

# Food Habits of Students At The Felix Houphouët-Boigny University of Ivory Coast

## Research Article

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### Abstract

A prospective cross-sectional study was conducted in order to describe the eating habits of the students of Félix Houphouët University of Côte d'Ivoire. In fact, a food consumption Survey was carried out from October 15, 2016 to February 17, 2017 in a population of 1228 students dominated by male with middle-aged of 22.5-year-old. These investigations revealed a diet dominated by certain types of food, namely rice and white bread in cereals, cassava for tubers (cassava), associated by a high consumption of snack food (peanuts, croquettes, biscuit), sweet foods, soft drinks, flavor enhancers (Maggi cube), against low consumption of fruits and water. This unbalanced diet, unstructured, little varied and poorly hydrated with a large amount of ultra-processed products and poor in fiber, is not without consequences for health. In this context, it would be advisable to carry out epidemiological investigations in order to investigate the specific impacts that these eating habits might have on the health status of the students. Also nutritional awareness campaigns on all the university campus of the country must be organized in order to improve the food security of the students.

**Keywords:** Students; Eating habits

### Introduction

Eating habits have changed considerably around the world since the middle of the 20th century. This dietary transition has led to an increase in the prevalence of preventable chronic diseases of nutritional origin, both in developed and developing countries WHO/FAO, (2003). In Côte d'Ivoire, this nutritional change is marked by a high consumption of red meat, dairy Product (yogurt, cheese), products with a high glycemic index (sweetened drinks, sweetened dairy desserts), fatty products (cheese, processed meats and animal fat), coupled with low fruit consumption, thus exposing populations to chronic metabolic diseases [1]. This phenomenon is growing and today concerns all socio-professionals (WHO/FAO, 2003)

especially the economically weak among whom students occupy a considerable place [2]. In 2010, Kouakou's work, carried out in an Ivorian school environment, showed that learners had several dietary gaps and unsuitable eating practices. Six years later, [3] conducted a nutritional epidemiological study in a population of students at the Felix Houphouët Boigny University in Abidjan. She noted several health problems such as digestive diseases, respiratory and neurological disorders. This precarious health state could be linked to their eating behavior. It is within this framework that the present study is carried out. Its main objective is to evaluate the eating habits of students at Felix Houphouët Boigny University in Cocody in order to update the data on the dietary profile and to propose prospects for appropriate preventive solutions if necessary.

**Material and Methods of the Study**

**Material**

**Framework of the Study:** The study was carried out at the Félix Houphouët Boigny University of Cocody located in the Abidjan District. This university is the largest among the universities of Côte d'Ivoire. According to the pre-community diagnostic Survey, students spend more time on campus, during the school year, generally eating in University restaurants and surrounding restaurants. The university has a public restaurant, with subsidized meals, and several other restaurants offering various dishes (rice, foutou, fofou, attiéke, placali and tôh) accompanied by sauces such as peanut sauce, pistachio, palm seeds and vegetables. Sauces usually contain fish or meat. Around the University, several small businesses also offer food to students. These include roasted peanuts, bread, pancakes, cakes, croquettes, with wheat flour and various accompaniments (avocado, soy, fish, meat, eggs, pasta, potatoes, etc.). These dishes are often accompanied by drinks (water, soft drinks, industrial sweetened drinks and traditional sweetened fruit juices, alcoholic drinks).

**Study population (inclusion, non-inclusion and exclusion criteria)**

Any student enrolled in the second year of study in the Chemistry Biology Geology (CBG) department at Félix Houphouët-Boigny University who wished to participate in the study was included in this study. First-year students and those above second year were not included in the study. All students from other departments were excluded from this study.

**Data Collection Tools**

The survey data was collected using a questionnaire designed for this purpose and validated by a pre-survey of 45 students from the AGRHYMET Regional Center in NIAMEY (NIGER). It is structured in two parts. The first part retraced the socio-demographic characteristics of the study population and the second highlighted the eating habits (Frequency of food consumption).

**Methods**

**Type of study and sample:** This is a prospective cross-sectional study with a descriptive aim based on a food consumption survey. A total of 1228 male and female students volunteered to participate in the study.

**Frequency of food consumption:** Food consumption is categorized based on the methods used by [3] and [4]. Indeed, food consumption was assessed by the food consumption frequency method and by the retrospective study of eating behavior, readjusted over one week.

**Consumption of other Food Than Water**

- a) Consumption of a food from zero to once per week is considered low
- b) From 2 times a week, consumption is considered average
- c) Consumption 3 to 4 times per week is considered strong
- d) Consumption of 5 to 8 times per week is considered very strong.

**Frequency of water consumption**

- a) Water consumption of less than one liter outside of meals per day is considered low.
- b) A water consumption of between 1 and 1.5 liters outside of meals per day is considered average.
- c) Water consumption of more than 2 liters outside of meals per day is considered very high.

**Statistical analysis**

Quantitative and qualitative data were collected. The analysis of the frequency of consumption by type of food and the general level of consumption by category of food (cumulative frequency) was done with SPSS 20 software. The graphs were made with Excel.

**Ethical aspects**

With regard to ethical considerations, the volunteers were informed of all stages before the start of the investigation and were interviewed or examined after free and informed consent. Confidentiality was assured by assigning an anonymity number to each survey sheet.

**Results And Discussion**

**Socio-Demographic Characteristics**

In terms of sociodemographic criteria, three parameters were analyzed, namely ethnic group, age and gender.

Regarding the ethnic group, the Akans are the most represented with a number of 621 peoples, the Krou, the Northern Mandé and the Gour are respectively 161, 109 and 182 and the foreigners are the least represented with a workforce of 31 peoples (Figure 1). Regarding the age of the respondents, the age of the population was subdivided into 3 groups. Thus, respondents aged 17 to 19 yearsold are 20% and those

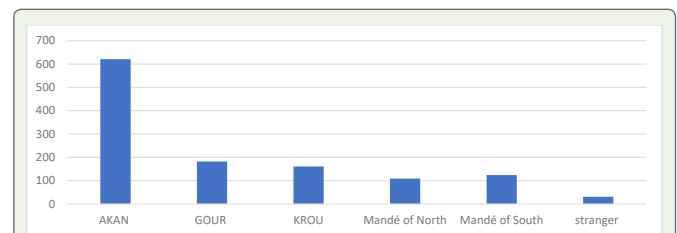


Figure 1: Distribution of respondents according to ethnic group

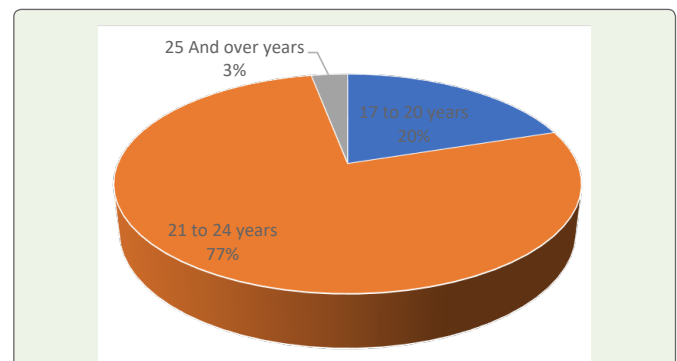


Figure 2: Distribution of respondents by age

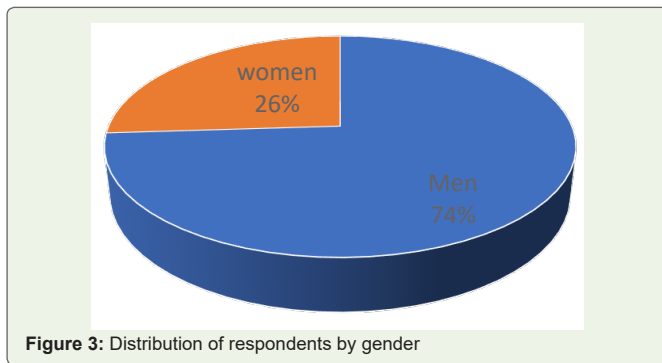


Figure 3: Distribution of respondents by gender

aged 20 to 24 years old and 25 and over are 77% and 3% respectively (Figure 2). And in this population, 74% are men compared to 26% women (Figure 3).

**Food Consumption**

**a) Consumption of cereal products**

There are 92.8% of respondents who have a very high consumption of cereals. Among cereals, rice (64%) is the food most consumed by students, i.e. at least 5 days a week, followed by white bread (18.3%). Whole meal bread comes in third position among cereals (7%).

**b) Consumption of tubers and starchyfoods**

In terms of foods in the tubers and derived products category, 95.1% of students consume them very heavily, that is to say more than 3 days per week. In this category, attiéké, that is to say the food made from cassavasemolina, is the most consumed (45%), followed by foods like plantain (23.5%) and placali (6.8%). On the other hand, taro (94.2%) and sweet potato (90.6%) are foods classified as low consumption during this survey.

**c) Consumption of products from the dairy category, sweet products, and foods containing eggs**

Regarding foods in the dairy category, sweet products, and foods containing eggs, 81.2% consume them at least 5 days a week. Among the foods of high consumption in this group, croquettes and cakes are the most consumed (11.6%) followed by biscuits (11.2%). As for low consumption foods, icecreams (89.6%) and dèguè (85.5%) come first.

**d) Consumption of products from the protein-oleaginous category**

The Peanuts are the most consumed oil seed product;

**e) Consumption of products from the red meat and animal fat category**

Concerning animal products, the foods of very high consumption are beef, sheep, goatmeat (11.2%) and porkmeat (6.9%)

**f) Consumption of products from the redmeat and animal fat category**

In the category of white meats and fish, fishis the food that has a very high consumption (49.8%) among students, whereas chicken meat has a low consumption (70.4%).

**g) Consumption of products from the red meat and animal fat category**

Regarding stratification according to fruits and vegetables, the foods heavily consumed by respondents are eggplant (34%), tomatoes (33%) and onions (30%). Those with low consumption among this population are passion fruit (91.3%), cassavaleaves (92.3%), papaya (89.3%) and squash and zucchini (89.3%).

**h) Level of consumption of products in the alcoholic beverage category**

Beer is the alcoholic drink with the highest consumption (8.1%), followed by wine (2.8%).

**i) Level of consumption of products in the soft drinks and water category**

Regarding water consumption, 27.4% of respondents have low water consumption compared to 7.6% and 0.5% respectivelywho have high consumption and very high water consumption. As for soft drinks, 51.8% have low consumption, high and very high consumption of soft drinks is 26.1% and 9.2% respectively. Only 8.1% (7.6% + 0.5) consume more than 1.5 liters of water.

**J) Consumption of products in the spices and derived products category**

The majority of students consume very heavily foods from the spices and derived products category (56.4%). Chili peppers are the most consumed spicy product.

**k) Consumption of products in the flavor enhancer products category.**

Regarding flavor enhancing products, seasoning cubes are widely consumed by 55.7% of respondents. Next comes the akpi (5%). The least consumed flavor enhancer is potash (86.3%).

**Discussion**

This study, which focuses on the evaluation of the eating habits of students at the Félix Houphouët Boigny University of Côte d'Ivoire, indicates that the predominant ethnic group was that of the Akan

Table I: Distribution of respondents according to frequency of consumption of foods in the cereal category.

Foods in the cereal category	Consumption frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
Rice	57(4.6%)	30(2.4%)	355(28.9%)	786(64.0%)
But	1076(87.6%)	50(4.1%)	78(6.4%)	24(2.0%)
Sorghum	1194(97.2%)	0(0%)	32(2.6%)	2(0.2%)
Mil	1103(89.8%)	45(3.7%)	64(5.2%)	16(1.3%)
White bread	469(38.2%)	100(8.1%)	434(35.3%)	225(18.3%)
Whole wheat bread	832(67.8%)	75(6.1%)	235(19.1%)	86(7.0%)

Number: 1228 individuals, N = number of individuals, % = percentage of individuals

Table II: Distribution of respondents according to frequency of consumption of foods in the category of tubers and starchy derived products.

Foods in the category of tubers and starchy derived products	Consumption frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
Attiéke (cassavase molina)	96(7.8%)	83(6.8%)	552(45.0%)	497(40.5%)
Placali	824(67.1%)	105(8.6%)	216(17.6%)	83(6.8%)
Taro root	1157(94.2%)	34(2.8%)	33(2.7%)	4(0.3%)
Yam	782(63.7%)	158(12.9%)	249(20.3%)	39(3.2%)
Plantain	558(45.4%)	186(15.1%)	196(16.0%)	288(23.5%)
Sweet potato	1112(90.6%)	42(3.4%)	58(4.7%)	16(1.3%)
Potato	986(80.3%)	103(8.4%)	112(9.1%)	27(2.2%)

Number: 1228 individuals, N = number of individuals, % = percentage of individuals

Table III: Distribution of respondents according to the frequency of consumption of foods in the dairy category, sweet products, and foods containing eggs.

Foods in the dairy category, products containing eggs and or sweetened	Consumption Frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
Milk	679(55.3%)	177(14.4%)	268(21.8%)	104(8.5%)
Dèguè*	1005(85.5%)	68(5.5%)	92(7.5%)	18(1.5%)
Ice cream	1100(89.6%)	49(4.0%)	66(5.4%)	12(1.0%)
Mayonnaise	739(60.2%)	134(10.9%)	273(22.2%)	81(6.6%)
Cake	610(49.7%)	155(12.6%)	320(26.1%)	143(11.6%)
Cookies	629(51.2%)	130(10.6%)	329(26.8%)	138(11.2%)
Chocolate	966(78.7%)	83(6.8%)	133(10.8%)	46(3.7%)
Eggs	530(43.2%)	182(14.8%)	401(32.7%)	115(9.4%)

Number: 1228 individuals N = number of individuals % = percentage of individuals Dèguè\*: Millet Semolina Milk

Table IV: Distribution of respondents according to frequency of consumption of foods in the protein-oleaginous category.

Foods from the protein-oleaginous category	Consumption Frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
Palm seed	868(70.7%)	136(11.1%)	206(16.8%)	17(1.4%)
Peanut	780(63.5%)	176 (14.3%)	224(18.2%)	48(3.9%)
Pistachio	1161(94.5%)	14(1.1%)	47(3.8%)	6(0.5%)
Soja	1033(84.1%)	72(5.9%)	98(8.0%)	25(2.0%)

Number: 1228 individuals N = number of individuals % = percentage of individuals Dèguè\*: Millet Semolina Milk

Table V: Distribution of respondents according to frequency of consumption of foods in the category of redmeat and animal fat or derived products.

Red meat, animal fat and derived products	Consumption Frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
Beef, sheep, goat	732 (59.6%)	100 (8.1%)	259 (21.1%)	137 (11.2%)
Pork	931 (75.8%)	40(3.3%)	172(14.0%)	85 (6.9%)
Sausage	1099 (89.5%)	55(4.5%)	64(5.2%)	10(0.8%)
Other red meat	1146(93.3%)	23(1.9%)	45(3.7%)	14(1.1%)

Number: 1228 individuals N = number of individuals % = percentage of individuals Dèguè\*: Millet Semolina Milk

Table VI: Distribution of respondents according to frequency of consumption of foods in the white meat and fish category.

Foods from the white meat and fish category	Consumption Frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
Chicken	865(70.4%)	99(8.1%)	127(10.3%)	137(11.2%)
Fish	8249(6.7%)	52(4.2%)	482(39.3%)	612(49.8%)

with 51% of respondents. This could be explained by the geographical location of the Félix Houphouët Boigny University of Abidjan which is more accessible by this ethnic group, especially since the Biosciences specialty is found in other Universities of the country located in the North, and in the center. West. These results are comparable to those of [3]. The study population was young with an average of 22.5 years and dominated by men. This is explained by the higher level of education of young boys than that of young girls in Côte d'Ivoire [2].

In terms of eating habits, 92.8% of respondents have a very high consumption of cereals, rice and white bread are the most consumed. Regarding foods in the tubers and derived products category, 95.1% have very high consumption, dominated by cassava (attiéké). These results are justified by the fact that rice, bread and cassava are very accessible products in Côte d'Ivoire and constitute the basic diet of the populations since the phase of dietary diversification in childhood [5]. These results are also comparable to those of Kouamé

Table VII: Distribution of respondents according to frequency of consumption of foods in the fruit and vegetables and derived products category. Regarding stratification according to fruits and vegetables, the foods heavily consumed by respondents are eggplant (34%), tomatoes (33%) and onions (30%). Those with low consumption among this population are passion fruit (91.3%), cassava leaves (92.3%), papaya (89.3%) and squash and zucchini (89.3%).

Foods from the fruits and vegetables category	Consumption Frequency N (%)			
	Low consumption	Average consumption	Average consumption	Very high consumption
Citrus	838(68.2%)	93(7.6%)	93(7.6%)	84(6.8%)
Passion fruit	1121(91.3%)	42(3.4%)	42(3.4%)	11(0.9%)
Papaya	1097(89.3%)	53(4.3%)	53(4.3%)	19(1.5%)
Sweet banana	683(55.6%)	203(16.5%)	203(16.5%)	50(4.1%)
Pineapple	1083(88.2%)	69(5.6%)	69(5.6%)	00(0%)
Other fruits and juices	761(62.0%)	58(4.7%)	58(4.7%)	179(14.6%)
Eggplant	465(37.9%)	226(18.4%)	226(18.4%)	113(9.2%)
Onion	140(11.4%)	34(2.8%)	34(2.8%)	675(55.0%)
Spinach leaves	1101(89.7%)	59(4.8%)	59(4.8%)	6(0.5%)
Cassava leaves	1133(92.3%)	35(2.9%)	35(2.9%)	8(0.7%)
Other Leaves	951(77.4%)	98(8.0%)	98(8.0%)	38(3.1%)
Cabbage	734(59.8%)	155(12.6%)	155(12.6%)	57(4.6%)
Carrot	771(62.8%)	155(12.6%)	155(12.6%)	75(6.1%)
Tomato	228(18.6%)	80(6.6%)	80(6.6%)	515(41.9%)
Squash	1097(89.3%)	25(2.0%)	25(2.0%)	38(3.1%)
Green bean	1132(84.0%)	72(5.9%)	72(5.9%)	00(0%)
Okra	812(66.1%)	173(14.1%)	173(14.1%)	43(3.5%)

Number: 1228 individuals N = number of individuals % = percentage of individuals Dèguè\*: Millet Semolina Milk

Table VIII: Distribution of respondents according to the frequency of consumption of foods in the category of alcoholic exciting products.

Foods in the category of alcoholic stimulants and derived products	Consumption Frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
Beer	1088 (88.6%)	41 (3.3%)	99 (8.1%)	00(0%)
Wine	1166 (95.0%)	20(1.6%)	34(2.8%)	8(0.7%)
Liqueur	1186 (96.6%)	18(1.5%)	21(1.7%)	3(0.2%)

Number: 1228 individuals N = number of individuals % = percentage of individuals Dèguè\*: Millet Semolina Milk

Table IX: Distribution of respondents according to frequency of consumption of foods in the soft drinks and water category.

Foods in the beveragecategory	Consumption Frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
Soft drinks	636(51.8%)	158(12.9%)	321(26.12%)	113(9.2%)
Water	336(27.4%)	793(64.6%)	93(7.6%)	6(0.5%)

Number: 1228 individuals N = number of individuals % = percentage of individuals Dèguè\*: Millet Semolina Milk

Table X: Distribution of respondents according to frequency of consumption of foods in the spices and derived products category.

Foods in the category of spices and derived products	Consumption Frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
Chili peppers	194(15.8%)	57(4.6%)	363(29.6%)	614(50.0%)
Ginger	943(76.8%)	109(8.9%)	146(11.9%)	30(2.4%)

Table XI: Distribution of respondents according to frequency of consumption of foods in the flavor enhancer product category.

Category of flavor enhancer products	Consumption Frequency N (%)			
	Low consumption	Average consumption	High consumption	Very high consumption
	226(18.4%)	27(2.2%)	291 (23.7%)	684(55.7%)
Seasoning cube	1060 (86.3%)	66 (5.4%)	84(6.8%)	18(1.5%)
Potash	838(68.2%)	128(10.4%)	201(16.4%)	61(5.0%)
Akpi	207(16.9%)	1(0.1%)	240(19.5%)	780(63.5%)

and Enoh (2011) who reported that the eating habits of Ivorians are mainly oriented towards the consumption of rice and cassava which contribute the most to the formation of calorific availability per person and per day. On a national level.

In terms of foods in the dairy category, sweet products, we note more than 81% of very high consumption, especially cakes and croquettes. These are widely available snack foods on the University campus. These results could explain the high level of snacking among students. Indeed, according to the 2009 survey by the national union of regional student mutual societies (USEM) in France, 95% of students snack during the day. The observation is that it is a common practice in the student environment which is very often part of the student's life and can become a compulsion. In general, students spend little time with their meals and often eat quickly. They often have disjointed schedules and, most of the time, they seek convenience when it comes to eating or when class times coincide with lunch times[6].

In terms of protein oil seeds, there is high consumption (66.5%), dominated by peanuts. It is also a snacking food. Its high consumption is also justified by the availability of the product at the national level [7]. This availability facilitates accessibility to all socio-economic levels and makes it a widely consumed product in Côte d'Ivoire [8]. In the redmeat category, beef and pork are the most consumed. In terms of white meat and fish, the diet of the respondents is dominated by fish which in fact constitutes the source of animal protein most consumed by the study population [9]. These results are comparable to those of the WFP which noted that in Côte d'Ivoire, fish is the most consumed source of animal protein (WFP, 2006).

Fruit and vegetable consumption is dominated by vegetables, preferably tomatoes and onions. These results are also comparable to those of the WFP (2006), according to which fruit consumption is very low compared to that of vegetables in Côte d'Ivoire. The preference for onion and tomato could be justified by the fact that attiéké-garba, one of the most popular meals among Ivorians and particularly students [10],[2] is eaten with tomato, onion and pepper.

More over, pepper is the most consumed spicy food in the present study. In the non-alcoholic drinks category, many students prefer sweets and soft drinks instead of water. The majority of students consume less than one and a half liters of pure water per day. These results are comparable to those of the Lucie and André Chagnon foundation (2016) [11] and those of [12] Benoit, *et al* (2003). According to which, the low level of pure water consumption among young people is a reality linked to the high consumption of carbonated and energy drinks. The consumption of exciting alcoholic or non-alcoholic products is dominated by coffee and beer, but the level of alcohol consumption is generally low. These results are comparable to those of Sylvain Benoit and Marie-Christine Rata [12] (Benoit *et al* 2003) who revealed the low consumption of alcohol among students at the University of Limoge in France. Finally, in the category of flavor enhancer products, we note a high consumption of seasoning cubes. These latest results are identical to those published in 2016 by Amoikon and colleagues and corroborate the conclusions

of Pierre Lepidi's survey in 2015[13], which estimated that more than 100 million Maggi cubes are sold everyday in Africa.

## Conclusion

At the end of this descriptive analysis, we can notice that the students' diets dominated by certain types of foods, namely rice and white bread for cereals, cassava for tubers (manioc), associated a high consumption of snack foods (peanuts, croquettes, biscuits), sweetfoods, soft drinks, flavor enhancing products (Maggi cube), compared to a low consumption of fruits and pure water. This unbalanced, unstructured diet, with little variety and little hydration, with a predominance of ultra-processed products low in fiber, is not without consequences for health. To this end, it would be wise to carry out epidemiological investigations to look for the factors favoring these habits and then to assess the repercussions that these eating behaviors could have on the state of health of students and their academic results.

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