Research Article

PROSPECTIVE ANALYSIS OF THE RELATIONSHIP BETWEEN DIETARY HABITS AND THE OCCURRENCE OF HEMORRHOIDAL DISEASE IN A YOUNG IVORIANS' POPULATION

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ABSTRACT

A study was conducted to find a relationship between dietary habits, and the occurrence of hemorrhoid disease in young Ivorians' population. A descriptive and analytical cross-sectional survey in which 1228 students were enrolled was carried out at the Félix Houphouët-Boigny University (UFHB) in Côte d'Ivoire. Respondents had a mean age of 22.5 years. The results revealed a prevalence of hemorrhoids of 39.7% strongly correlated with a consumption, three times and more per week, of red meat, protein-oilseed, spicy foods and five or more times a week of sweet or milky foods or foods containing eggs and soft drinks all associated with a consumption of less than 1 liter of water per day. In addition, this study has confirmed the results of a previous study of the kind reported by Amoikon *et al*. (2016), and identified other dietary habits that can cause hemorrhoids in young Ivorians' population.

INTRODUCTION

Food habits have changed considerably in the world since the middle of the 20th century. This situation has caused an increase of the prevalence of preventable chronics diseases of nutritional origin in both developed and developing countries (WHO / FAO, 2002).

In Côte d'Ivoire, these changes in the eating habits are marked by a sharp increase in the consumption of meat, dairy products (yogurts, cheeses), products with a high glycemic index (sugary drinks, dairy and sweet desserts), fat (cheese and cold cuts). At the same time, fruits and vegetables consumption has declined sharply, exposing populations to chronic metabolic diseases (Kouamé *et al.*, 1998). Nowadays, there is an emergence of digestive diseases such as hemorrhoids. This disease, which is the most common of the terminal intestine, is the first reason for proctological surgery consultations in Côte d'Ivoire, and has become a public health concern (N'Dri *et al.*, 1994).

Among these contributing factors, besides inheritance, certain conditions such as sedentary lifestyle, transit disorders, pregnancy and eating habits are considered (Sielezneff *et al.*, 1998). According to Amoikon *et al*. (2016), the occurrence of hemorrhoids among young Ivorians is linked to a high consumption of red meat (more than three times a week). However, not all hemorrhoidal persons in that study consumed red meat, and not all those who frequently consumed this food did necessarily experience the disease.

The present study aimed to continue the search for relationship between dietary habits and the occurrence of hemorrhoids disease among the same population in order to confirm the previous findings and also to show other dietary habits that may trigger the hemorrhoid disease.

MATERIAL AND METHODS

The study took place at the Félix Houphouet-Boigny University (UFHB) of Abidjan, from October 15, 2016 to February 17,

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2017. The investigations were carried out through a descriptive and analytical cross-sectional survey.

This study was based on a food consumption and medical history survey coupled with proctological examinations. It targeted a mixed student population of boys and girls from all parts of Abidjan, and sometimes from the surrounding areas.

The frequency of consumption was evaluated through a food consumption frequency survey validated by a pre-survey.

When the consumption of a food was less than once to once a week, it was considered low; twice a week was considered mean; three (3) to four (4) times a week was considered high; and five (5) to seven (7) times a week, was considered very high.

Regarding fruits and vegetables, the level of consumption was evaluated per portion (a portion corresponding to 80 g).

At the water level, when consumption was less than one liter per day, it was considered low; from 1 to less than 1.5 liter, it was considered mean, from 1.5 to 2 liters, it was considered high. Beyond the 2 liters, it was considered very high.

Data analysis was performed with SPSS.20 software. For quantitative variables, the average and extreme values were determined. Concerning the qualitative variables, the distribution of the proportions was chosen. The comparison of proportions was made using the Chi-square or Yate-corrected Chi-square test, or Fisher's exact test, when the conditions for the Khi- test were not matching. The threshold of significance was set at a value of $P \leq 0.05$ ($\alpha \leq 0.05$).

Informed consent was obtained from all students involved in the study. The results of this study were to be published, but respondents 'names or identities were not revealed. Records remained confidential and the results of tests were codified to prevent association with participants' names. Data entered into computerized files were accessible only by authorized personnel directly involved in the study. Respondents 'specific information could be provided to medical personnel only with the respondents' permission.

RESULTS

Demographic parameters

The study focused on a young population with an average age of 22.5 years. There were more male subjects than female with a sex ratio of 2.84. The respondents belonged to five ethnic groups, namely Koua Akan, Krou, Gour, northern Mandé, southern Mandé. To these groups, were associated foreigners (2% of the respondents) coming mainly from neighboring countries of Côte d'Ivoire. The predominant ethnic group was the Koua Akan's representing 51 % of the respondents. These demographic data have been reported elsewhere (Yapi *et al*., 2018: *In press*).

Respondents' general food profile and frequency of consumption

Respondents used to consume foods belonging to the seven food groups in. However, all foods had not the same frequency of consumption. In fact, among cereals and starchy foods, rice, cassava and bread were the most consumed. Regarding the red meat, beef, sheep and goat meat were the most consumed. The consumption of spices was dominated by pepper. The consumption of cakes, crackers and biscuits was high. Groundnuts were the most popular of the protein-oilseed category. In the white meat and fish category, the diet of the respondents was dominated by fish. In fruit and vegetables category, there was generally low consumption dominated by onion and tomato. Beer was the most consumed alcoholic product. In non-alcoholic exciting food products, coffee was dominant. In the flavor enhancer's category, seasoning cubes were the most consumed. For non-alcoholic beverages, approximately half of the respondents drank at least one (1) soft drink per week. Concerning water consumption, a large majority of respondents consumed less than one (1) liter and half a day. These data are pubished in N'guessan *et al*. (2018).

Relationship between eating habits and hemorrhoids

Prevalence of hemorrhoidal disease

The health assessment in the study population showed a prevalence of 39.7% of individuals with frequent hemorrhoidal attacks.

Food categories and hemorrhoids

The analysis of the relationship between the consumption of red meat, sweet foods containing eggs or milk, protein-oilseeds, soft drinks, spices and water, and the occurrence of hemorrhoids has shown a relationship according to the Khi-square test (**Table I**).

On the other hand, no relationship has been identified for fish / white meat, tubers, fruits and vegetables, cereals, alcohol, exciting non-alcoholic products or flavor enhancers (**Table I**).

Threshold of frequency of food consumption favoring hemorrhoids

In order to determine exactly the level of consumption that would trigger the occurrence of the disease, a more detailed analysis according to the different degrees of consumption was carried out. The analysis showed that all levels of consumption did not trigger hemorrhoids. In fact, only consumption of three or more times a week of red meat, protein-oilseed, spicy food and five or more times a week of sweet or milky foods, foods containing eggs, and soft drinks combined, with water consumption of less than 1 liter a day was related to the occurrence of the disease (Fig 1 to 6).

Table I Relationship between food categories and hemorrhoids.

| Food categories	Relation with Hemorrhoids (khi square test)
Red meat, animal fat and derived products	P = 0.000
White meat and fish	P = 0.146
Milk and food products containing eggs, sweet products and by-products	P = 0.001
Proteo-oleaginous and vegetable fat	P = 0.002
Fruits and vegetables and derived products	P = 0.423
Starch and derived products	P = 0.628
Cereals and derived products	P = 0.247
Soft drink	P = 0.023
Taste enhancers	P = 0.229
Spicy foods and derived products	P = 0.000
Exciting alcoholic products and derived products	P = 0.060
Exciting non-alcoholic products and derived products	P = 0.258
Water (less than 1 L)	P = 0.045
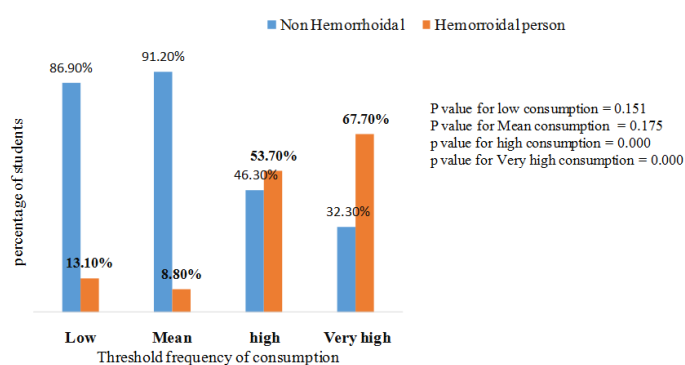
Figure 1 Threshold of consumption frequency of red meat / animal fat for hemorrhoids (Total population = 1228 students)
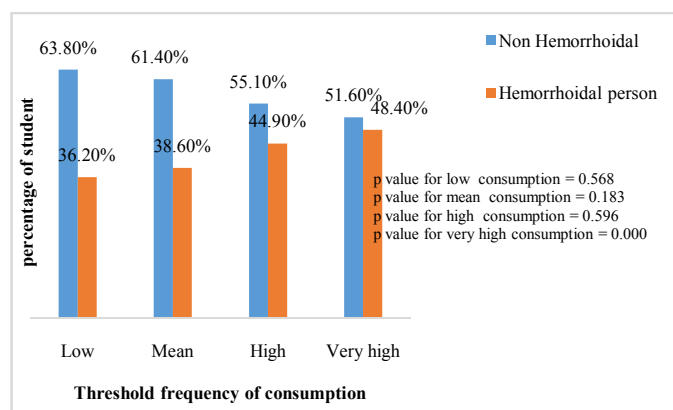
P value for low consumption = 0.151
P value for Mean consumption = 0.175
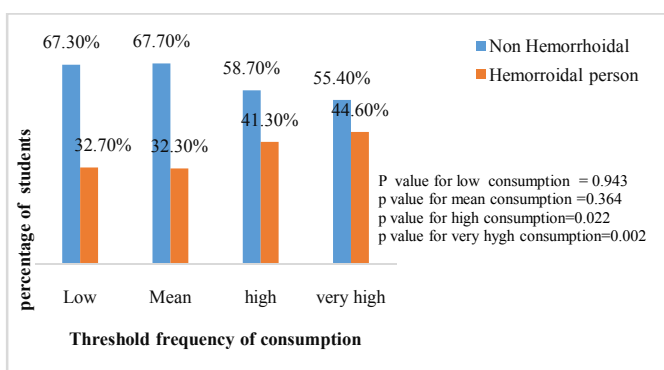p value for high consumption = 0.000
p value for Very high consumption = 0.000

Figure 2 Threshold of consumption frequency of proteo-oleaginous foods for hemorrhoids (Total population= 1228 students)

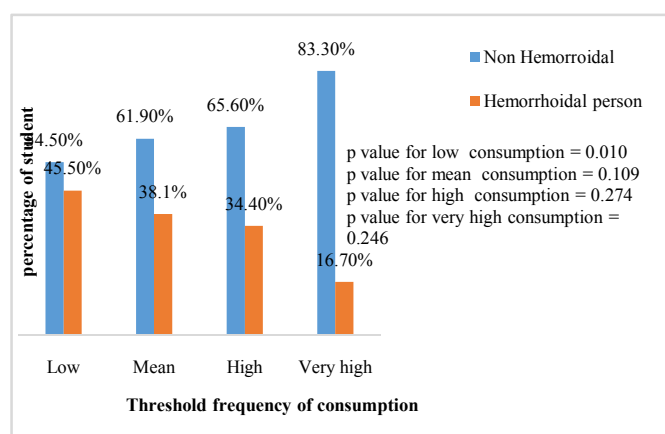P value for low consumption = 0.943
p value for mean consumption =0.364
p value for high consumption=0.022
p value for very hygh consumption=0.002

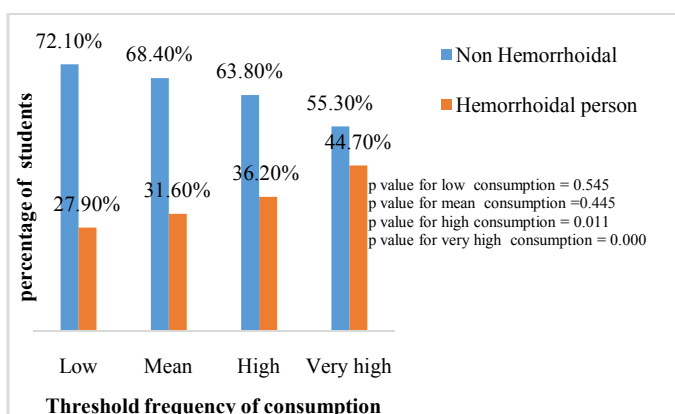**Figure 3** Threshold of consumption frequency of spicy foods for hemorrhoids (Total population = 1228)

p value for low consumption = 0.545
p value for mean consumption =0.445
p value for high consumption = 0.011
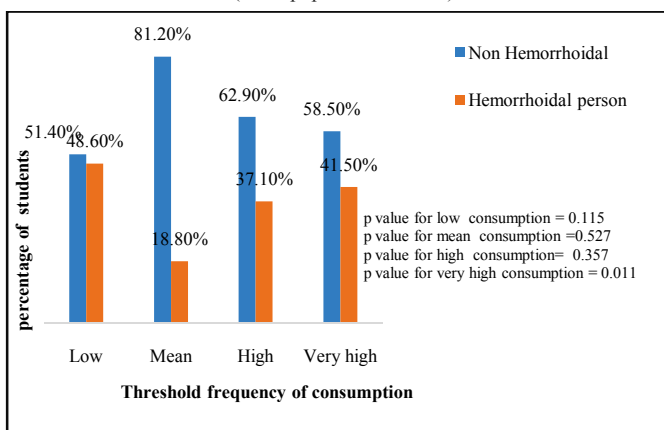p value for very high consumption = 0.000

Figure 4 Threshold of consumption frequency of sweetened milk products and foods containing eggs for hemorrhoids (Total population = 1228 students)

p value for low consumption = 0.115
p value for mean consumption = 0.527
p value for high consumption= 0.357
p value for very high consumption = 0.011

Figure 5 Threshold of consumption frequency of soft drinks for hemorrhoids (Total population = 1228 students)

p value for low consumption = 0.568
p value for mean consumption = 0.183
p value for high consumption = 0.596
p value for very high consumption = 0.000

Figure 6 Threshold of water consumption for hemorrhoidal pathology (Total population = 1228 students)

p value for low consumption = 0.010
p value for mean consumption = 0.109
p value for high consumption = 0.274
p value for very high consumption = 0.246

DISCUSSION

The first-level analysis of the relationship between food consumption and the occurrence of hemorrhoids has revealed the involvement of certain food categories, namely red meat, sweet foods containing eggs or milk, and protein-oilseeds, soft drinks (soda), spices and water. In order to determine exactly the level of consumption that would trigger the occurrence of the disease, a second analysis according to the different degrees of consumption was carried out and had identified the threshold frequencies.

Regarding red meat, this analysis revealed that consumption levels of less than three times a week were not involved. Only consumption greater than or equal to three times (high or very high consumption) exposed the patient to hemorrhoidal disease (p <0.05). These results are identical to those reported by Amoikon *et al.* (2016). In addition, according to Dabo (2006) and Dembélé (2009), meat consumption is one of the factors mostly associated with hemorrhoidal disease and could be justified by the fact that it is difficult to digest and is associated with constipation (Dukan, 2010). Constipation being strongly associated with hemorrhoidal disease would justify this relationship (Amoikon *et al*., 2016), (Sielezneff *et al*., 1998).
For the food category of dairy / sweet products / and food containing eggs, a consumption greater than or equal to five times a week is related to the occurrence of hemorrhoidal disease (p <0.05).

Indeed, these foods play an important part in the preparation of snack foods, or because of their low digestibility or their ability to induce digestive inflammation (eggs, milk, sugar, biscuits, crackers, cakes, etc.) (Dukan, 2011). This factor could explain the relationship between this category and the occurrence of hemorrhoids.

Consumption of more than three times a week of protein and oilseed (peanut, soya and chocolate) food was associated with the occurrence of the disease (p <0.05). This could be explained by their high fat content, which favors the slowing down of transit. Proteo-oil also is among the most allergenic food in the world (Dukan, 2011). According to the genetic predispositions of the consumer, high consumption could lead to inflammation of the digestive tract and transit disorders such as diarrhea or constipation, creating a nest for hemorrhoids (Nancey, 2005).

For foods in the spice category, students with a consumption greater than or equal to 3 times a week were exposed to hemorrhoidal disease (p <0.05). This is explained by the fact that these foods are accelerators of transit after high consumption (Dukan, 2011). An acceleration of the transit leads to the diarrhea which is incriminated in the triggering mechanism of the hemorrhoids by an increased demand on the rectum according to Kouamé, (2008). In addition, high consumption of spicy meals may be responsible for inflammation of the digestive tract and lead to constipation (Dukan, 2011). Finally, spices are capable of leading to alternating diarrhea-constipation which is strongly associated with the hemorrhoidal disease (Dembélé, 2009).

Regarding soft drinks, students with a very high consumption, greater than or equal to five times a week, were exposed to hemorrhoidal disease (p <0.05). Soft drinks contain acidic substances such as citric acid, malic acid, sodium citrate, phosphoric acid, atric acid, ascorbic acid, sorbitol and a significant amount of carbon dioxide (Dukan, 2011; Hannifin, 2011). These substances cause inflammatory phenomenon at the intestinal level (Orr, 2010). In case of frequent consumption, these chronic inflammatory reactions favor a decrease in intensity of intestinal peristaltism and a weak progression of the alimentary or fecal bolus thus leading to constipation which in turn leads to the hemorrhoidal disease (Nancey, 2005); Samaké, 2013). Moreover, Santiago (2015) revealed that the high gas content of soft drinks is strongly associated with irritable bowel syndrome, known for its involvement in the onset of hemorrhoids.

The analysis of the relationship between water consumption and the occurrence of hemorrhoids shows that students with very low water consumption were more exposed to the disease (p <0.05). Our results are similar to those of sielezneff (1998). Dukan also reported that low water consumption is responsible for dry faeces and lasts with prolonged emission, a factor strongly associated with hemorrhoids.

Analysis of the relationship between the consumption of fish / white meat, tubers, fruits and vegetables, cereals, alcohol, exciting non-alcoholic products or flavor enhancers and the occurrence of hemorrhoids did not show any links. These results are superimposable to those of Amoikon *et al.* (2016).

CONCLUSION

Eating habits, when not rationalized, weaken the body and expose it to serious diseases. This study revealed a prevalence of 39.7 % of hemorrhoidal persons in a population of young Ivoirians with a food profile dominated by certain types of foods such as bread, attiéké (cassava couscous), rice and fish opposite to a low consumption of fruit and water. An analysis of the involvement of food consumption in the occurrence of hemorrhoids revealed a strong implication of consumption of three times and more, per week, of red meat, proteo-oleaginous foods, spicy foods and five or more times weekly of sweet or milky food or products containing eggs and soft drinks. Also a water consumption of less than 1 liter per day is a favorable factor for hemorrhoids. This study, in addition to confirming the results of the previous work performed by the same team, has identified other dietary habits capable of promoting the hemorrhoids among young Ivoirians.

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