Comparative study of the food habits of populations in southern Benin

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Article Info

ABSTRACT

An unbalanced or inappropriate diet promotes the onset of the metabolic syndrome, one of the risk factors in the occurrence of cardiovascular disease and type 2 diabetes. The aim of this study was to analyze the food habits of four ethnic groups in southern Benin to assess their impact on the occurrence of the metabolic syndrome. This was a prospective cross-sectional descriptive study that took place over 4 months and identified volunteers aged 18 years or more in four ethnic groups of southern Benin. An interview using a questionnaire collected anthropometric, socio-demographic, behavioral and physical activity data. Informed consent was obtained from each participant in the study. The study population consisted of 497 participants recruited from both departments. The Goun, Tori, Nago and Yoruba ethnic groups were concerned. The average age of participants was 38.85 ± 14.4 years. The sex ratio was 1.67. The preferred foods at breakfast were: porridge (26.76%), attassi (18.91%), pasta (18.51%) and akassa (11.67%) with a female predominance in consumption. Food consumed at lunch was akassa (37.17%), pasta (34.54%), rice (10.9%) and gari (8.08%). Those of the dinner were pasta (62.57%) and akassa (32.19%). The four ethnic groups have almost the same food habits composed largely of oil and starchy foods.

Introduction

Metabolic diseases are now widespread in our societies and constantly evolving. They are linked by an overconsumption of food or an unbalanced or inappropriate diet, thus favoring the appearance of the metabolic syndrome (Liévin, 2015). The latter corresponds to the coexistence of a set of

metabolic aberrations, mainly insulin resistance, obesity (general and abdominal), dysglycemia, dyslipidemia and arterial hypertension (Capeau et al., 2006). The metabolic syndrome increases the increased risk of developing cardiovascular disease and type 2 diabetes (Ford et al., 2002; Grundy et al., 2004; Després et al., 2008) and exposes to a significant number of other complications, it is therefore considered as a major public health problem. Large variations in prevalence have been reported from one country to another, between the sexes on the one hand and ethnic groups on the other (Ford, 2005; Pollex et al., 2006; Fezeu et al., 2007; Hydrie et al., 2009).

Premature deaths resulting from this syndrome have a significant impact on the health budgets of many developed and developing countries. Prevention seems to be an essential measure to reduce the incidence of these diseases and reduce health care costs. The objective of our work was to analyze and compare dietary habits, to evaluate their contribution to the occurrence of the metabolic syndrome in four ethnic groups in southern Benin.

Materials and methods

Framework of study

Our study took place in southern Benin in the departments of Ouémé and Plateau from September 30th, 2017 to January 30th, 2018. The commune of Avrankou was retained in Ouémé and those of Ifangni and Sakété in the Plateau. The choice of municipalities was random. For each municipality selected, the survey took place in the public square of the central district.

Study population and type of study

The study population consisted of Beninese adults apparently healthy and belonging to one of the 4 ethnic groups involved in our study. The Goun, Tori, Nago and Yoruba ethnic groups were concerned. It was a prospective cross-sectional descriptive study.

Sampling

Our sample consisted of 497 individuals. This sample consisted of a recruitment of volunteer individuals (male - female) fulfilling the inclusion criteria. The sample size was calculated using the following formula:

$$n = \frac{t^2 \times p\,(1 - p)}{m^2}$$

Where:
n = sample size required
t = confidence level
p = estimated prevalence of the studied variable
m = margin of error

This calculation was made on the basis of a 95% confidence level (standard value of 1.96), a metabolic syndrome prevalence of 50% and a margin of error to 5% (value type of 0.05). Using these criteria, the minimum sample size required was 384 participants, which is significantly lower than the 497. Was included in the study, all the inhabitants of the three communes at least 18 years of age, apparently healthy, belonging to one of the ethnic groups targeted by the study, actually residing for at least 2 years in the corresponding geographical area to ethnicity. Not included were all those unable to provide sufficient information regarding the necessary data, as well as those with no evidence of age of majority and pregnant women.

The variables of the study and their measurement

The dependent variable

The dependent variable was: food habit. This variable is represented in particular by the types of food consumed in a preferential way, their variations and their constitutions.

Independent variables

The independent variables were: ethnicity, socio-demographic factors (age, sex, level of education, occupation, marital status, level of education) were identified.

Data collection procedure

The data collection was done by a fact sheet consisting of two parts:

- The part concerning the socio-economic and demographic characteristics of the populations.
- The second part is about the food consumption of the populations. In this part the main foods most consumed at breakfast, lunch and dinner were recorded. For this purpose, the interviewer asked the respondent to remember and describe his dish consumed during 24 hours and 48 hours and frequencies of food consumption over 7 days and a month.

Ethical considerations

This study was submitted to the approval of the Ethics Commission of the University of Abomey-Calavi. Written informed consent was obtained from each participant prior to their recruitment into the study.

Data analysis

The Shapiro-Wilk test has been applied to check whether the target groups' food preferences follow a normal distribution. The Kruskal-Wallis test was used to test the variability of food preferences between different groups. All the statistical analyzes carried out were realized with the R version 3.2.2 software equipped with the FactoMineR package.

Results

Socio-demographic characteristics of the subjects surveyed

A total of 497 participants were surveyed in both departments. Of these, 229 (46.08%) were male and 268 (53.92%) female with a sex ratio of 0.85. The average age of the participants was 38.85 ± 14.4 with extremes from 18 to 80 years. Table 1 shows the distribution of respondents by socio-demographic characteristics.

Table 1. Distribution of respondents by socio-demographic characteristics.

Socio-demographic characteristics	Frequency (N=497)	Percentage (%)
Sex		
Female	268	53.92
Male	229	46.08
Age of the respondents		
Age<40 ans	293	58.95
Age ≥40 ans	204	41.05
Ethnic group		
Goun	150	30.18
Tori	150	30.18
Nago	150	30.18
Yoruba	47	9.46
Level of education		
Illiterates	239	48.09
Primary	100	20.12
Secondary	107	21.53
Supérior	51	10.26
Marital status		
Maried	393	79.07
Single	74	14.89
Divorced	6	1.21
Widower	24	4.83
Profession		
Employee	25	5.03
Independents	242	48.69
Unemployed	76	15.29
Households	154	30.99
Religion		
Christians	324	65.19
Islam	132	26.56
Traditional	41	8.25

Food habits

Nature of food at breakfast

The preferred foods consumed at breakfast were: porridge (26.76%), attassi (18.91%), pasta (18.51%) and akassa (11.67%) with a female predominance in consumption respectively (60.15%, 67.02%, 55.43% and 63.79%) (Fig. 1).

Table 2 shows the breakfast variations of the different target groups surveyed. The Kruskal-Wallis test performed on different dietary preferences does not show large variations from one target group to another.

Nature of the diet at lunch

Foods consumed at lunch were akassa (37.17%), pasta (34.54%), rice (10.9%) and gari (8.08%) (Fig. 2).

Table 3 shows the lunch variations of the different target groups surveyed. The Kruskal-Wallis test performed on different dietary preferences does not show large variations from one target group to another.
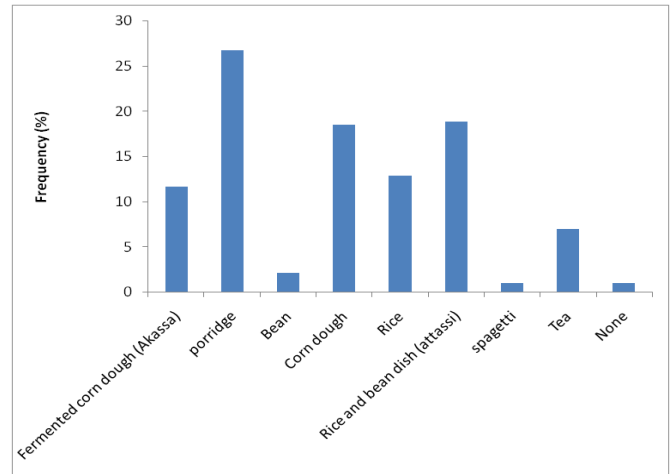
Nature of food at dinner

Foods consumed preferentially at dinner were: pasta (62.58%) and akassa (32.19%) (Fig. 3).

Table 4 presents the dinner variations of the different target groups surveyed. The Kruskal-Wallis test performed on different dietary preferences does not show large variations from one target group to another.

Fig. 1: Food preference at breakfast.

Table 2. Variation in dietary preferences at breakfast from one group to another.

Target Groups	Akassa	Porridge	Bean	Pasta	Rice	Attassi	Spaguetti	Tea	None
Sex	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]
Marital status	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Ethnic group	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Occupation	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Level of education	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Religion	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]

NS= Not Significant.

Table 3. Variation in dietary preferences at lunch from one group to another.

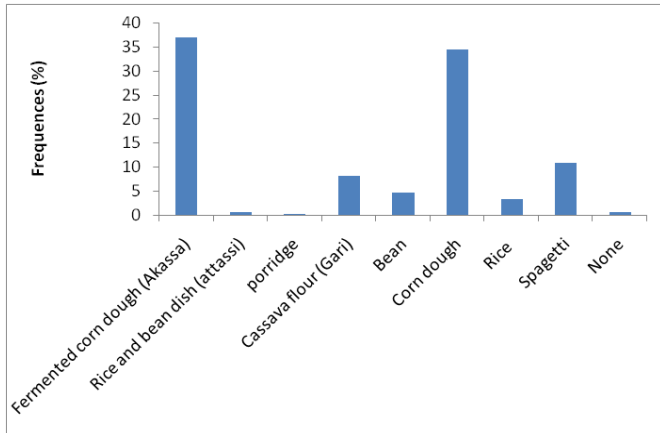| Target Groups	Akassa	Attassi	Porridge	Gari	Bean	Pasta	Nothing	Rice	Spaguetti
Sex	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]
Marital status	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Ethnic group	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Occupation	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Level of education	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Religion	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]

NS= Not Significant.
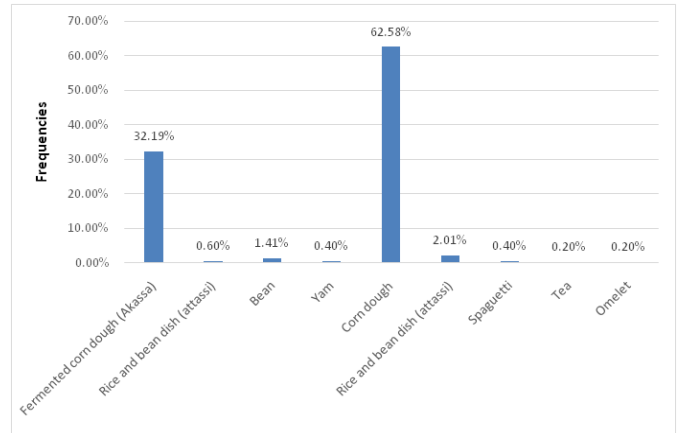
Fig. 2: Dietary preference at lunch.

Fig. 3: Food preference at dinner.

Table 4. Variation in dietary preferences at dinner from one group to another.

Target Groups	Akassa	Attassi	Bean	Yam	Pasta	Rice	Spaghetti	Tea	Omelette
Sex	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]	0.3173[NS]
Marital status	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Ethnic group	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Occupation	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Level of education	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]	0.392[NS]
Religion	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]	0.368[NS]

NS= Not Significant.

Oils consumption

The results on the consumption of oils and their frequency are shown in Fig. 4. The 24-hour recall shows that palm oil was consumed by a total of 231 participants (46.47%), peanut oil by 11 participants (2.21%) and finally the oils imported by 205 participants (41.24%).
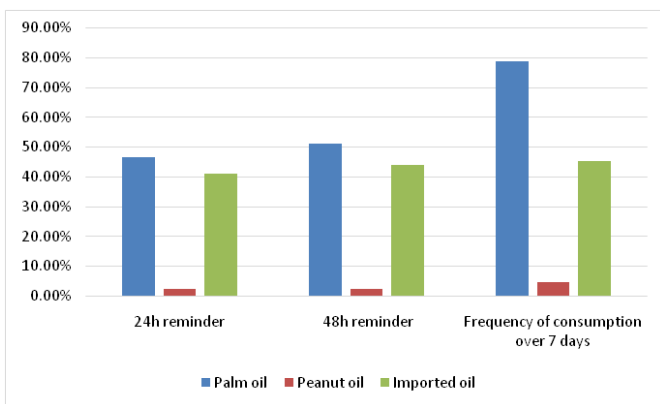

Fig. 4: Frequency of consumption of oils.

The number of participants at the 48-hr recall is: 255 participants (51.3%) for palm oil, 11 participants (2.21%) who consumed peanut oil and 219 participants (44.06 %) for imported oils. The 7-day consumption frequency survey revealed that palm oil was consumed by 393 participants (79.07%) compared to 23 participants (4.63%) for peanut oil and 225 participants for imported oils (45.27%). Regarding the frequency of consumption, most participants consumed on average three times a day these foods (66%).

Fruits and vegetables consumption

The consumption results obtained are given in the Fig. 5.
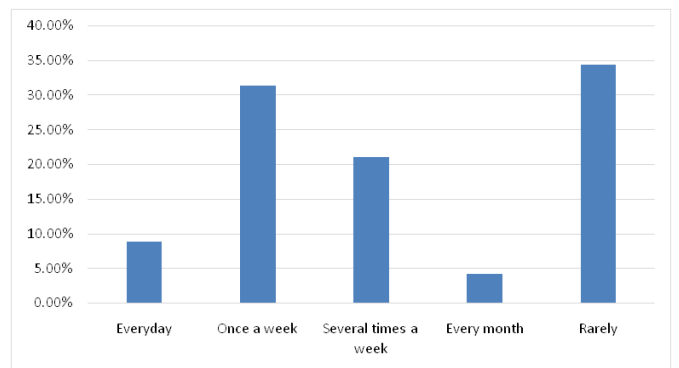

Fig. 5: Frequency of fruits consumption.

They show that 8.85% of the participants consume five servings of fruit every day, 31.39% of the participants consume once a week, against 21.13%

take several times in the week, 4.23% of the participants every month while 34.41% rarely consume it. These results show that 91.15% of the population did not consume five servings of fruits and vegetables per day.

Discussion

The present study focused on the food habits of four ethnic groups in southern Benin. It allowed to determine the nature of the foods consumed preferentially by the population. To achieve this, we carried out a prospective study of transverse type with a descriptive purpose.

Socio-demographic characteristics of the subjects surveyed

The study population was young with an average age of 38.85 ± 14.4. It is the most active layer, providing resources for economic development. This youth of the study population was found in several studies. In a series of studies conducted on health personnel in Benin, Acakpo et al. (2000), Gounongbé et al. (2013), Alassani et al. (2015) and Dovonou et al. (2016) reported an average age of 31.3 ± 7.2 years, 35.7 ± 8.8 years, 40.7 ± 9.71 years and 37.2 ± 9.0 years old respectively. In a series of Cameroonian non-health work, Bita Fouda et al. (2012) reported an average age of 34.5 ± 6.8 years in 2012. In contrast, in Kosovo (2006), the average age of workers was 56 ± 10 years old (Soualem et al., 2006), thus much higher than that of our study.

The participants included in this study were mostly women with a sex ratio of 0.85. This female dominance was also observed in the Dovonou et al. (2016) and Mbunkah et al. (2014) study. Most participants were married (79.075). This rate is similar to that of 79.7% reported by Dovonou et al. (2016) but higher than that of 53.7%, found by Janice et al. (2001) in California, USA in 2007. This suggests that sub-Benin participants would be well nourished.

Food habits

We used the food survey method while practicing 24-hour, 48-hour reminders, as well as 7-day and 1-month consumption frequencies. At breakfast, the preferred foods were: porridge (26.76%),

attassi (18.91%), pasta (18.51%) and akassa (11.67%) with a female predominance in consumption. At lunch, the preferred foods were: akassa (37.17%), pasta (34.54%), rice (10.9%) and gari (8.08%). At dinner, the foods consumed in a preferential way were: pasta (62.57%) and akassa (32.19%). From these results it appears that the menu of the population in the main meals is rich in carbohydrate. This observation corroborates with the one of Cissé et al. (2001) in Senegal who found that the menu served at the university restaurant to students of the university campus, Cheikh A. Diop of Dakar is rich in carbohydrates. This type of high carbohydrate diet of our respondents may be associated with the metabolic syndrome, which is an important risk factor for diabetes and cardiovascular disease (Liu, 2001; Keller, 2003; Procopiou, 2005).

The staple foods of our respondents are: maize, rice and cassava. This result is similar to that found by Mitchikpe et al. (2001) in urban households in Benin. Conversely, it is different from that found by Mutoula et al. (2016) in households in Brazzaville where beef, chicken legs, salt fish, beans, eggplant, "koko", and palm nuts are the most consumed. This difference is explained by the fact that the study of Mutoula et al. (2016) aimed to provide basic information on the food habits of households in Brazzaville, to identify the foods most consumed by these households and to see if these foods can contribute to improving the vitamin A situation in vulnerable people.

At breakfast, lunch and dinner, our study does not show a great variation in food consumption from one ethnic group to another. This similarity in food consumption is explained by the fact that the respondents share almost the same agro-ecological zone (Mitchikpe et al., 2001).

In our study, three types of oil were consumed by our respondents: palm oil, peanut oil and imported oils. In 24 hours 46.47% of respondents consume palm oil 2.21% peanut oil and 41.24% imported oils. In 48 hours 51.3% of respondents consume palm oil 2.21% peanut oil and 44.06% oils. The 7-day consumption frequency survey revealed that palm oil was consumed by 79.07% compared to 4.63% for peanut oil and 45.27% for imported oils. These rates are higher than those found by Mutoula et al. (2016) in households in Brazzaville

where palm oil was consumed by (11.4%), (8.0%) and 61.2% respectively in 24 hours, 48 hours and one week. This difference is explained by the high production of palm nuts that characterizes our study area.

The study found that 8.85% of participants consume five servings of fruit every day, 31.39% of participants consume once a week, while 21.13% take several times a week and 4, 23% of participants every month while 34.41% rarely consume it. From these results, 91.15% of the population did not consume five servings of fruits and vegetables per day. This result is similar to that found by Houinato et al. (2008) in a STEPS survey in Benin that reported that 78.05% of the population did not consume five servings of fruits and vegetables per day.

Conclusion

The study shows that the four ethnic groups have almost the same food habits composed largely of oil and starchy foods. The most consumed foods are: corn, rice and cassava very rich in carbohydrates. These foods have been consumed 3 times a day by the majority of the population. Based on these results, we conclude that the diet of most populations in southern Benin is monotonous. This diet is not varied, but a good diet must be diversified. Future studies will bring up some light on the diagnosis of the metabolic syndrome.

Conflict of interest statement

Authors declare that they have no conflict of interest.

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