

Prospective Analyze of the Relationship between the Dietary Profile and the Frequent Occurrence of Diarrhea among Students in Ivory Coast

Research Article

Anon Franck-Donald N'Guessan^{1*}, Kollet Yao Aimé Sylvère ZAHE², N'da Mireille-Vanessa Yoboué⁴, AHOUA Yapi⁵, and AKE-TANO Sassor Odile Purifine⁵

¹National Institute of Public Health, Abidjan, MSHPCMU Ivory Coast

²Laboratory of Pharmacology and Nutrition, Félix Houphouët BOIGNY University Abidjan, Ivory Coast

³UNESCO Chair, Félix Houphouët-Boigny University Abidjan, Ivory Coast

⁴Félix Houphouët Boigny University Abidjan, Ivory Coast

⁵Félix Houphouët BOIGNY University Abidjan, Ivory Coast

⁵Félix Houphouët BOIGNY University Abidjan, Ivory Coast, National Institute of Public Health, Abidjan, MSHPCMU Ivory Coast,

*Corresponding author: Anon Franck-Donald N'Guessan, National Institute of Public Health, Abidjan, MSHPCMU Ivory Coast, Email : anonfranc@gmail.com

Article Information: Submission: 11/03/2024; Accepted: 07/06/2024; Published: 10/06/2024

Copyright: © 2024 Anon Franck-Donald N'Guessan, et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Abstract

In 2016, the work of [1] showed a high prevalence of digestive disorders such as diarrhea in the student population of the Felix HouphouëtBoigny University in Côte d'Ivoire. Given the known relationship between Diarrhea and eating behaviors, a nutritional and health epidemiology survey was carried out from October 15, 2016 to February 17, 2017. The objective of the study was to research the link between food consumption and episodes of diarrhea encountered among students. For this purpose, 1,228 student volunteers volunteered and were surveyed. The study confirmed the high prevalence of acute diarrhea (57.5%) among students. After analyzing the relationship between eating habits and disease, it turned out that high consumption of spicy foods, sweet foods, foods containing eggs or milk were strongly involved. In view of these results, it would be important to carry out studies to evaluate the health safety of foods consumed on the Cocody University campus and also organize nutritional education sessions in all university campuses in the country with a view to an improvement in their eating habits and their health.

Keywords: Students; Food Habits; Digestive Pathologies; Diarrhea

Introduction

Diarrhea is defined as the passing of stools that are too frequent, greater than three exonerations per day, too abundant (more than 300g/day) and of abnormal consistency (very soft to liquid). Most often, it is characterized by a sudden onset and a favorable evolution. Depending on its duration, it is considered acute or chronic if it persists for less or more than 14 days [2]. Generally due to an infectious bacterial, viral or parasitic cause, it is frequently linked to the absorption of food or non-food substances [3]. Indeed, whatever

the causal mechanism, eating habits occupy an important place among the factors favoring attacks of acute or chronic diarrhea[4].

In developed countries, there is approximately one acute episode per inhabitant per year [5]. On the other hand, in developing countries, the prevalence is much higher, especially among children and not negligible among young adults including students[6].

In Ivory Coast, a nutritional epidemiological study carried out in 2016 revealed a high prevalence of digestive pathology (63.28%), including acute diarrhea, among students [1]. In view of this

situation, it would be important to investigate the reasons, with a view to proposing appropriate and adapted solutions. It is in this context that a nutritional epidemiological survey was carried out at the Félix Houphouët-Boigny University, in order to describe the eating habits of students and to analyze their implications in the occurrence of diarrhea attacks.

Material and Methods of the Study

Material

Framework of the study: The study was carried out in West Africa, in Ivory Coast precisely at the Félix Houphouët-Boigny University of Cocody in Abidjan. It was carried out from October 15, 2015 to February 17, 2016 with student volunteers. The latter spending more time on campus during the school year, generally eat in the university's restaurants and surrounding restaurants. The university has a public restaurant, with subsidized meals, and several other restaurants, offering various dishes (rice, foutou, fofou, attiéké, placali and tôh) accompanied by sauces such as peanut sauces, 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, pancakes, cakes, wheat flour croquettes and bread with various accompaniments (avocado, soy, fish, meat, eggs, pasta, potatoes, etc.). These dishes are often accompanied by drinks (water, sweetened industrial soft drinks and traditional sweetened fruit juices).

Study Population (inclusion and non-inclusion criteria)

Any student enrolled in the second year of Chemistry Biology Geology (CBG) at Félix Houphouët-Boigny University who wished to participate in the study was included in this study.

They were not included in the study, as all other people did not respect the conditions raised.

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 Agrhyet Regional Center of NIAMEY (NIGER). It is structured in three parts: (i) the first part retraced the socio-demographic characteristics of the study population (ii) the second revealed the medical histories regularly experienced by the patients over a period of one year while (iii) the third part was reserved for eating habits (Frequency of food consumption).

Methods

Type of study: This is a prospective cross-sectional study with a descriptive and analytical aim based on a food consumption survey associated with a nutritional and health assessment.

Sampling

A total of 1228 male and female students volunteered to participate in the study.

Diagnosis

The diagnosis of diarrhea was essentially clinical during this work. Indeed, our investigation consisted solely of a clinical examination consisting of a questioning.

Individuals who had frequently passed stools over the last 6 months that were too frequent, too abundant compared to usual and of abnormal consistency (very soft to liquid) were considered sick,

Statistical analysis

Quantification of the frequency of food consumption:

Food consumption is categorized based on the methods used [1]and [7]. Indeed, food consumption was evaluated by the food consumption frequency method and by the retrospective study of eating behavior, readjusted over one week.

When the consumption of a food is less than once to once a week, it is considered low.

When consumption is 2 times a week, it is considered average.

When consumption is 3 to 4 times per week, it is considered strong.

When consumption is 5 to 7 times per week, it is considered very strong.

- Quantification of the frequency of water consumption:

When water consumption is less than one liter outside of meals per day, it is considered low.

When water consumption is 1 to less than 1.5 liters outside of meals per day, the consumption is considered average.

Processing of qualitative and quantitative data

Quantitative and qualitative data were collected. The analysis was done with SPSS 20.0 software. For quantitative variables, the mean, standard deviation, and extreme values were highlighted. At the level of qualitative variables, the distribution and comparison of proportions was retained.

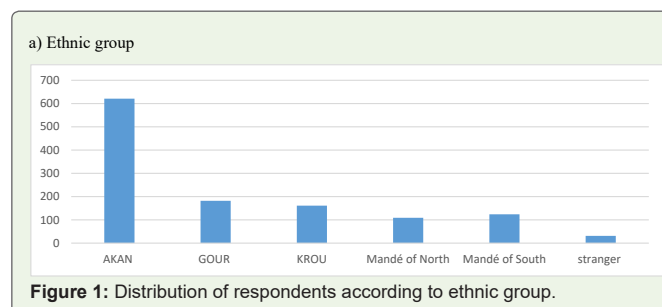
Ethical aspects

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

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 people, 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 people (Figure 1). Regarding the age of the respondents, the age of the population was subdivided into 3 groups. Thus, respondents aged 17 to 19 years old are 20% and those 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 Habits and Occurrence of Diarrhea

The analysis of the relationship between eating habits and the occurrence of diarrhea in the study population revealed the involvement of a high consumption of foods sweetened and or containing eggs or milk (P= 0,006), fruit and vegetables (P= 0,035) and spicy products (P= 0,002). However, no link exists concerning red meat/animal fat, fish, white meat, vegetable fat, cereals, tubers, soft drinks, and flavor enhancing products.

Discussion

During this study the predominant ethnic group was the Koua Akan with 51% of respondents. This could be explained by the geographical location of the Félix HouphouëtBoigny University of Abidjan, which is more accessible to this ethnic group, especially because the biosciences specialty is found in other universities in the country located in the North and in the center-West. These results are comparable to those of Amoikon *et al* in 2016 [1].

The study population was young with an average age of 22.5 years and dominated by men with a sex ratio of 2.84 in favor of men. This could be explained by the fact that in Ivory Coast the level of education of young boys is higher than that of young girls.[8].In the population a prevalence of 57.5% of diarrhea was recorded. These results are superimposable to those of Amoikon *et al* (2016)[1].

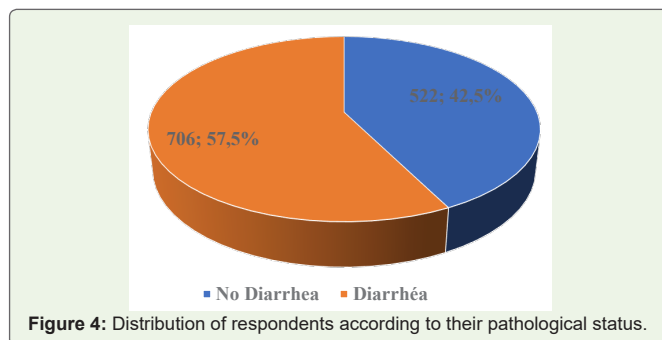


Figure 4: Distribution of respondents according to their pathological status.

Table 1: The relationship between the level of consumption of food containing eggs or milk or sugar and the occurrence of diarrhea.

Diarrhea	Consumption frequency N (%)				Total	P value
	Low	Average	High	Very high		
No sick	19 _a 54.3%	48 60.0%	48 _b 41.4%	406 _c 40.8%	522 42.5%	P= 0,006
Sick	16 _a 45.7%	32 40.0%	68 _b 58.6%	589 59.2%	706 57.5%	
TOTAL	35 100,0%	80 100,0%	116 100,0%	995 100%	1228 100,0%	

N = 1228

Table 2: The relationship between the level of fruit and vegetable consumption and the occurrence of diarrhea.

Diarrhea	Consumption frequency N (%)				Total	P value
	Low	Average	High	Very high		
No sick	224 _a 47.5%	216 38.5%	8 _b 38.1%	74 _c 42.5%	522 42.5%	P= 0,035
Sick	248 _a 52.5%	345 61.5%	13 _b 61.9%	100 57.5%	706 57.5%	
Total	472 100,0%	561 100,0%	21 100,0%	174 100,0%	1228 100,0%	

N = 1228

Table 3: The relationship between the level of spice consumption and the occurrence of diarrhea.

Diarrhée	Niveau de Consommation				Total	P value
	Low	Average	High	Very high		
No sick	66 _a 47.1%	47 61.8%	134 _b 41.9%	275 _c 39.7%	522 42.5%	P= 0,002
Sick	74 _a 52.9%	29 38.2%	186 _b 58.1%	417 60.3%	706 57.5%	
Total	140 100,0%	76 100,0%	320 100,0%	692 100,0%	1228 100,0%	

N = 1228

The health status assessment was carried out and cross-referenced with the level of food consumption. This analysis highlighted a relationship between high consumption of sugary foods containing eggs or milk, fruits and vegetables, and spicy products, and the occurrence of diarrhea among students.

In terms of fruits, vegetables, sweet foods containing eggs or milk, the results are comparable to WHO data (WHO, 2017).

Indeed, according to the WHO, poor hygiene linked to the storage, preparation and consumption of sweet foods, containing eggs

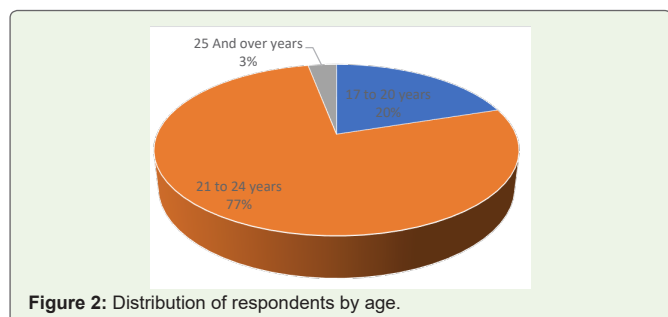


Figure 2: Distribution of respondents by age.

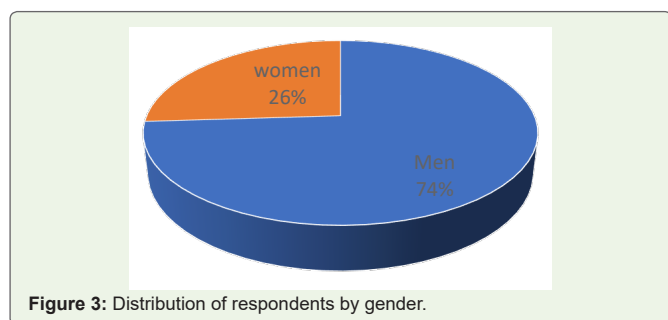


Figure 3: Distribution of respondents by gender.

or milk, and fruits and vegetables, could be a source of contamination of Salmonella, Campylobacter, Entero-hemorrhagic Escherichia coli, Listeria, Vibrio-cholerae, Entamoeba-histologica, or Giardia intestinalis all responsible for acute or chronic diarrhea in humans.

Also, sugary foods, foods containing eggs or milk, have a recognized reputation for the occurrence of irritable bowel syndrome including chronic diarrhea [9-11] (Talley, 2006), [4] (Xiong L et al, 2017), [10] (Olesen, 2017), [11] (Sabaté, 2013).

Concerning spicy products, it is recognized that they have the capacity to accelerate transit and to cause in high doses (depending on personal sensitivities) attacks of diarrhea in certain people who are allergic or sensitive to them [12] (Nancey, 2005), [11] (Sabaté, 2013), [13] (Hordé, 2014). Food allergies, in fact, are immune reactions of the body to the ingestion of a food that is usually well tolerated by the majority [14] (Biérmé, 2017). In the event of prolonged exposure to causal dietary factors such as spices in sensitive subjects, there is either a reduction in the intensity of intestinal peristalsis which can lead to constipation or an acceleration of transit leading to the occurrence of diarrhea. [15-16] (Chaput, 2004, Akuete et al., 2017).

At the end of this analysis, it is remarkable that the high consumption of certain foods is actually involved in the occurrence of diarrhea attacks in the population. Furthermore, poor hygiene linked to the storage, preparation and consumption of foods such as sweet foods containing eggs or milk, fruits and vegetables, could be a source of bacterial, parasitic or viral contamination responsible of acute or chronic diarrhea among students at Felix Houphouët-Boigny University in Cocody.

Conclusion

Eating habits, when they are not rationalized and taken care of, they weaken the body and expose it to acute or chronic and serious illnesses. This study revealed a relationship between high consumption of spicy foods, sweet foods, foods containing eggs and/or milk and the occurrence of diarrhea. Furthermore, it is notable that the lack of respect for hygiene measures linked to the conservation, preparation and consumption of certain foods (sweet foods or foods containing eggs or milk, and fruit and vegetables), could be a source of bacterial, parasitic or viral contamination responsible for acute and chronic diarrhea in student's population.

In view of these results, we will carry out studies to evaluate the health safety of foods consumed on the Cocody University campus,

then we will organize nutritional education sessions in all university campuses in the country with a view to improving their eating habits and health conditions.

References

1. Amoikon KE, Yapi A, N'Guessan A (2016) Habitudes alimentaires liées à la survenue de la maladie hémorroïdaire chez les ivoiriens. *European Scientific Journal* February édition 12: 1857-7881.
2. Maggipinto X (2013) La prise en charge des troubles digestifs à l'officine : constipation, diarrhée et reflux gastro-œsophagien, Université de Lorraine, thèse de pharmacie n° Pp: 23- 33.
3. Shaheen NJ, Hansen RA, Morgan DR, Gangarosa, Lisa M, et al. (2006) The burden of gastrointestinal and liver diseases », *Am J Gastroenterol* Pp: 2128-2138.
4. Xiong L, Wang Y, Gong X, Chen M (2017) Prevalence of lactose intolerance in patients with diarrhea-predominant irritable bowel syndrome: data from a tertiary center in southern China. *J Health Popul Nutr* 36: 38.
5. Tremblay, Larry (2007) Auto-traitement du mal de ventre ou Soulager les troubles digestifs fonctionnels et les symptômes associés : diarrhée, constipation, migraine, insomnie, anxiété, Larry Tremblay éditeur, Québec, 188p.
6. World Gastroenterology Organisation (2012) Global Guidelines la diarrhée aiguë chez les adultes et les enfants une approche globale rapport annuel Pp : 18- 21.
7. Kouakou O (2010) Origines sociales et comportements disciplinaires des élèves adolescents d'Abidjan. *Rev. ivoir. anthropol. sociol. KASA BYA KASA* Pp: 122-131.
8. Institut national de statistique de Côte d'Ivoire (2015) : Enquête de niveau de vie Pp: 85.
9. Talley NJ (2006) Irritable bowel syndrome *Intern. Med. J* 36: 724-728.
10. Olesen SS, Wilder-Smith CH, Materna A, Drewes AM, (2017) Predictors of response to a low-FODMAP diet in patients with functional gastrointestinal disorders and lactose or fructose intolerance. *Aliment Pharmacol Ther.* Apr 45:1094-1106.
11. Sabaté JM (2013) Liens entre alimentation et syndrome de l'intestin irritable, *Colon and rectum journal* 7: 86-92.
12. Nancey S, Driffa M, Sabine R, André F, Bouvier M, Claudel S, et al, (2005), L'allergie alimentaire et digestive chez l'adulte, Vol 29, N° 3 Pp: 255-265.
13. Hordé P, (2014) les allergies aux épices symptômes et traitements .
14. Biérmé P., Nowak-Węgrzyn A, Caubet JC., (2017), non-IgE-mediated gastrointestinal food allergies. *Curr Opin Pediatr* 29: 697-703.
15. Chaput M (2004) Le traitement naturel des allergies, Les Éditions Québecor.
16. Akuete K, Guffey D, Israelsen RB, Broyles JM, Higgins LJ, Green TD, et al. (2017) Multicenter prevalence of anaphylaxis in clinic-based oral food challenges. *Ann Allergy Asthma Immunol.* 119: 339-348.