

*Full Length Research Paper*

# **A pilot study of the dietary and physical activity behaviours of international students: Implications for health promotion**

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**A cross-sectional survey was conducted to describe the dietary practices of international students attending the University of Ghana, Legon. One hundred and fifty international students volunteered to participate in the study. A structured questionnaire was used to solicit information from respondents. Main outcome measures were self reported demographics, breakfast, lunch, dinner, snacks, meal skipping, fruit and fat related behaviours. Analysis of variance, paired t-test, and logistic regression were used to test for differences and association between dependent and independent variables. The findings indicated the eating habits differed both in the home country and in Ghana. Although breakfast is the most important meal of the day, some (n = 21) respondents skipped it because there was no time for them to eat in the morning due to their tight schedule. There was a significant difference between ethnicity and breakfast intake with more Caucasians eating breakfast than those of African origin. More respondents of African descent (n = 88; 61.1%) than Caucasians (n = 37; 25.7%) were of the view that fruits were of less importance. Reasons for skipping lunch were either not hungry, weight related or lack of time. Science students skipped meals than those in the Humanities and Arts. Food choice was influenced by availability, variety and affordability. More than half of the respondents (78.5%) engaged in some physical activity. There is the need for nutrition education for foreign students as they enter a new environment.**

**Key words:** International students, diet, nutrition, behaviour.

## **INTRODUCTION**

In the history of mankind, people have moved in and out of places and this is seen in the global front, within and between communities and across cultural lines. Depending on the circumstances, the movement can be temporary, for example, in the case of international students. Such movements may lead to changes in behaviours which are impacted by psychological, economic, cultural, physical and social environment (Woods, 1992; Lee et al., 1999; Satia et al., 2001). Among the behaviours that change and are mostly affected by the environment are eating and activity patterns.

In recent times, student migration is on the rise and the implications on health may be either positive or negative. Pan et al. (1999) documented that for international students, even a short term stay in a foreign country can result in significant and often undesirable changes in eating patterns. Earlier report by the Centre for Disease Control (CDC) stated that university students make unhealthy food choices due to lack of knowledge of good nutrition (CDC, 1996). Nevertheless, very few studies have investigated the effect of short term migration, or temporary translocation, on eating habits (Perez-Cueto et al., 2008). The current rises in non-communicable diseases which are nutrition related have been linked with migration and the associated dietary acculturation (Gilbert and Khokhar, 2008; Nicolaou et al., 2006). It is

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**Table 1.** Demographic characteristics of the participants.

Variable	N (%)
<b>Gender</b>	
Male	38 (25.3)
Female	112 (74.7)
<b>Age</b>	
15 - 20	46 (31.3)
21 - 30	95 (64.6)
≥30	6 (4.1)
<b>Ethnicity</b>	
African	88 (61.1)
Caucasian	37 (25.7)
Other	19 (13.2)
<b>Course of study</b>	
Arts	24 (16.0)
Humanities	64 (42.7)
Science	62 (41.3)

timely and of public health significance to consider the nutrition behaviour of foreign students who find themselves in a new environment.

This formative research, therefore, was to find out the dietary practices of foreign students attending the University of Ghana and to compare the circumstances in Ghana to their native country. It is anticipated that the findings will serve as an impetus for planning appropriate nutrition education programmes for international students within socio-cultural contextual framework to enhance nutrition and health.

## METHODS

### Study design, setting and population

The study was a cross-sectional survey conducted at the University of Ghana, Legon Campus. All international students who had stayed at the university for at least one semester were eligible to participate in the study. A total of 150 international students volunteered to participate in the study.

### Data collection instrument and analysis

A structured questionnaire was designed to solicit information on the following: demographics, dietary practices (breakfast, lunch, supper and snacks); factors that influenced food choices in Ghana (peer pressure, lack of information on healthy eating, high price of healthy foods, healthy foods boring to eat, media influence, no healthy food items in the market that I like); behaviours towards fried foods and fruits, as well as physical activity. The questionnaire

was pre-tested on 5 students to check reliability, clarity and discrepancies. The amended questionnaire was given to participants to answer after the study had been explained to them and their consent sought. The data were collected between March and May 2009 and analysed using SPSS (version 16). Analysis of variance (ANOVA), Duncan test and paired T-tests, were used for continuous variables to test for differences. Linear logistic regression models were developed to determine the odd ratio (OR) with breakfast intake as the dependent variable.

## RESULTS

The participants were made up of 38 (25.3 %) males and 112 (74.7%) females. About 65% were between 21 and 30 years. Africans were the major ethnic group in the study with mixed race (white plus afro Caribbean) the least group (Table 1). Most of the students (n = 117; 78.0%) did engage in some form of physical activity/exercise (data not shown). Frequency of performing any activity ranged from once a day to 7 days in a week. However, majority (n = 83; 72.2%) engaged in physical activity 2 - 4 days a week with a duration range of 20 to 90 minutes. Activities mostly performed were walking, jogging, soccer, volley ball and basket ball. Reasons for engaging in this physical activity were to improve appearance, improve health and lose weight, among others. Pair wise comparison test between gender showed that there was a significant difference ( $P < 0.05$ ) in the type and duration of physical activity carried out. This implies that male students engaged in more physical activity which lasted for a longer period than their female counterparts.

A higher percentage of respondents in both genders consumed breakfast both in their native country and in Ghana (Table 2). About 29 (76.3%) of male respondents ate breakfast in their home country and in Ghana, respectively, while 9 (23.7%) did not consume breakfast. For females, 89 (80.9%) and 82 (74.5%) consumed breakfast in their home country and in Ghana, respectively. The data further showed that students within the age group 15 - 20 years were the largest population (n = 34; 73.9 %) that consumed breakfast both at home country and in Ghana, however, 12 respondents within this age range (15 - 20 years) did not eat breakfast both at home and in Ghana. Multiple comparison test showed that respondents within the age group of 15 - 20 years were significantly different ( $p < 0.05$ ) from the rest, in breakfast-eating habits both at home and in Ghana. With respect to field of study, Science students were significantly different ( $p < 0.05$ ) from those in the Humanities in breakfast habits in Ghana but not at home ( $p > 0.05$ ). There was a significant difference between ethnicity and breakfast intake. The odds for taking breakfast were greater for Caucasians than for African-Americans and other groups (OR = 0.038, CI: 0.004 - 0.384; Table 3).

**Table 2.** Distribution of breakfast, lunch and supper intake by demographics.

Variable	Breakfast		Lunch		Supper	
	Native country	Ghana	Native country	Ghana	Native country	Ghana
<b>Gender</b>						
Male	29	29	38	36	38	36
Female	89	82	106	101	106	102
<b>Age</b>	34	34	44	42	45	43
15 - 20	78	72	92	89	92	86
21 - 30	3	3	6	6	6	6
>30						
<b>Ethnicity</b>	69	58	86	80	85	79
African	30	34	35	35	35	35
Caucasian	13	13	17	18	18	18
Other						
<b>Course of study</b>	17	17	21	19	21	21
Arts	54	42	63	59	61	56
Humanities	47	52	60	59	62	61
Science						

Values are total number of respondents.

The popular food eaten for breakfast in this study was egg sandwich which was consumed by 73.4% of the respondents; and this was because of availability, affordability and convenience.

Interestingly, all the male respondents (n = 38) ate lunch at home country (Table 2) and only 2 of them did skip lunch while in Ghana. With respect to the females, a greater percentage, 97.2 and 92.7%, consumed lunch at home and in Ghana, respectively. Ethnicity did not show much discrepancy but it is worth mentioning that all the Caucasians interviewed ate lunch both at home and Ghana. The most frequent reason given for skipping lunch was "not being hungry" (Table 4). For those who ate lunch, rice, in various forms, was usually the lunch meal. These were the most available food that the respondents could adopt in Ghana and were said to be more convenient, readily available and affordable.

Majority of students consumed supper at home and in Ghana. Those who skipped attributed it to watching their weight (Table 4). Respondents studying Arts, were significantly different ( $P < 0.05$ ) from those studying Sciences and Humanities in supper consumption habits at home. Similar to foods taken for lunch, rice was the most popular food due to convenience, availability and affordability.

Intake of fruits and perceptions about fruit intake are presented in Table 5. Majority of the students, consumed fruits and their perception was that fruits were very

important. It is interesting to note that all those (n = 11) with the view that fruits are of less important were Blacks (both Africans and African Americans).

Table 6 puts the fried foods consumption situation of foreign students in perspective. Most students (males n = 38, females n = 106) reported it was important to consume fried foods. Arts students were significantly different ( $p < 0.05$ ) in their knowledge about the importance of consuming less fried foods from those in the Sciences and Humanities. They had less knowledge about the importance of consuming less fried foods.

Snacking occurred both in Ghana and in home country but the pattern varied (data not shown). Thirty five percent (35%) of the respondents ate snack at home as compared to 39.7% in Ghana. In this study, biscuit and fruits were reported as the most consumed snacks. Comparing biscuit consumption both at home country and in Ghana, there was an increase in intake by 26.5% in Ghana. Table 7 gives an overall perspective of the dietary behaviour both in Ghana and home country.

## DISCUSSION

### Dietary behaviour

The dietary changes observed among international students in University of Ghana are consistent with the

**Table 3.** Logistic regression analyses with breakfast consumption in Ghana as the dependent variable

Variables	OR (Confidence Interval)
<b>Gender</b>	
Male	0.852 (0.290-2.506)
Female (reference)	
Model $\chi^2$	0.086 (0.770)
<b>Age (years)</b>	
15-20	0.350 (0.260-4.749)
21-30	0.162 (0.014-1.911)
>30 (reference)	
Model $\chi^2$	4.072 (0.131)
<b>Ethnicity</b>	
African	1.208 (0.342-4.262)
Caucasian	0.038 (0.004-0.384)*
Other (reference)	
Model $\chi^2$	3.274 (0.195)
<b>Course of study</b>	
Arts	2.294 (0.510-10.323)
Humanities	2.563 (0.890-7.384)
Science (reference)	
Model $\chi^2$	3.274 (0.195)

Note. OR = odds ratio, \*p < 0.05.

**Table 4.** Reasons for skipping breakfast, lunch and supper.

Reason	Breakfast		Lunch		Supper	
	Native country	Ghana	Native country	Ghana	Native country	Ghana
No time	11	21	1	6	-	3
Not hungry	6	8	2	3	-	
Eat late at night	-	2	-		-	
Busy schedule	4	1	1		-	1
No appetite	5	-	-		-	
Wake up late	5	-			-	
Watching my weight	-	-	-		-	4
No reason	1	5	1	3	-	
Total	32	37	5	12	-	8

Values are total number of respondents.

findings of Perez-Cueto and associates (2008), on “changes in dietary habits following temporal migration,” which reported that 85% of international students made dietary changes since their arrival in Belgium. Pan et al.

(1999) suggested that even a short term stay in a foreign country could result in a significant and often undesirable change in eating patterns. The foreign students, however, tried to retain their traditional foods. Cost, availability, and

**Table 5.** Fruit intake and perception on intake among respondents.

Characteristics	Fruit intake (n)		Perception on fruit intake (n)	
	Yes	No	Less important	Very important
<b>Sex</b>				
Males (38)	37	1	4	34
Females (109)	102	7	7	102
<b>Age</b>				
15 - 20 (45)	44	1	5	40
21 - 30 (93)	86	7	6	87
>31 (6)	6	0	0	6
<b>Ethnicity</b>				
Africans (88)	80	8	9	79
Caucasians (35)	35	0	0	35
African -American (13)	13	0	2	11
Other (5)	5	0	0	5
<b>Course of study</b>				
Arts (22)	22	0	2	20
Sciences (63)	59	4	6	57
Humanities (62)	58	4	3	59

**Table 6.** Fried foods intake and perceptions among respondents.

Characteristics	Intake of fried-foods (n)		Perception on consuming less fried foods (n)		
	Yes	No	Not important	Less important	Very important
<b>Sex</b>					
Males (38)	38	0	5	8	25
Females (109)	106	3	1	14	94
<b>Age</b>					
15-20 (45)	43	2	3	6	36
21-30 (93)	92	1	3	15	75
31 and above (6)	6	0	0	0	6
<b>Ethnicity</b>					
Africans (88)	87	1	6	13	69
Caucasians (35)	33	2	0	6	29
African- American (13)	13	0	0	2	11
Other (5)	5	0	0	4	1
<b>Course of study</b>					
Arts (22)	22	0	2	7	13
Sciences (63)	62	1	3	7	53
Humanities (62)	60	2	1	8	53

**Table 7.** Paired sample t-test: food behaviour at home country and in Ghana.

Food consumption habits	p- value
Do you eat breakfast in Ghana? - Do you eat breakfast at home?	0.238
Do you eat lunch in Ghana? - Do you eat lunch at home?	0.019*
Do you eat supper in Ghana? - Do you eat supper at home?	0.019*
Do you eat fried foods? - Do you eat fruits in Ghana?	0.132
Do you eat fruits in your home? - Do you eat fruits in Ghana?	0.764

\*Significant =  $P < 0.05$ .

convenience were challenges and these made them adopt the eating patterns and food choices of the host country (Soyer et al., 2008; Tavelli et al., 1998). It is, therefore, not surprising that majority ate egg sandwich for breakfast and rice for lunch and supper mostly which, usually, are the meals of Ghanaian students. Peng (2005), observed a similar situation with Chinese students in the United States, who "always and usually" bought foods from American supermarkets because traditional foods were too expensive and time-consuming to prepare. Satia et al. (2002) also documented that when students migrate to another country acculturation occurs. This is usually accompanied by environmental and lifestyle changes including the adoption of dietary patterns that are high in fat and low in fruits and vegetables.

It was not an easy task for students to follow the traditional eating pattern of breakfast, lunch and supper. Although breakfast is an important meal of the day, quite a significant number of students in this study skipped it. Other researchers observed similar trends and reasons given included hectic classes and lack of time as major determinants (Reeves and Henry, 2000; Anding et al., 2000; Pan et al., 1999). A study about the health behaviour of Chinese undergraduate students also showed that about 62% of the respondents did not eat breakfast due to lack of appetite and time (Johnson et al., 1998). It is, therefore, important to educate students on some simple strategies such as eating leftovers from previous day for breakfast as well as preparing the breakfast the night before. Skipping breakfast may also lead to over eating during the rest of the day and that may impact on the global overweight and/or obesity epidemic. Skipping lunch and supper were also common among the students and the data are consistent with findings on foreign students in the United States (Reeves and Henry, 2000). Furthermore, more females than males skipped lunch or had snacks instead. Skipping lunch and supper, especially for females, is likely to impact on the needs of essential nutrient, for example, iron and folic acid. The need for nutrition education programmes for students is long overdue.

Snacking was a common feature among students both

in Ghana and in their native land. Biscuits consumption as a snack among foreign students seem universal (Papadaki and Scott, 2002). Biscuit is a convenient food, relatively cheaper than most snack foods and has a long shelf-life that students can fall on at any time. In some western countries, however, students frequently consume high fat foods like ham, cheese sandwich and hamburger which are inexpensive (Huang et al., 1994; Cohen et al., 2000; Schrauwen and Westerterp, 2000). Peng (2005) stated that out of the 69% Chinese students that changed their snack habit in the United States, 62.9% of them ate fruits and vegetable as snacks. The decrease in using fruits as snack in Ghana as compared to increase in use of fruits as snack in the United States could be explained by availability, variety and affordability. Furthermore, the environment plays an enabling role which was lacking in the case of Ghana.

The 1995 National College Health Risk Behaviour Survey reported higher consumption rates of fatty foods among students; 3 or more high-fat foods daily (CDC, 1997). Other studies have also shown that of the three energy-yielding foods (fats, carbohydrates and proteins), carbohydrate (particularly sugars) and fat intake often exceeded recommended levels among college students (Anding et al., 2000; Tavelli et al., 1998). Although many students reported it was very important to eat less fried foods, they did otherwise. This implies that the students were aware of the health implications of consuming high fat foods but had very little control over the situation due probably to peer pressure or taste for fatty foods. Behaviour change interventions are needed to correct this eating pattern to prevent the occurrence of non-communicable disorders later in life.

### Physical activity behaviour

The observed physical activity engagement showed gender differences in this study and may be due to their food choices and lifestyle. This fact has been documented that a healthy lifestyle including regular physical activity is associated with healthy dietary choices (Johnson et al., 1998). These behavioural traits,

according to Johnson et al. (1998) can have a long term effect into adulthood such that students who fail to meet recommendations for physical activity are more likely to become sedentary adults.

## IMPLICATIONS

Dietary acculturation and migration greatly influenced foreign students' eating habits in Ghana. The unavailability of specific healthy food items in the open market for which students identify with remains an issue of nutritional concern. Increased intakes of diets high in fruits and vegetables and lower in saturated fat, meat, cholesterol and alcohol are associated with an overall healthier dietary behaviour (Fung et al., 2001).

The current trend of globalisation and the epidemiological shift towards increase in non-communicable diseases that are as a result of poor dietary choices is a wake up call for university authorities to consider nutrition education for foreign students when they enter a new food environment. The need for nutrition education is critical as evident by the present study and that of the United States, which showed that university students tend to make poor food choices and also do not get enough exercise (Racette et al., 2005).. The need is further reiterated by King et al. (2007), that there is lack of understanding of nutrition guidelines by students.

## Conclusion

Eating habits of foreign students differed both in the home country and in Ghana and the differences were attributed to cost, availability and time. Inactivity is skewed toward those of African descent. The need for nutrition education for foreign students as they enter a new environment is warranted. Also food venues on university campuses should be encouraged to open at early hours of the day so that students having early morning lectures can have access to breakfast before classes begin to enhance learning. Students should also take responsibility for their meals and learn to prepare quick breakfast or use left-overs from previous day.

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