foods which could lead to excess energy consumption and subsequently being overweight.

As was expected, more of the children had their breakfast at home (87.6%) than at school or on the way to school (12.4%). Children are more likely to eat street foods if they are not fed at home. However, among those who skipped breakfast, lack of time (15.4%) on the part of parents and children was one of the reasons

children not having breakfast. Similar reasons were reported by other studies.^{22,23} Among Spanish children, 95% reported having breakfast at home, indicating an effort on the part of parents to ensure that their children took breakfast.

In our study, children who skipped breakfast did so because there was no food or money at home. Other studies have attributed low socioeconomic status and poor education of parents as some reasons why children skip breakfast.^{15,24} It should also be noted that this study was carried out between February and March which is considered a lean season in the study area. Since lean seasons are usually characterized by very high prices in food commodities, it is likely this would affect the quantity and the nutritional quality of foods consumed by the children and not necessarily the frequency of consumption. This may explain the high frequency of consuming breakfast among the children even in the lean season. Notwithstanding, the number of children consuming breakfast in the mornings is comparable to other studies elsewhere.²

In this study, without breakfast, many of the children would not have met their daily nutrient requirements, due to the difficulty to compensate for energy and nutrients lost in the morning when conscious effort is not made to replace nutrients lost.²⁴ Some studies also found that breakfast consumers had significantly higher intakes of micronutrients like vitamin A, thiamine, vitamin C, iron, calcium and zinc.^{8,25,26}

Among our Ghanaian children breakfast meals did not contribute significantly to calcium intake. This is not surprising as milk and milk products are rarely con-

sumed as part of the breakfast meal in the rural setting in Ghana. The relatively high cost of milk and milk products in Ghana discourage consumption, even among young children.

In conclusion, consumption of breakfast is a common practice among the Ghanaian schoolchildren studied. Children who had breakfast generally had significantly higher nutrient intakes than children who did not. Encouraging breakfast consumption among school children is a way to ensure that they meet their daily nutrient and energy intakes. Parents and Caregivers should be educated on the benefits of breakfast for children. This should include what makes a nutritious breakfast to ensure that the children are not only fed breakfast but also one that enhances their nutritional status.

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