



PREVALENCE OF EXCESS BODY WEIGHT AND ASSOCIATED RISK FACTORS AMONG ADULTS IN YAOUNDE, CAMEROON.

Marianne Patricia Ntsama*¹, Christine Sarah Minka² and Anne Christine Ndzana¹

¹Centre for Food and Nutrition Research, Institute of Medical Research and Medicinal Plants Studies, (IMPM), P O Box 6163 Yaounde, Cameroon.

²Centre of Medical research, Institute of Medical Research and Medicinal Plants Studies (IMPM), P.O. Box, 6163 Yaounde, Cameroon.

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*Corresponding Author

Marianne Patricia Ntsama

Centre for Food and
Nutrition Research, Institute
of Medical Research and
Medicinal Plants Studies,
(IMPM), P O Box 6163
Yaounde, Cameroon.

ABSTRACT

Background: Excess body weight is a very serious global epidemic. It constitutes a major public health issue in the world on developed, emerging and under-developed countries. Obesity and overweight trends are especially alarming in adults. If correctives measures are not put in, this epidemic will considerably increase morbidity at a global level. **Objective:** In Cameroon, very few data on the excess body weight are available hence this study aim to evaluate the importance of obesity, overweight and the factors that are associated with it among adult population in the city of Yaounde. **Methods:** The cross-sectional, descriptive and analytic study was conducted on 244 adults recruited from January to June 2011 in the capital city of Yaounde. Anthropometric and arterial blood pressure measurements were taken

and well-structured questionnaire was used to collect socio demographic characteristics, food habits and practice of physical activity. The data collected was entered and analysed using Epi info software. Multivariate logistic regression analysis was used to identify factors associated with excess body weight in Yaounde's population. **Results:** Out of the 244 subjects included in the analysis, 112 (45.9%) subjects were male and 132 (54.1%) subjects were female with sex ratio male/ female of 0.85. The mean age was 43 years, the prevalence of the obesity was 32.4% (IC95%: 26.5% - 38.6%). The prevalence of overweight was 43% with an overall prevalence of excess body weight 75.4% (IC 95%: 69.5% - 80.7%). **Conclusion:** The prevalence of excess body weight was high in the studied population of

Yaounde. Excess body weight was closely associated to gender, age, physical activity and hypertension after other variables are control.

KEY WORDS: Obesity, overweight, excess body weight, adults, Yaounde.

INTRODUCTION

Excess body weight is a very serious global epidemic. Due to the rapid increase in the number of overweight and obese individuals over the past several decades, it is often referred as a “pandemic”, indeed 1.1 billion worldwide adults and 10% of children are overweight or obese^[1]. It constitutes a global public health challenge even so in developing countries. Overweight and obesity are the fifth risk factor of mortality worldwide. At least 2.8 million adults die from its causes every year. In addition, 44% of the burden of the diabetes, 23% of the burden of the ischemic heart disease and 7% to 41% of the burden of some cancers are attributable to overweight and obesity^[2].

According to the global estimates of the WHO on obesity, 1 billion adults are overweight and more than 300 millions are obese. At least, 2.6 million persons die every year due to overweight or obesity^[3]. In Cameroon, there is paucity of studies conducted on excess body weight in general population. However, a survey carried out by Etoundi Ngoa and al, give a prevalence of obesity of 33% among women of the village of Foto in the West region of Cameroon^[4]. Another survey conducted by Bita Fouda and al, revealed a prevalence of obesity of 23.4% among workers based in Douala in the Littoral region of Cameroon^[5].

Problem once reserved mainly to developed countries; obesity now exists in all types of societies from third world to developed countries. In effect, obesity is no longer considered as an illness of those of high socioeconomic status^[6]. In every developing country, the burden of obesity tends to transpose to the low socio-economic status groups as the gross national product of the country increases^[7].

The socioeconomic conditions that prevail in Africa in general and Cameroon in particular do not encourage the adoption of healthy hygieno-dietetics behaviors. In effect, Cameroonians have a tendency for diet rich in fat, low in fruits and vegetables. The increasing urbanization and the modes of production that stretch toward the western model will result in a change in the life style: non balanced meals, stress, reduction of the physical activity due to more sedentary professional activities and the use of motorized modes of transportation^[8].

The consequences of obesity and overweight on the health of the populations are important to a point where the world health organization (WHO) talks of a real epidemic in the developed countries. The obesity is on the increase in lower middle-income countries and the evolution is faster in these countries^[9].

In Cameroon, the excess body weight is commonly considered as a sign of good standard of living and an indicator of a high socio-economic status. The reverse of this trend and the protection of future generations require the setting up of emergencies measures while taking into account the socio-economic and cultural factors of the excess body weight.

To do this, surveys and studies are necessary to better understand the lifestyle of our populations and finally, to conduct a massive sensitization campaign of the populations about the risks factors that are associated with excess body weight. The objective of the present study is to evaluate the importance of excess body weight among adults of age 18 years and above in Cameroon and its associated risk factors. Therefore we carried out in February to May 2011, an analytic study aiming to determine the prevalence of obesity and overweight and associated risks factors in adults populations of the capital city Yaoundé.

MATERIELS AND METHODS

Study Design

This was a transversal, descriptive and an analytical study.

Study Area and period

The study was conducted from February to May 2011 in Yaoundé, the administrative and political capital of Cameroon located in the Centre region of the country.

Study Population

Study population was selected among adults visiting a local Pharmacy situated in the heart of the city: “La Pharmacie Camerounaise”. The confidentiality of the data was assured throughout the study. Names of the participants were not collected. Informed written consent was obtained from each participant in the study. The protocol was approved by the ethics committee of the Institute of Medical Research and Medicinal Plants Studies (IMPM).

Sampling and sample size

It involved a non-probability sampling; notably a purposive sampling. All adults patients of 18 years and above were included in the study, except pregnant women, breastfeeding women and athletes.

The sample size was 244 patients. The sample size was calculated using the Schwartz formula

$$N = \frac{\varepsilon^2 \alpha p q}{i^2}$$

P = 26% proportion of adults presented symptoms of obesity in Cameroon in 2003

q = 1 - p = 74% proportion of adults did not present symptoms of obesity in Cameroon

$\varepsilon\alpha = 1.96$ is the value of standard deviation to reduce a risk of 5%

i = 6% is precision

$$N = (1.96^2 \times 0.26 \times 0.74) / 0.06^2 = 205$$

As estimated 10% non response rate of the sample size gave us N=225 people

Data collection

Using a structured questionnaire, participants were interviewed on socio-demographic characteristics, socioeconomic and family situation, nutrition lifestyle, physical activities, and anthropometric data of participants.

The anthropometric parameters (weight, Height), the systolic arterial pressure, the diastolic arterial pressure, the body mass index (BMI), the fat mass and lean mass indices were taken by the investigator with the help of a Keito K6 measurement device.

For these measures, the patient had to remove his/her jewelry, bracelets and shoes before climbing and standing up-right with the heels flat shape on the device. The measure of the arterial pressure was done with the help of an arm band available on the device, he investigated passes his/her left wrist in the armband after having gotten rid of his/her/its bracelets, watches and jewelry. For the measure of the fat mass, the candidate to firmly hold the Keito K6 hand-holders, the candidate age and gender were typed into the device by the investigator for automatic calculation of the fat mass. The printed data were reported in the questionnaire.

Overweight and obesity were defined using international body mass index (BMI) cut off points established for adults: overweight BMI of 25 - 29.9Kg/m² and obesity BMI \geq 30. All people overweight or obese were classified as excess body weight (BMI \geq 25).

Hypertension (High blood pressure) defined as repeatedly elevated blood pressure exceeding 140 over 90 mmHg: systolic pressure above 140 mmHg or a diastolic pressure above 90 mmHg.

Control and verification

The quality control of the data and parameters taken were achieved by randomly collected data from a participant using a classic weight balance scale and a tension meter. All the questionnaires were properly verified to make sure that data was correctly filled in.

Data analysis

The data entry was done with the help of Epi info software version 3.3.2; the abnormal data were double checked and corrected on every questionnaire. Data analyses were performed using Epi Info and SAS software. The calculation of frequencies enabled the description of variables categories. Chi-Square test was used to test for significant association between the proportions of two groups of variables. A p value < 0.05 was considered to be statistically significant. Excess body weight variable was created and defined by a BMI equal or more than 25. Univariate and multivariate analyses were also performed, with regard to multivariate analysis, only variables found to be associated to excess body weight with a p value ≤ 0.25 in univariate analyses were introduced in the logistical regression model.

RESULTS

Sample characteristics

Socio demographics characteristics

During the inclusion period, 244 eligible subjects agreed to take part in the study. The subjects were distributed into 112 (45.9%), males and 132 (54.1%) females with a male/female ratio of 0.85. The median age was 42 years with the minimum age of 19 years and the maximum of 77 years, the average of age was of 43 years (standard deviation= 12.56). The average number of people in the household was 6 (standard deviation = 3.53) and the median was 5. Concerning the marital status, 63.1% of subjects were married and 28.7% were unmarried, 2% had divorced and 6.1% were widows. Concerning the occupation, the junior administrative staffs were the more represented (33.6%), followed senior administrative staff (25.8%) and retired workers (11.1%). Majority of the subjects had university level of education (50.4%), followed by those that had secondary level (7.0%), followed by those that had primary level (42.2%) and lastly, those who had no formal education 0.4%.

Nutrition habits

With regard to nutrition habits of the included subjects, the average number of meals per day was 2 (standard deviation = 0.62). The results concerning the food habits were stratified according to gender and age due to the fact that nutrition habits often vary mostly with age and gender. The proportion of subjects consuming alcoholic drinks was significantly lower among females subjects ($P=0.0004$) and among the subjects that were less than 42 years ($P=0.015$). The proportion of subjects consuming sweet drinks didn't vary significantly with sex ($P = 0.055$), this proportion was significantly associated with subjects of age more than 42 years ($P = 0.00004$). The proportion of subjects consuming tobacco was significantly lower among female sex ($P=0.006$), this proportion was not significantly associated with age ($P=0.44$). The proportion of subject eating between meals was significantly higher among the female subjects ($P = 0.048$) and among subjects of less than 42 years ($P = 0.016$) as shown in the table 1:

Table 1: Distribution of the subjects according to their food habits and gender N = 244

Characteristics	Males	Females	P
Consumption of sweet drinks			0.055
Yes	78	106	
No	34	26	
Consumption of tobacco			0.006
Yes	12	3	
No	100	129	
Chewing			0.048
Yes	70	98	
No	42	34	
Total	112	132	

Table 2 shows the distribution of subjects according to their group age and the consumption of alcoholic drinks, sweet drinks, tobacco and chewing.

Table 2: The distribution of subjects according to their feeding habits and age

Variables	< 42 years	≥42 years	P
Consumption of sweet drinks			0.00004
Yes	107	77	
No	14	46	
Consumption of alcoholic drinks			0.015
Yes	50	70	
No	71	53	
Consumption of tobacco			0.44
Yes	6	9	
No	115	114	
Chewing			
Yes	92	76	0.016
No	29	47	
Total	112	132	

Physical activity

Among the 244 recruited participants, 142 (58.2%) practiced physical activities and 102 (41.8%) did not. Majority of the subjects that were practicing their physical activities 93 (65.2%) did sport at least two times per week. Out of the 244 recruited subjects, majority 174 (71.3%) had a sedentary lifestyle at work. The table 3 shows the characteristics associated with the practicing of physical activities among recruited subjects.

Table 3: Characteristics associated with physical activity N=244

Variables	Frequency	Percentage %
Physical activity		
Yes	142	58.2
No	102	41.8
Sedentary work		
Yes	174	71.3
No	70	28.7
Sport frequency		
< 2	49	34.5
>=2	93	65.5

Arterial hypertension

Out of the 244 subjects, 88 (36.1%) had the arterial hypertension and 156 (63.9%) did not have. There was statistically significant difference between hypertension and subjects of age 42years and above whereas there was no significant difference between hypertension and gender ($p < 0.10$).

Table 4: Distribution of subjects according to arterial hypertension, age and gender N=244.

	Arterial hypertension		Total
	yes	No	
Age			
< 42 years	19	102	121
>= 42 years	69	54	123
Total	88	156	244
gender			
Female	44	68	112
Male	44	88	132
Total	88	156	244

Prevalence of the overweight and the obesity

Among the 244 subjects included in the study 79 subjects were obese with a prevalence of 32.4% (95% CI: 26.5% - 38.6%). 105 subjects were in overweight with a prevalence of 43.0% (95% CI: 36.7% - 49.5%). 58 subjects had a normal weight with a prevalence of 23.8% (95% CI: 18.6% - 29.6%) and 2 subjects had insufficient weight with a prevalence of 0.8% (95% CI: 0.1% - 2.9%). Among the 244 subjects 184 subjects have a BMI ≥ 25 , the prevalence of excess body weight was 75,4%. See figure 1: Distribution of subjects according to the weight N=244.

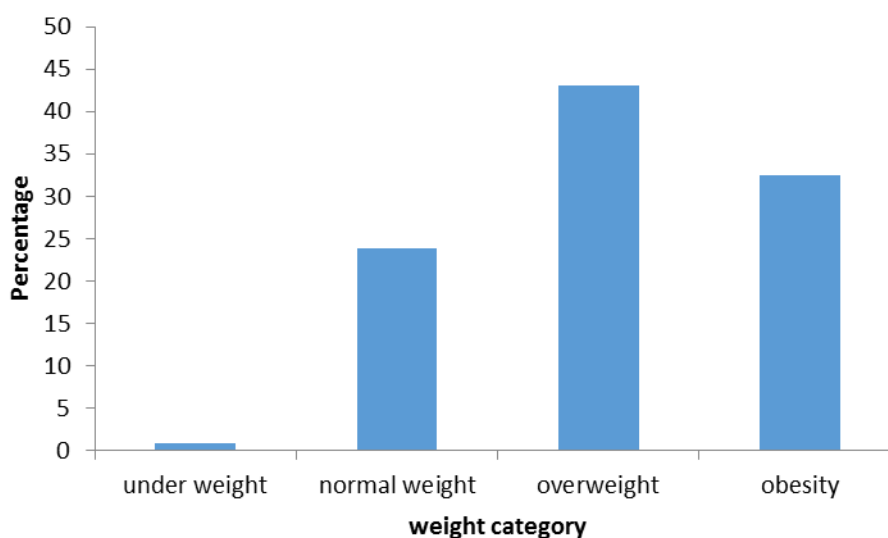


Figure 1: Distribution of subjects according to the weight N=244.

Associated factors with excess body weight in univariate analysis

In univariate analysis three variables were statistically associated with excess body weight ($p < 0.05$), it included particularly the gender, the number of people in the household and the arterial hypertension. The study showed that women had two times higher risk of having excess body weight than men (OR = 2.13), it also revealed that when the number of people in the household increases the risk of having excess body weight also increases (OR = 1.11), the proportion of hypertensive patients was 3 times higher in subjects with excess body weight ($p = 0.001$ and OR = 3.2). The table below shows the variables associated or not associated to the excess body weight.

Table 5: Associated factors to the excess body weight in univariate analysis N=244

Variables	Frequency N	excess body weight N (%)	OR	95% CI	P value
Sex					
Men	112	76 (31.15)	1		
Women	132	108 (44.26)	2,13	1.18 – 3.90	0.01
Age			1.02	0.99 – 1.04	0.09
Number of people in the household			1.11	1.01 – 1.23	0.035
Consumption of sweet drinks					
Yes	184	137 (56.15)	1		
No	60	47 (19.26)	0.8	0.40 – 1.62	0.54
Consumption of alcohol drinks					
Yes	120	85 (34.84)	1		
No	124	99 (40.57)	0.61	0.34 – 1.11	0.10
Consumption of alcohol					
Yes	15	10 (4.10)	1		
No	229	174 (71.31)	0.63	0.21 – 1.93	0.42
Chewing					
Yes	168	127 (52.05)	1		
No	76	57 (23.36)	1.03	0.55 – 1.93	0.92
Physical activity					
Yes	142	112 (45.90)	1		
No	102	72 (29.51)	1.55	0.86 – 2.79	0.13
Sedentary work					
Yes	174	129(52.87)	0.78		
No	70	55 (22.54)	1	0.4 – 1.51	0.47
Sport frequency					
<2	49	36 (25.35)	1		
>=2	93	76 (53.52)	1.61	0.71 – 3.68	0.26
Hypertension					
Yes	88	77 (31.56)	1		
No	156	107 (43.85)	3.20	1.56 -6.56	0.001
Number of meal /day					
1					0.59
2	21	15 (6.15)	1		
3	125	96 (39.34)	1.32	0.47 – 3.72	
	98	73 (29.92)	1.16	0.41 – 3.23	
Meal distribution					
Yes	104	74 (30.3)	1		
No	140	110 (45.08)	0.67	0.37 – 1.21	0.18

Associated factors with excess body weight in multivariate analysis

Only explanatory variables which had at least a p-value ≤ 0.25 were considered for inclusion into the model after adjustment. These variables include age, gender, hypertension and physical activity which were significantly associated with overweight. The table 6 below shows the results of the multivariate analysis of the subjects included in the study.

Table 6: Factors associated with excess body weight in multivariate analysis N=244.

Variables	Adjusted OR	95% IC	P
Age (group)	3.53	1.3 – 9.55	0.013
Gender	2.96	1.44 – 6.07	0.003
Number f people in the household	1.08	0.96 – 1.21	0.19
Consumption of alcoholic drinks	0.56	0.28 – 1.11	0.09
Physical activity	2.57	1.27 – 5.18	0.008
Hypertension	4.39	1.77 – 10.87	0.001
Distribution of meals	0.82	0.43 – 1.56	0.55

DISCUSSION

This study whose objective was to determine the prevalence of excess body weight and its risk factors associated among adults in the city of Yaounde has revealed a high prevalence of obesity (32.4%), the prevalence of overweight was 43% and prevalence of excess body weight was 75,4%. This study revealed that excess body weight was associated with age, gender, physical inactivity and hypertension in multivariate analysis.

The prevalence of 32.4% observed in our study is comparable with that found in the study CamBod conducted in 2003 on adult populations of Cameroon living in urban areas in the cities of Yaounde (Central region), Douala (Littoral), Garoua (North region) and Bamenda (Northwest region) where the overall prevalence of obesity was 30%^[10]. A study conducted by Mbanya et al.^[11] on the adult population living in Douala in 2003 revealed the prevalence rate of 28.6%. More lower Prevalence rate of 23.4% have been observed among workers in a study conducted by Bita and al.^[4] carried out in the city of Douala in 2010, and in another study conducted by Pasquet in the city of Yaounde in 2002^[12].

Almost half of the population was overweight 43%, this prevalence is comparable to that observed in most of the studies conducted by Kiawi et al.^[13]. This high prevalence of overweight in the study population is an indicator of the magnitude of the problem because these overweight subjects can easily become obese. These high prevalence rates support the WHO estimates. Thus, despite the high prevalence of malnutrition in Africa, the prevalence

of overweight is increasing alarmingly and it is estimated that 25% to 60% of women living in urban areas are overweight or obese^[14].

The strong prevalence observed may be explained by changes in lifestyle modes. Yaounde population feeds more in local fast-food or street cantines so called *Gargotte* which are conveniently located around administrative buildings and in most popular squares. The nutritional quality of these foods is not always at its best, they are generally too fat and high in carbohydrates. A typical breakfast menu will consist of donuts, bread, red beans cooked in palm oil, and corn flour "pap". For lunch, food prepared from groundnut accompanied by fried plantains, rice or cassava sticks all served with local beers or soft drinks.

In our study, the prevalence of obesity was higher among women than among men. In effect, 45% of women were obese against 17% of men. The overall prevalence of obesity among men was 7.8% and among women it was 24.6%. This predominance obesity among women has been published by several authors. According to a study conducted by Cambod^[9], the prevalence of obesity was 6.5% for men and 19.5% among women. In another the study carried out by Pasquet^[12] the prevalence of obesity was 5.4% for men and 17.1% among women. Similarly, another study by Leopold Fezeu and al^[15] revealed 7.5% for men and 21.2% among women, in this same study the BMI was higher among women than among men in urban areas in Cameroon and lowest among women than among men in France. In Uganda, Baalwa et al. reported a higher rate in women^[16]. Pouane et al. have also noted a high prevalence in their study conducted in South Africa where 9.2% of men and 42% of women were obese^[17].

The prevalence of obesity and overweight among women can be explained by the fact that in urban areas in Cameroon women are more sedentary at work where they are often secretaries, cashiers, attendants or vendors in the market where they are seated throughout the day. The men on the contrary are moving more at work, they are often of businessmen, courier's drivers, engineers, technicians, or street vendors.

In Cameroon, the culture of "housewife" is still predominant, the woman must therefore remain at home to take care of children, and this is more frequent in urban areas as compared to rural areas where women are more physically active in the fields farming, in the search of water or fire-wood for cooking.

This dominance can also be explained by the fact that the nutrition habits of men and women differ. In our study, the consumption of sugary drinks and chewing/nibbling was significantly higher among women. In our sample we found that very few people admitted to consume fruits between meals, the trends are rather for foods high in sugars, and fat content such as caramelized groundnuts, fried plantains (chip's), the donuts (made with flour and sugar), sandwiches with eggs, mayonnaise sauce and canned sardines in oil.

In our study, the prevalence of obesity and overweight increases between the age of 19 - 28 years and 29 - 38 years and then, we noted a certain stability between 39 to 58 years, after 59 years the prevalence of obesity decreases. In Pasquet's study, we also noted an increase in BMI with age. The same trend has been observed in a study conducted by Cambod where an increase has been noted between 15 and 44 years in the two sexes.

As regards the level socio economic, we observed no significant association between property owned and the excess body weight and between the level of education and the excess body weight in univariate and multivariate analysis. Opposing results have been observed in Tanzania where the BMI was associated with the level of education^[18]. The same in the study conducted Cambod, the socio-economic status was associated with the overweight after adjustment of all other confounding factors. Other studies in developing countries have shown that the BMI was inversely proportional to all socio-economic indicators^[19].

Sedentary at work and during free time was assessed, without taking into account the age, most of the participants were sedentary at their office (71.3%) and nearly 42% of them were inactive during free time. This is explained by the fact that in urban areas it is difficult to find free time for physical activity as people are busy with urban life reality (business related matters, time spent commuting from one place to the other etc). Data from our study showed that 79.6% of participants were sedentary at work and more than 91.5% of participants were inactive during free time^[19]. Other studies conducted in Africa have shown an association between the inactivity and excess body weight for instance a study conducted by Kruger et al in South Africa^[20].

The present study revealed that excess body weight was associated with hypertension in univariate analysis and after adjustment with other variables. The prevalence of hypertension was 36.1%, the prevalence was equal for men and women (18.05%). Cooper et al^[21] have

noted a prevalence of 19.1% among Cameroonians adults of 25 years and above based on a single measurement in 1994. In 1998, Mbanya et al^[22] have revealed a prevalence rate of 28.5%, with 16.4% among men and 12.1% among women based on the WHO criteria (160/95mmHg). In 2003, the prevalence was 24.6% according to a study carried out by Cambod. In a study conducted by Kengne et al^[23], the prevalence was 20.8 among the population of Douala. The high prevalence of our study is similar to that of the developing countries and can be explained by an increase of risk factors resulting from changes in life style, and feeding habit. Hypertension has become a major public health problem in developing where studies foresee 80% prevalence of hypertensive patients by 2025^[24].

CONCLUSION

Excess body weight is a public health problem among adults in the city of Yaounde with women being most affected group. Cameroon has not been spared by this epidemic whose magnitude is often under-estimated. Excess body weight was associated with age, gender, physical activity and the hypertension. Overweight and obesity, as well as the diseases associated with them are largely preventable. The prevention of excess body weight in adults must therefore be given a high priority in order to reduce the incidence of this phenomenon and thus reducing cardiovascular pathologies associated with the paralysis of many individuals.

It is therefore necessary to include the prevention of obesity and overweight among the issues of major public health in our country, to improve access to a reliable information on the determinants and consequences of obesity to all social classes of this country, to put in place information campaigns to local populations in order to break all Socio-cultural considerations associated with excess body weight in our country and to allow all healthier choices area of diet and physical activities.

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