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Food Habits and the Prevalence of Sickness in the Northern Part of Cameroon

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Abstract

Information on the food habits and prevalence of chronic non communicable diseases in people of the Sudano-sahelian region of Cameroon is limited. The aim of this study was to evaluate the eating habits of the people, know the prevalence of chronic non communicable diseases in this region, and investigate their relationship. A cross-sectional study using anthropometric measurements and food frequency questionnaire (FFQ) was done. Body Mass Index (BMI) was calculated from anthropometric data and information on feeding habits was gathered using a standardized frequency questionnaire. Approximately 47.6% of the people who participated in the study were female as opposed to 52.4% male. Among these, 16.9% were overweight and 5.8% obese. An increase in body weight was noticed among the people of the urban population, bringing about a weight difference with those of the rural areas in terms of IMC (χ^2 =17.33, P= 0.0006). The health problems in this zone were prominently parasitic (85.9%) and digestive tract (39.3%) infections. Chronic non communicable diseases showed a prevalence of 3.9%. Generally vegetables and cereals were more consumed than meat and/or fish, and a rare consumption of milk. There is a need for nutrition education of the Sudano-sahelian population on consumption of diversified meals and also a need for the prevention and care for non-communicable chronic diseases.

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Keywords

Body Mass Index
Food habits
Food frequency
Health problems

Introduction

Food habits are a basic part of every African culture, whose tendencies have a lot of influence on the type of foods in each community. In every part of the society, people show diverse feeding habits that have been inherited from past generations (Oniang et al., 2003). In Africa, the traditional diet consists of a basic foodstuff (staple) and a soup / stew / sauce that is eaten in association with the staple. The daily meal is prepared from a basic staple food (grains, fruits, roots and tubers) which provides most of the daily calorie intake, while the soup/stews/ sauce used to accompany these foods are vegetables, pulses, tomatoes, fish/meat cooked with palm or vegetable oil and water (Froment et al., 1993). Typically, in the Sudano-sahelian region of Africa, grains (millet/sorghum, maize, rice, wheat and fonio) with leafy or fruit vegetables **(**Hounhouigan, 2003**)** are the order of the day; same trend found in the Northern part of Cameroon (Tchiegang, 2004). However, the economic situation of the household is also a determinant factor of the meals adopted by the family.

In rural areas, people eat the same type of traditional dishes which are based on staple foods, whereas the urban population incorporates more diversified foods

into their diet (Nzefa et al., 2005). Diet and nutrition are important factors in the promotion and maintenance of good health throughout life. Their role as determinants of chronic non communicable disease (NCDs) is well established and they therefore occupy a prominent position in prevention strategies. The chronic disease problem is far from being limited to the developed regions of the world, contrary to widely held beliefs; developing countries are increasingly gaining grounds as far as these diseases are concerned (World Health Report, 2002). Almost half of the total deaths from chronic disease are attributable to cardiovascular diseases. Obesity and diabetes are also showing worrying trends, not only because they already affect a large proportion of the population, but also because they have started to appear earlier in life (WHO, 2014).

In Cameroon, 43% of all deaths in 2002 were accounted for by chronic non communicable disease (NCDs) (Echouffo – Cheugui and Kengne, 2011). In the Sudano-sahelian region of Cameroon, studies relating the food habits and prevalence of chronic non communicable diseases are limited. The present study was carried out to describe the food habits of the population of the Sudano-sahelian region of Cameroon, to compare their food practices both in urban and rural, and to know and how these can influence the prevalence of chronic non communicable diseases within this population.

Materials and methods

Study design, sampling and subjects

The study was conducted in the Sudano-sahel region in the north of Cameroun (North and Far-North Regions). This region is bound by the Chad to the North and East, the Adamawa region to the South, Nigeria to the West, and Central African Republic to the South east. This region covers an area of 100.353Km^2 and has about 5530643 inhabitants (Cameroon National Census, 2010). The climate is Sudano-Sahelian characterized by a short rainy season of about 5 months (June-October) and a relatively long dry season which lasts about 7 months (November-May) (Saointoing et al., 2011). The majority of ethnic groups in this region are the "paleo-soudanais" or early Sudanese and the neo-Soudanais. The main economic activities are agriculture, cattle breeding, business and people working with the Government.

At the start of this study, all participants who gave their consent to take part were drilled on the principle and objectives of the study. A cross-sectional study was carried out from February to July 2011. The rural and urban zones were identified for each study area and 100 persons were selected in the 10 divisions of the region according to gender and age (15-34 years, 35-59 years, 60 and plus years old) in a total of 1000 persons.

Data collection and indicators

A questionnaire was developed and used to collect background data. A food frequency questionnaire (FFQ) was used to collected data on food and meal frequencies, and anthropometric data was obtained to and used to describe the nutritional status of the sample population. Prior to administration of the questionnaire, a preliminary test was first administered and appropriate adjustments made. The languages used for this study were those spoken in the region that is Fulfude (fulani), French, and Arabic. Data was collected from February to July 2011.

Food frequency questionnaire

The food frequency questionnaire (FFQ) is a cheap and useful tool used to describe and assess the food pattern of individuals over recent months (Cade et al., 2002). The FFQ was developed based on information from nutritional surveys used to assess food habits in Cameroon (Nzefa et al., 2005). Focus group interviews with the study participants were used to obtain information on the most consumed food to be included in the FFQ. The FFQ consisted of 40 food items, including meat and/or fish/eggs, red beans (*Phaseolus vulgaris*)/cowpea (*Vigna unguiculata*), sesame (*Sesamum indicum*), soya (*Glycine max*), biridji (*Arachis hypogaea*), maize (*Zea mays*), millet (*Pennisetum typhoïdes*), fonio (*Digitaria exilis*), sorghum (*Sorghum caudatum*), pasta (*Triticum durum*), rice (*Oryza sativa*), potatoes (*Ipomea batatas*), yam (*Dioscorea spp*), cassava (*Manihot esculenta*), plantain (*Musa paradisiaca*), taro (*Colocassia esculenta*),dark vegetables: *Adansonia digitata*, *Gnetumspp*, *Corchorus olithorus*, *Cerathotheca sesamoïdes*, *Bombax costatum*, *Hibiscus sabdariffa*, *Cassia tora*, *Solanum suprium*, *Manihot esculenta*, *Amaranthus hybridus*, *Vernonia sp*, *Balanites eagyptiaca*, *Curcubita sp*, *Hibiscus cannabinus*, *Moringa oleifera*, *Cleome gynandra L*, *Celtis integrifolia*, *Vigna unguiculanta*, *Ficus ingens*, *Spina ciaoleracea*. This list was divided into 4 groups (cereals, roots and tubers, vegetables, and meat and/or fish).

The FFQ was self-reported, by asking people how many times a day and how many times per week they consumed each of the food items listed. No specified

quantities were recorded; therefore, collected data were only used for assessing the frequency of food or meals.

Evaluation of Nutritional status of people from the Sudano-sahel region

Body Mass Index (BMI) is an assessment tool that has been used to judge nutritional status of individuals and of a population, indicating thinness and excessive fatness. This index incorporates height and weight in the estimation of critical fat values at which the risk of disease increases (Martinez et al., 2005). According to BMI, the lowest risk for chronic disease is in the 18.5 to 24.9 range which is classified as normal weight as oppose to values from 25 and above classified as overweight (WHO, 1990). According to National Institute of Health USA, mortality rates are 25% higher for individuals with a BMI between 25-30 and 50-100% higher for those individuals with a BMI above 30 that is those considered obese (WHO, 1990).

Statistical analysis

Analyses were performed using Statistical Package for the Social Sciences (SPSS) version 12. Data analysis included descriptive statistics of the respondents. Means, standard deviations and percentages were computed. Differences were analysed using Pearson's chi-squared test, and considered statistically significant when the *p*-value was less than 0.05.

Results

Questionnaire

In this study 40% of the participants were of the North region while 60% of the Far north, with 47.6% being female and 52.4 % male, all belonging to 3 major religions groupings: Christianity, Islam and Animist (Table 1). Participants in this study were not all natives of these regions (33.3%). They are known to have moved for various reasons: marriage, search for greener pastures, farming, movements due to career and many others.

Food habits of the study population

Data in Fig. 1 shows that the population of this region consumes mainly cereals (99.6%) and green leafy vegetables (99.2%). The number of people with intake of Meat and/or fish (17.8%) and tuber (10.7%) is lower. In the North, the percentage consumption of cereals, vegetables, meat and/or fish, and tubers are 99% 98%, 29%, and 18.25% respectively while in the Far-North, these percentages stand at 100%, 100%, 10.33 %, and 5.66% and respectively (Fig. 2). From this data it can be deduced that the feeding habits of people from North region were significant differently from those from the Far-North region (χ^2= 72.65, p<0.05) (Table 2).

Food habits of urban and rural populations

As shown in Fig. 3, there is no significant difference between the food habits of people from the urban zone and those from the rural zone in the Sudano-sahel region (χ^2 =1.09, p= 0.79). Generally, the people from the urban zone consumed meat and/or fish (52.25%), legumes (50.60%), tubers (57. 01%) and cereals (50.70%). The consumption of those in the rural zone is 47.75%, 49.39%, 42.99%, and 49.30% from meat and/or fish, legumes, tubers and cereals respectively.

Frequency of food consumption in the study population

The results obtained show that all participants consume vegetables and cereals on a daily basis while the intake of meat and/or fish and tubers stands at 10.8% and 0% respectively. Some participants however ate the above food items once a week: 26.5% eat meat and/or fish, 0.1% took milk and 0.3% consumed tubers. Nevertheless these foods are not completely under looked in the feeding of the rest of the population since an increase was recorded in the number of people who eat them on feast days and other rare/special occasions (27%, 28.6% and 60% for meat and/or fish, milk and tubers respectively). Surprisingly, some participants in this region consume no meat and/or fish (36%), milk (27%) or tubers (40%) at all. Generally the frequency of vegetable and cereal consumption was higher than tuber, milk and meat and/or fish (Fig. 4).

BMI of the study population

In general 9.9% of the population assessed were underweight, 67.4% had normal weight, while 16.9% were overweight and 5.8% obese. From amongst the female population, 10.5% were underweight, 65.84% were of normal weight, 18.70% were overweight and 4.96 % obese. For males, 9.24, 69.12, 14.91, and 6.72% are underweight, normal weigh, overweight and obese respectively. No significant differences were observed between the two sexes (χ^2 =0.85, P=0.84) and age groups (χ^2 =4.06, p=0.666) (Figs. 5 and 6). However significant variations in IMC were observed between the people from the urban zone and those from the rural zone (χ^2 =17.33, p= 0.0006) (Fig. 7).

Table 1: The characteristics of the Sudano-sahel population.

Parameters	Total (n=1000)	Nord (n=400)	Far-North (n=600)	*p*-value
Area (km^2)				
Urban	509 (50.9)	219 (54.75)	290 (48.33)	0.046
Rural	491 (49.1)	181 (45.25)	310 (51.66)	
Age				
15-34	366 (36.6)	127 (31.75)	239 (39.83)	0.034
35-59	366 (36.6)	158 (39.5)	208 (34.66)	
60+	268 (26.8)	115 (28.75)	153 (25.5)	
Sex				
Male	524 (52.4)	188 (47)	336(56)	0.005
Female	476 (47.6)	212 (53)	264 (44)	
Matrimonial status				
Monogame	714 (71.4)	260 (65)	454 (75.66)	0.00
Polygame	228 (22.8)	119 (29.75)	109 (18.17)	
Single	58 (5.8)	21 (5.25)	37 (6.17)	
Level of education				
No Education	378 (37.8)	139 (34.75)	239 (39.83)	0.00
Primary	413 (41.3)	149 (37.27)	264 (44)	
Secondary	195 (19.5)	104 (26)	91 (15.16)	
Superior	14 (1.4)	8 (2)	6 (1)	
Professional status				
Farmers/Shepherd	355 (35.5)	171(42.75)	184 (30.66)	0.00
Trader	187 (18.7)	31 (7.75)	156 (26)	
Technician	47 (4.7)	15 (3.75)	32 (5.33)	
Labourer	35 (3.5)	11 (2.75)	11 (2.75)	
Businessman	3 (0.3)	2 (0.5)	1 (0.16)	
Public servant	67 (6.7)	30 (7.5)	37 (6.16)	
Housewife (others)	306 (30.6)	140 (35)	166 (27.66)	
Religion				
Animist	80 (8)	8 (2)	72 (12)	0.00
Christians	587 (58.7)	278 (69.5)	309 (51.5)	
Moslem	333 (33.3)	114(28.5)	219 (36.25)	
Economic index of the household				
Low	401 (40.1)	126 (31.5)	275 (68.75)	0.00
Medium	442 (44.2)	187 (46.75)	255 (63.75)	
High	157 (15.7)	87 (21.75)	70 (17.5)	

n = the number of participants.

Table 2: The different types of cereal and tubers consumed in the North and in the Far-North

Cereals	North (%)	Far-North (%)
Maize	95.00	61.50
Millet	46.50	87.66
Rice	28.75	47.50
Fonio	0	3.00
Wheat	0	1.00
Tubers		
Sweet potatoes	10.50	4.33
Cassava	10.25	2.33
Irish	0	1.16
Yams	5.00	0.83
Taro	1.25	0.33
Plantains	0.50	0.33

Prevalence of diseases in the study population

From the results obtained many respondents suffer from diseases such as parasitic (85.9%), gastrointestinal (39.3%), respiratory (18.5%), viral (7.5%), ocular, cardiovascular and endocrine (3.9%), nerve (1.6%) and urogenital (1.8%) diseases and infections. The prevalence of parasitic infections and gastrointestinal disease was higher in this region (Fig. 8). In general, four percent of people had non communicable diseases in the Sudano-sahel region of Cameroon.

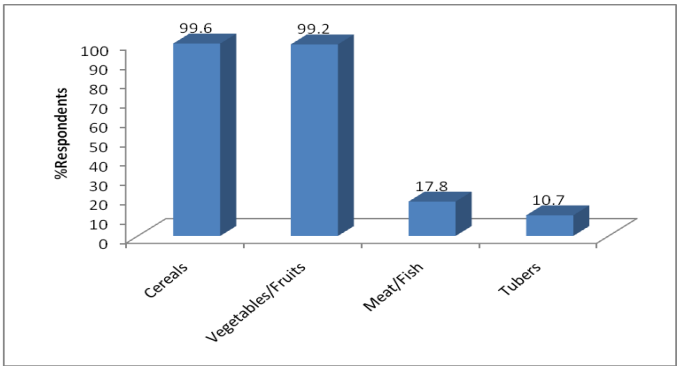

Fig. 1: Different types of food.

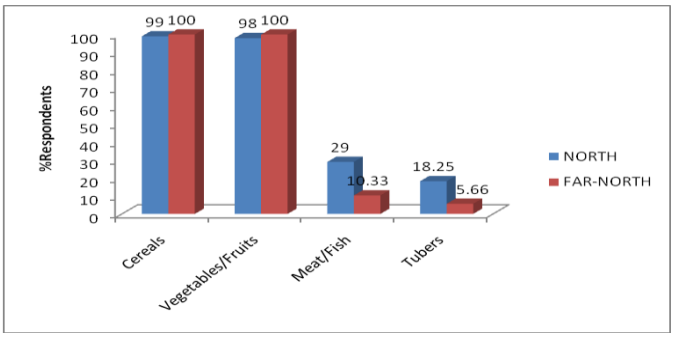

Fig. 2: Food groups in the North and Far-North regions.

The prevalence of diseases in the North and Far-North

No significant difference was recorded between the diseases suffered by participants in North and those from the Far-North (χ^2 =10.51, p>0.05). In the North, the percentages noted were as follows: gastrointestinal (25%), parasitic (84%), respiratory (21%), locomotive (16.75%), ocular pathology (5.25%), cardiovascular and endocrine (2.75%), urogenital (1.5%), viral (10.25%) and disease of nerve (1.5%). In the Far North these percentages were 48.83%, 87.16%, 16.83%, 16.33%, 7%, 4.66%, 2%, 5.66% and 1.66% for gastrointestinal, parasitic, respiratory, locomotive, ocular pathology, cardiovascular and endocrine, urogenital, viral, and disease of nerve respectively (Fig. 9).

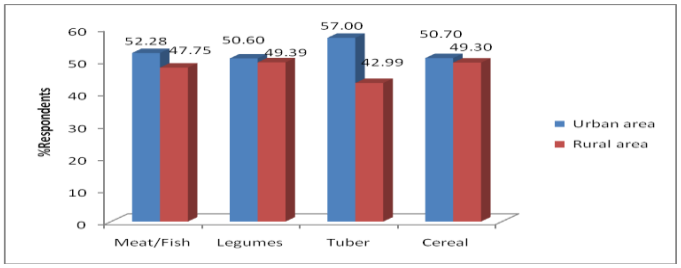

Fig. 3: Food groups in the Urban and Rural areas.

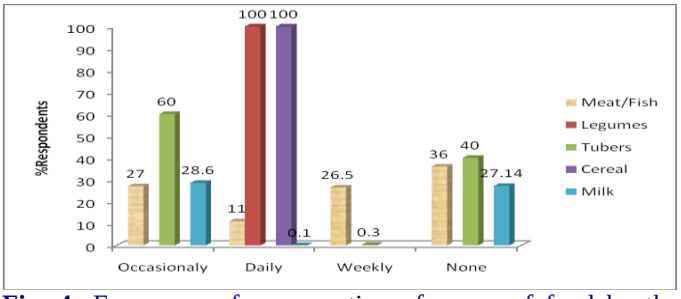

Fig. 4: Frequency of consumption of group of food by the people of Sudano-sahel region of Cameroon.

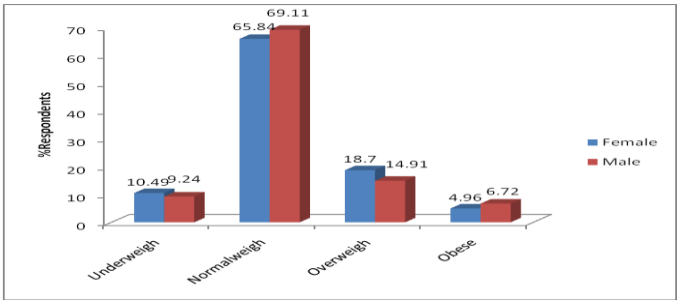

Fig. 5: Prevalence of diseases in the study population.

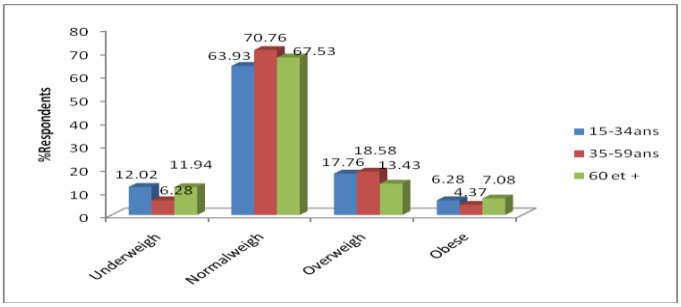

Fig. 6: BMI and age Classification of people who participate in the nutritional status assessment.

Relationship between food habits and diseases prevalent in the region

Fig. 10 shows the relationship between the food habits and the sickness of people of the Sudano-sahel region. The chi-square and AFC tests reveal that there is no difference between the sickness and food habits of the population of the Sudano-sahel region (χ^2 = 14.62, p= 0.93).

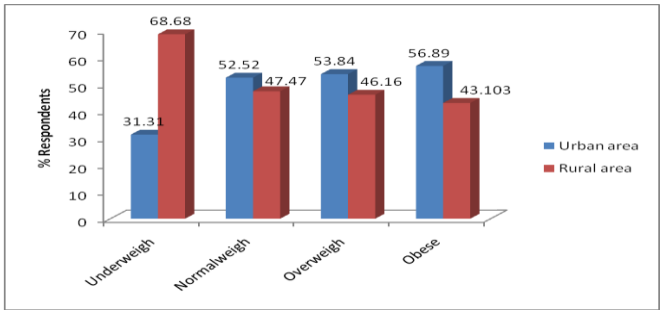

Fig. 7: BMI and area Classification of people who participated in the nutritional status assessment.

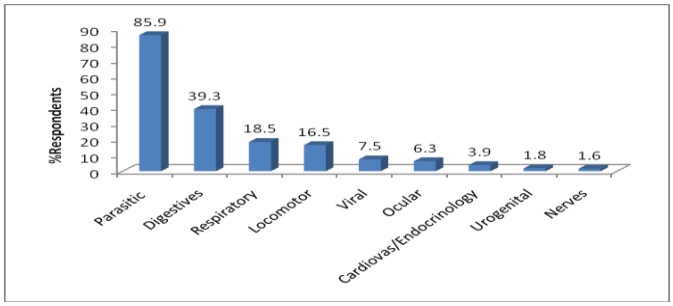

Fig. 8: Different sickness in the population of Sudano-sahel region.

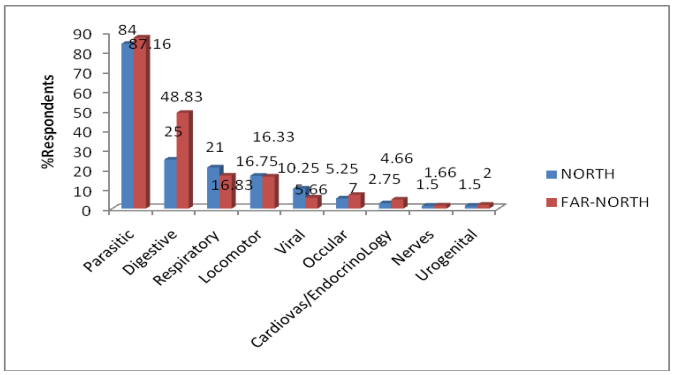

Fig. 9: Different sickness from North and Far-North in the Family.

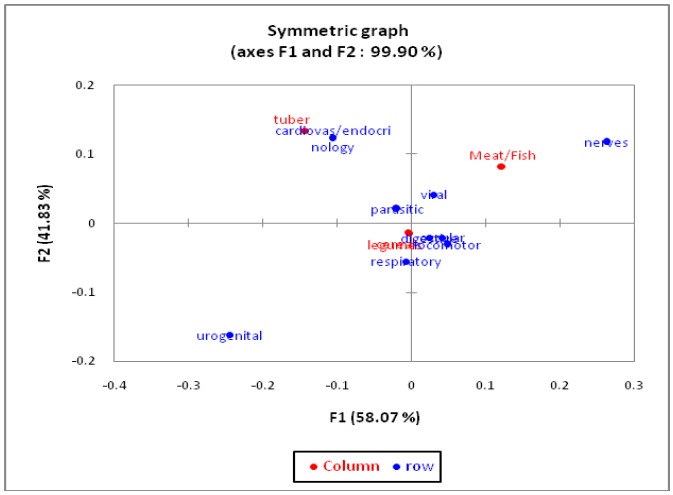

Fig. 10: The relationship between food habits and sickness.

Discussion

In the North region, the cereals mostly consumed are rice, millet and maize, in increasing order of importance while in the Far North, fonio and wheat are mainly eaten in addition to the above mentioned. Maize is preferred to millet in the North region and vice versa in the Far North. This result is similar to that obtained by Ndjouenkeu et al. (2010) who found that people in the North have replaced the consumption of millet and/or sorghum by maize, as oppose to the Far-North where millet/sorghum are still more cherished than maize.

Millet and/or sorghum have been substituted with rice and wheat in urban areas in Senegal and most parts of the Sudano-sahel region of Africa (Broutin, 1999; Saartjen and Aertsen, 2013). This was shown particularly by Yaméogo et al., (2002) in Burkina Faso, where, in the urban areas, millet and/or sorghum have been replaced by the consumption of maize. This situation exists in the north region because of the all-round availability of maize in the markets in addition to its cheapness when compared to millet and possibilities of production in larger quantities for export.

Tubers are less consumed than the cereals, with the most consumed being sweet potatoes, yams, cassava, taro, and plantain in the North and Far-North regions. The difference may be due to the fact that the soil and climate types favour the cultivation of cereals, which have become the staple food in the region. This has also led to so much familiarity with these staples, with tubers being used in a lesser extent (Ndjouenkeu et al., 2010). There is no significant difference between the feeding habits of people living in urban zones and those in rural zones. The same result was reported by Oniong et al. (2003) who reported that food habits and dietary patterns are often related to the ecological zone within which people live.

Meat and/or fish are less consumed in this region for people of this region are familiar with the use of cowpeas (*Vigna unguiculanta*), and legumes in their soups (Raimond, 2005); this is so because *bush meat* has become a rare commodity in this zone and breeding of animals is not for household consumption but for commercial purposes (Froment, 2005). This therefore shows the low level consumption of proteins foods in this region.

Vegetables as in the case of cereals, are consumed almost every day because these are always available, even in

non-harvesting seasons since they are dried for use at such periods. No difference was observed between the intake of these products (meat and/or fish, cereals, legumes and tubers) between female and male. Most participants in the study were farmers, who live on what they cultivate and especially because meat is only eaten occasionally.

The study showed that few persons are overweight and obese with no differences observed between gender and BMI. The low percentage obtained can be due to the low fat and protein intake of the people, their physical activity levels and to their genetic constitution. A difference in BMI was however recorded between people in urban and rural areas with people in the urban areas generally fatter. Fouda et al. (2012) found the prevalence of obesity (23.4%) among people with 'white collar jobs' in Douala, one of the biggest towns in Cameroon. In Burkina Faso 13% of the women in urban zones were recorded as obese (Savy et al. (2007). In Nigeria, the prevalence of overweight/obesity ranges from 10.5% in Yobe to 50.2% in Lagos (Ngianga-Bakwin et al, 2014); in this study women of older age groups, with higher educational level and wealth index, and living in urban settings were associated with a higher prevalence of combined overweight and obesity. A good explanation for this would be the consumption of higher amounts of fats and sugars, with less fiber in their meals, in addition to physical inactivity and sedentary lifestyles (Vorster et al., 2005). The role of cultural factors in this transition cannot be disregarded because in developing societies 'fatness' has often been considered as a symbol of beauty and social standing, particularly among women (Brown and Konner, 1987).

The results obtained in the investigation of prevalent of diseases in the population of Sudano-sahel region show that there is no difference between the sickness of people from North and those of Far-North. This can be due to the climate which is almost the same in both regions. Parasitic infections like malaria that leads to anemia in the long run and the digestive disorders are predominant. Malaria affects almost 247million people in Africa (WHO, 2008). In Cameroon the prevalence is 71% in high transmission zones (WHO, 2012), lower than the 85.9% obtained in this study. This high prevalence could be attributed to the limited awareness as concerns malaria prevention, limited education, socio-economic status and carelessness. Diseases of the digestive tract can be attributed to many causes, for example, in Africa dietary causes play a role in the etiology of duodenal ulcers. It has been suggested that spices mainly pepper play an important role in the development of duodenal ulcers; there is also stress and genetic pre-disposition which are not negligible factors in the incidence of duodenal gastritis (Galint, 1998; Woolston, 2014). The result obtained through the prevalence of sickness among sex and age groups show that both men and women are exposed to these pathologies. The absence of a relationship between the food habits and the sickness of the people for the Sudano-sahel region may be due to the fact that the survey was transversal and not analytic with case-control.

Conclusion

In the Sudano-sahel region of Cameroon, the most consumed foods are cereals (99.6%) and vegetables (99.2%), meat and/or fish (17.8%) and tubers (0.3%) are less consumed; milk is rare in the meals of the people. There is a difference in the amount and frequency of cereal consumed between people from the North and Far-North regions. In households of the North there is a higher consumption of maize as compared to the Far-North where millet/sorghum is preferred to maize. The study showed that about 16.9% of the population is overweight and 5.8% obese. Parasitic (85.9%) and the digestive tract (39.3%) sicknesses are predominating in this region. No link was observed between food habits and types of sicknesses of the people. Another study must be done to evaluate those people with the case-control in this work and the aspect that needs to be addressed is the training of health professional, in which public health aspects of the prevention and care for non-communicable chronic diseases need to be incorporated.

Conflict of interest statement

Authors declare that they have no conflict of interest.

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