Overweight and Diet In Adolescents: Study in Private Schools in Pointe-Noire (Congo)

Guenole GUIE$^{1, 2}$, Etienne MOKONDJIMOBE$^{1, 2}$, Reine Freudlendrich EBOKA-LOUMINGOU SAKOU$^{1, 2}$, Benjamin LONGO-BENZA$^{3}$, *Zacharie MBOUNGOU$^{1}$, Donald NZAMBI MIKOULOU$^{5}$, Doctromée MBOUNGOU$^{1}$, Martin DIATEWA$^{1}$, François MBEMBA$^{1}$

$^{1}$Partners of Nutrition, health, and human movement; ISEPS, P.O. Box: 69, University Marien NGOUABI, Congo-Brazzaville;
$^{2}$National Laboratory of public health, P.O. Box: 120, Congo-Brazzaville;
$^{3}$Faculty of Health Sciences, Walter Sisulu University, Mthatha, South Africa
$^{4}$Multidisciplinary Team Research Food and Nutrition IRD Center (Institute of Research for the Development) P.O. Box 1286 Pointe-Noire, Congo.
$^{5}$Département des Langues et Littératures, Ecole Normale Supérieure, P.O. Box: 69 Université Marien NGOUABI.

Abstract: Determine a possible relationship between food usually consumed by obese adolescents and risk withatherogenic. In adults as in children, obesity is defined as an excess of body fat (adipose tissue) having harmful consequences on the physical and mental health. It is mainly explained by a prolonged positive energy balance: increased energy intake and decreased expenditures. Its prevention is a public health problem in developed countries. This disease interested in more developing countries. It’s as well as a cross-sectional study of 96 obese adolescents, including 50 girls and 46 boys is a sex ratio of 0.92 was conducted in Pointe-Noire, to study their eating habits and their risk atherogenique. The survey showed a high consumption of saturated fatty acid-rich fat, a large consumption of sugar, and sweet foods, low consumption of fruits and vegetables, foods high in vitamins and micronutrients. The lipid profile is characterized by an increase in the total cholesterol and LDL fraction and so an increase in the atherogeniques index: TC/HDL, LDL/HDL. These results suggest that obese adolescents in Pointe-Noire would appear to be more exposed to the risk of cardiovascular disease.

Key words: obesity, diet, atherosclerosis, Pointe-Noire, Congo

1. Introduction

Obesity has become the first non-infectious disease in the history of humanity. It is defined as an accumulation of abnormal or excessive body fat, often the result of an imbalance between the report daily calorie and energy costs [1]. The phenomenon described as pandemic (WHO, 2003), affects all age groups and is a growing threat to health, not only in industrialized countries, but also in countries with a higher prevalence in urban areas developing in rural areas [1, 2, 3].

Childhood overweight and obesity often persist into adulthood and are then accompanied by risk (pathologies joint, cardiovascular, metabolic, cancer cells...) morbidity and mortality in subjects who were overweight in adolescence, even among those who will join a normal weight at age adult [4]. The excess weight of children and adolescents have negative effects on health in the short and term: increase in blood pressure, decrease in tolerance glucose, increase in blood lipids and orthopaedic pathologies. In addition, obese adolescents have a greater risk to remain obese into adulthood with morbid consequences long term: high blood pressure, heart disease...

Adolescence is a sensitive transition period where the life choices that are emerging will influence health in adulthood. She so deserves special attention in a policy of prevention of health risks associated with obesity, although the effectiveness of these ages remains low. There is no study no recent epidemiological studies on the nutritional status of adolescents in Congo (Brazzaville).

A study of this particular age group is indispensable. Determine a possible relationship between food usually consumed by obese adolescents and risk of cardiovascular disease.

2 Material and methods

It is a study cross-sectional case-control which took place from February to may of the year 2015 in the colleges of Ouesso, in the Department of the sangha
in the Republic of the Congo and the National Laboratory of public health in Brazzaville.

2.1 Patients

Of 96 obese teenagers who have been the subject of this study, 46 (48%) were male and 50 (52%) of the female sex is a sex ratio of 0.92. The average age was 14.4 ± 2.1 years, the extremes being from 11 to 17 years old. The control group, which consisted of 51 adolescents whose 23 (45%) sex male and 28 female (55%) is a sex ratio of 0.82 with as extreme 11 and 17 years.

2.2 Inclusion criteria

Were selected: any elderly from 11 to 17 years, after the extent of reported BMI has its age on the curve of the body types, are located on the underside of the 97th percentile in the case of the control population. All older people 11 to 17, after reported BMI measurement has his age on the curve of body types, located above the 97th percentile in the case of the study subjects.

2.3 criteria for no inclusion

Were excluded from this study, individuals with hyperthyroidism, pregnancy, smoking cigarette, taking alcohol, oral contraceptives or other drugs that could interfere with the metabolism of lipids.

2.4 Food survey

School leaders were informed at least one week before the course of the investigation within their structure. The first day of the inquiry at the level of a school was, the day of the identification of obese students, the explanation of the purpose of our survey, its importance to their health, the discount card investigation, the plug that has a long range of foods which they should check the food eaten for 24 hours. The second day, was the removal of the cards and handing new sheets. The measure of weight, size for the calculation of muscle mass index (BMI), blood collection. The third day withdrawal survey sheets and presented for the third time new sheets, measure the weight and size, blood tests for those who don't have not been the day before. The fourth day, withdrawal of survey sheets.

During this investigation, as for obese subjects, we realized in parallel blood samples of non-obese adolescents (population witnesses) for the determination of lipid biomarkers. Unlike the obese subjects, control population which has not been respondent on feeding.

2.5 Treatment of samples

Blood samples, taken by venipuncture, the morning on an empty stomach at school, have been placed in haemolysis tubes. Blood samples were centrifuged at 3000 rounds per minute for 10 minutes. Obtained plasmas have been left in a 1.5 ml cryovials then frozen to a temperature of-20 ° C for 7 days maximum.

2.6 Determinations of lipid biomarkers

The dosages of total cholesterol (TC), cholesterol related to lipoprotein of high-density (HDL - C), triglycerides (TG) were made through the enzymatic methods color laboratories CYPRESS DIAGNOSIS using a spectrophotometer type Bio Chemistry analyzer "RX - 50V. Related to the low density lipoprotein (LDL) cholesterol levels were calculated by the Fried Wald formula: LDL - C = CT-(TG/5 + C - HDL) atherogenicite index has been defined by reports TC/HDL and LDL/HDL.

2.7 Statistical processing

Results of the bios lipid markers and lipoproteiques were expressed on average, accompanied by one standard deviation. The Student's t test was used for the analysis of the results with a significance for p<0.05.

3. Résultats

<table>
<thead>
<tr>
<th>No.</th>
<th>Aliments</th>
<th>1er Jour (%)</th>
<th>2ème Jour (%)</th>
<th>3ème Jour (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Huile de palme</td>
<td>30 (31.25)</td>
<td>21 (2.87)</td>
<td>49 (51.04)</td>
</tr>
<tr>
<td>2</td>
<td>Huile d’arachide</td>
<td>58 (60.41)</td>
<td>81 (84.37)</td>
<td>36 (37.50)</td>
</tr>
<tr>
<td>3</td>
<td>Margarine</td>
<td>39 (40.62)</td>
<td>44 (4.83)</td>
<td>23 (23.95)</td>
</tr>
<tr>
<td>4</td>
<td>Beurre</td>
<td>58 (60.41)</td>
<td>56 (58.33)</td>
<td>60 (62.50)</td>
</tr>
<tr>
<td>5</td>
<td>Mouambe</td>
<td>16 (16.66)</td>
<td>13 (13.54)</td>
<td>15 (15.62)</td>
</tr>
<tr>
<td>6</td>
<td>Pate d’arachide</td>
<td>28 (29.16)</td>
<td>31 (32.29)</td>
<td>32 (33.33)</td>
</tr>
</tbody>
</table>

This table shows a large consumption of energy supplement foods rich in fat, for example butter is consumed more than 50% the three days of the investigation.

Protection foods rich in micronutrients (table 2)

<table>
<thead>
<tr>
<th>No.</th>
<th>Food</th>
<th>1st day (%)</th>
<th>2nd day (%)</th>
<th>3rd day (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lemon</td>
<td>03 (03.12)</td>
<td>01 (01.04)</td>
<td>04 (04.16)</td>
</tr>
</tbody>
</table>
This table shows a low consumption of micronutrient-rich foods for protection. None of these foods has reached 50% for the three days.

### Plasma values of lipid biomarkers studied (table 3)

<table>
<thead>
<tr>
<th>Order no</th>
<th>Population</th>
<th>CT (g/l)</th>
<th>TG (g/l)</th>
<th>C-HDL (g/l)</th>
<th>C-LDL (g/l)</th>
<th>CT/HDL</th>
<th>LDL /HD L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Witnesses</td>
<td>1,99 (±0, 14)</td>
<td>1,09 (±0,15)</td>
<td>0,54 (±0,27)</td>
<td>1,14 (±0,23)</td>
<td>3,68 (±0,71)</td>
<td>2,11 (±0,60)</td>
</tr>
<tr>
<td>2</td>
<td>Obese</td>
<td>2,30 (±0, 48)</td>
<td>1,24 (±0,39)</td>
<td>0,47 (±0,17)</td>
<td>1,58 (±0,34)</td>
<td>4,89 (±0,84)</td>
<td>3,36 (±0,60)</td>
</tr>
</tbody>
</table>

**Legend** = CT: Cholesterol; TG: Triglycerides; HDL: High Density Lipoprotein; LDL: Low-Density Lipoprotein

This table shows an increase in total cholesterol, triglycerides, and the cholesterol-LDL in obese subjects. This increase is significant with p = 0.02 p = 0.04 p = 0.01 respectively for bio mentioned Jesus plasma markers. A significant decline in HDL-cholesterol (p = 0.04) is the difference of the atherogeniques index is significant between witnesses and the obese; p = 0.002 for TC/HDL and p = 0.005 for LDL HDL.

### Discussion

The results of our food survey and the dosage of lipid biomarkers and lipoproteiques showed: A high consumption of fats rich in saturated fatty acid (fatty meat, milk, pastry). Other authors have found similar results [1].

A large consumption of sugar, and usually sugar-containing foods. This situation is therefore as likely to promote the weight gain and its consequences. A low consumption of fruits and vegetables, foods high in vitamins and micronutrients. The dosage of the lipid parameters in showed an increase in the total cholesterol and LDL fraction. This increase in our subjects could be caused by a significant consumption of food rich in saturated fatty acids.

As the most favorable lipid profile is obtained by the partial replacement of fatty acids saturated by unsaturated fatty acids (sunflower oil, corn, glitch of grapes, colza oil, coconut, soy, meat, eggs...) without reducing the total lipid intake [5]. A significant reduction in lipid contributions is often not accept a low complacently and can be poorly followed [6]. Indeed, a reduction in LDL cholesterol in moderate cholesterol subjects is obtained by replacing the fat rich in fatty acids saturated by unsaturated fatty acids rich margarine consumption.

Our results showed an increase in cholesterol ratio total cholesterol HDL and cholesterol-LDL cholesterol HDL these reports report are indices of atherogeneite which are the effects of dietary fat on the risk of atherosclerosis. The risk of atherosclerosis depends on the composition in acids fat and the amount consumed on a daily basis [1]. Many epidemiological studies and intervention, including those carried out by (Mensink et al, 2003; Wahrburg, 2004) have shown that saturated fatty acids and unsaturated fatty acids mono and poly did not have the same effect on total cholesterol and HDL cholesterol and LDL cholesterol [7,8] fractions.
Excessive consumption of saturated fatty acids increases the cholesterol and cardiovascular risk. The acids lauric (C12), myristic (C14) and Palmitic (C16) are the most hypercholesterolemiants; they increase plasma LDL cholesterol by reducing the activity of LDL receptors [9]. 30% of the French for example are affected by an excess of cholesterol. When the 'bad' cholesterol (LDL) is in excess, it is gradually deposited on the walls of the arteries, causing cardiovascular disease [10].

5 References