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Overweight or Obesity: Serum Lipids in a University Population of Barranquilla Colombia

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Abstract- Introduction: According to the World Health Organization, overweight and obesity occur due to an abnormal or excessive accumulation of body fat that is harmful to health. During childhood and adolescence, risk factors such as dyslipidemia or obesity are detected, the maintenance of which in the adult stage has been verified, indicating that detection should be started as early as possible. It is necessary to carry out an anthropometric <- nutritional evaluation to detect a deficit or excess weight in time. A study on the topic of chronic non-communicable diseases in Colombia indicated that in 2014 more than 100,000 people died with ischemic and hemorrhagic cerebrovascular diseases (CVDs), cancer, DM and chronic obstructive pulmonary disease (COPD), by being able to carry out early detections that will allow adequate prevention of secondary complications. **Methodology:** An observational, descriptive, cross-sectional study was carried out with a population - sample of 36 university students of both sexes. After informed consent, those who met the inclusion criteria demanded by Bioimpedance included: weight, height, visceral fat, body fat, In addition to abdominal or waist circumference, hip and lipid profile: total cholesterol (CT), triglycerides (TG), HDLc, VLDLc. LDLc. **Results:** Overweight and obesity in the results of (BMI, Gf and FV)), found in young male and female sex with prevalence in the male sex group, and hyperlipidemias mainly in the female sex studied. **Conclusion:** High prevalence of CVD risk factors such as overweight, obesity, and hyperlipidemia in the female sex group.

Keywords: Obesity; Overweight; Anthropometric Assessment

I. Introduction

Currently, overweight and obesity problems appear from an early age and have a high prevalence in adults. Both constitute a serious public health problem mainly due to their association with the risks of developing various chronic diseases, some of which are among the leading causes of death in industrialized countries. According to the World Health Organization (WHO), overweight and obesity are conditions in which abnormal or excessive accumulation of body fat occurs [1,2].

Overweight is defined as excess fat or adipose tissue in relation to weight. Its prevalence has reached epidemic proportions in the Americas region. Considered by the World Health Organization as a Public Health problem, in which the prevalence has more than doubled in the last 35 years [2]. Globally, overweight and obesity are associated with a higher number of deaths than underweight. The Panorama of Food and Nutrition Security in Latin America and the Caribbean (2013), indicates that around 58% of the population is overweight and that obesity affects 23% in most countries of Latin America and the Caribbean, where Chile, Mexico, and the Bahamas lead with 63, 64 and 69% [3].

The Food and Agriculture Organization (FAO) considers that the fundamental cause of overweight and obesity is caused by an energy imbalance between calories consumed and expended; It can be produced by an increase in the intake of hypercaloric foods (high consumption of products with low nutritional value and high content of sugar, fat and salt), as well as a decrease in physical activity and sedentary lifestyles [4]. Global obesity rates of the child and adolescent population increased from less than 1% in 1975 to almost 6% in girls and close to 8% in boys in 2016. These figures show that, together, the number of individuals obese from 5 to 19 years old multiplied by 10 worldwide, going from 11 million in 1975 to 124 million in 2016 [5].

Changes in lifestyle and diet have increased the prevalence of cardiovascular mortality risk factors in an unprecedented way globally, to the extent that the United Nations has configured a strategy for the prevention of chronic diseases with the participation of the WHO and FAO [5,6].

Cardiovascular diseases (CVD) are a global public health problem; today they are the leading cause of disease and death in the Western world and will continue to advance in developing countries to overtake infectious diseases. Currently, and according to the World Heart Federation, these occupy the first place of morbidity and mortality in almost two-thirds of the world population [7]**.** Hypercholesterolemia contributes to 45% of heart attacks in Western Europe and 35% in central and Eastern Europe [8,9]. The risk of a heart attack is three times higher in cases of hypercholesterolemia compared to a normal lipid profile.

The economic and social cost for the individual, the family, and the society that generates obesity and the diseases that derive from it is very high. In Colombia, these values are unknown, but in industrialized countries such as the United States of America (USA) it is estimated that approximately 123 billion dollars were spent in 2001 to treat obesity and related problems [10,11]. The enormous costs for the treatment of this disease and associated pathologies could quickly overwhelm the weak economies of developing countries.

For the first time in human history, children could live fewer years than their parents, this is due to the early appearance of de- generative diseases associated with being overweight, obese adolescents can develop risk factors 30 years earlier than expected, which point to premature mortality or shorter life expectancy [12].

Given the high prevalence of overweight and obesity in Colombia, early detection, prevention, and treatment are necessary, since they are risk factors for type 2 diabetes mellitus, cardiovascular disease, fatty liver, joint degeneration, dyslipidemia, and various types of cancer. The study on the use of information and communication technologies, chronic non-communicable diseases in Colombia revealed that in 2014 more than 100,000 people died with ischemic and hemorrhagic cerebrovascular diseases (CVDs), cancer, DM, and chronic obstructive pulmonary disease (COPD). Like- wise, the number of new cases of these pathologies in the same year exceeded 500,000, which added to the more than 12,000,000 patients suffering from any of these diseases [13].

In Colombia, the prevalence of hypertriglyceridemia was 41.8%, hypercholesterolemia 46.0%, LDL cholesterol high 67.5% and dyslipidemia 74.7% associated with sex and age group [14,15]. Dyslipidemias constitute a serious current problem since it conditions an increase in mortality due to being a condition of cardiovascular diseases, even more so nowadays with the rise in the prevalence of overweight and obesity, smoking, alcoholism, as well as chronic de- generative diseases due to that being able to carry out early detections will allow adequate prevention of secondary complications [16].

Objective of the Study

The objective of our study was to evaluate the anthropometric- nutritional status and biochemical parameters in students of an Institution of Higher Education on the Atlantic Coast from Colombia.

II. Material and Methods

An observational, descriptive, cross-sectional study was carried out. With a population of 36 medical students from a University Institution on the Atlantic Coast. With the following inclusion criteria: women older than 18 and younger than 35, enrolled in the first academic period of 2019, apparently healthy, having signed the informed consent. Exclusion criteria: In gestation period, with chronic or acute diseases. Participation was on a voluntary basis. Participants were informed about the objectives, anthropometric assessment, laboratory tests, expected benefits, and possible risks of the study, thus obtaining informed consent from the university students. Personal data was obtained through a questionnaire- type instrument specially designed for the study; that same day the anthropometric - nutritional assessment and the extraction of venous blood for biochemical determinations will be carried out.

To know the Anthropometric - Nutritional Diagnosis of the study subjects, variables of weight, height, visceral fat, body fat, abdominal or waist circumference, hip, lipid profile were taken: Total cholesterol (CT), triglycerides (TG), HDLc, VLDLc, LDLc were cited in the morning, after a 12-hour fast, a 5 ml sample of venous blood will be taken, in which serum the total cholesterol (CT), HDL-Cholesterol, LDL-Cholesterol, and Triglycerides will be determined.

Lipid profile, according to the National and International Cholesterol Education Program, desirable cholesterol < 200 mg/dl, high limit, 200 - 239 mg/dl and elevated ≥ 240 mg/dl was considered. High-density lipoprotein cholesterol (HDL-C) was considered altered with figures ≤ 40 mg/dl. For low density lipoprotein cholesterol (LDL-C), 3 levels were established: desirable (< 100 mg/ dl), medium risk (100 - 129 mg/dl) and high risk (≥ 130 mg/dl). For serum triglycerides the following values were considered: desirable (<1 50 mg/dl), high limit (150 - 199 mg/dl), high (200 - 499 mg/dl) and very high (≥ 500 mg/dl) [17-19].

Weight (kg), height, and body fat percentage (% Gf) were deter- mined using the digital scale OMRON with the HBF-510LA bioelectrical impedance device at a frequency of 50 kHz, with electrodes on hands and feet. The size was taken on Tuesdays and Wednesdays, between July and August 2019. Equipment: Seca brand stadiometer was recorded in centimeters (cm, precision 1 mm), without shoes and standing [20]. All the measurements were performed ac- cording to the procedures and techniques described by Lohman., *et al*. [21], the subjects were evaluated without footwear, with a mini- mum of light clothing, standing in the center of the scale with the body and head upright facing forward and With their arms parallel to the floor (extended in front) holding the electrodes with both hands, they stood with their ankles, calves, buttocks, back and head touching the wall. The position of the head was consistent with the Frankfurt plane, and the measurement was made when inhaling air.

The BMI of the subjects was calculated from the division of the bodyweight (in kilograms) by the height (in meters) squared (kg/ mt2) [22] the waist circumference was measured with a metal tape with a precision of 1 mm at the point between the iliac crest and the subject's hip [23].

Bioimpedance, this is a very practical, fast, non-invasive and low-cost method; it also bases its measurement on the different resistance offered by both water and different body tissues to the passage of an electric current, allowing to establish the composition of the subjects, that is, body fat [24].

The following criteria will be used to classify the population ac- cording to their percentage of body fat [25].

Interpretation of the results of body fat percentage

For BMI, it will be obtained by dividing the weight by the squared height (BMI = Weight, kg/height, m2) and the population was stratified by BMI level according to the SEEDO 2016 consensus

Gender	Age	- (Low)	O (Normal)	+ (High)	++ (Very high)
Female	20-39	<21.0	21.0-32.9	33.0-38, 9	39.0
	40-59	<23.0	23.0-33.9	34.0-39.9	40.0
	60-79	<24.0	24.0-35.9	36.0-41.9	42.0
Male	20-39	<8.0	8.0-19.9	20.0-24.9	25.0
	40-59	<11.0	11.0-21.9	22.0-27.9	28.0
	60-79	<13.0	13.0-24.9	25.0-29.9	30.0

Table a: classification for the evaluation of overweight and obesity, establishing the following criteria:

BMI According to the SEEDO consensus classification (2016)	
Insufficient weight	Less than 18.5 kg/m^2
Normal weight	Between 18.5 to 24.9 kg/m^2
Grade I overweight	Between 25.0 to 26.9 kg/m^2
Grade II overweight (Pre-obesity)	Between 27.0 to 29.9 kg/m^2
Type I obesity	Between 30.0 to 34.9 kg/m^2
Type II obesity	Between 35.0 to 39.9 kg/m^2
Type III (morbid) obesity	Between 40.0 to 49.9 kg/m^2
Type IV (extreme) obesity	Equal to or greater than 50 kg/m^2

Table b: Source: BMI classification according to SEEDO [26].

Classification of the population according to visceral fat

Level of visceral fat visceral fat	Classification
≤ 9	0 (Normal)
10 – 14	+ (High)
≤ 15	++ (Very high)

Table c: Source: Classification of the population according to visceral fat [27].

The waist-hip index

These two measurements relate the waist circumference to that of the hip and depending on the result, it is established whether there is a cardiovascular risk or not. This is an indirect measure of the distribution of fat in the lower and upper regions of the body, and obesity in the upper region of the body (waist) "central adipose tissue", measured with this index is moderately related to the factors of risk of developing cardiovascular or metabolic diseases as we have already said. Young people with waist-hip ratios greater than 0.94 (men) and 0.82 (women) will have a higher risk of suffer- ing adverse health consequences [28].

The following formula was applied to find the waist-hip ratio:

$$WHR = \frac{WAIST}{HIP}$$

The WHO established a protocol in which it recommends measuring the waist circumference at the midpoint between the lower edge of the rib and the iliac crest and the hip circumference at the widest point on the greater trochanters, but instead the table that is still used to establish the risk of cardiovascular diseases.

Values waist/hip ratio according to cardiovascular risk [28]

		RISK			
	AGE	LOW	INTERMEDIATE	HIGH	VERY HIGH
MAN	20-29	<0,83	0,83-0,88	0,89-0,94	>0,94
	30-39	<0,84	0,84-0,91	0,92-0,96	>0,96
	40-49	<0,88	0,88-0,95	0,96-1	>1
	50-59	<0,9	0,9-0,96	0,97-1,02	>1,02
	60-69	<0,91	0,91-0,98	0,99-1,03	>1,03

		RISK			
	AGE	LOW	INTERMEDIATE	HIGH	VERY HIGH
WOMAN	20-29	<0,71	0,71-0,77	0,78-0,82	>0,82
	30-39	<0,72	0,72-0,78	0,79-0,84	>0,84
	40-49	<0,73	0,73-0,79	0,8-0,87	>0,87
	50-59	<0,74	0,74-0,81	0,82-0,88	>0,88
	60-69	<0,76	0,76-0,83	0,84-0,9	>0,9

Total cholesterol (CT), HDL-Cholesterol, LDL-Cholesterol, and Triglycerides were determined. The lipid profile, according to the National and International Cholesterol Education Program, was considered desirable cholesterol < 200 mg/dl, high limit, 200 - 239 mg/dl and elevated ≥ 240 mg/dl. High-density lipoprotein cholesterol (HDL-C) was considered altered with figures ≤ 40 mg/dl. For low density lipoprotein cholesterol (LDL-C), 3 levels were established: desirable (< 100 mg/dl), medium risk (100 - 129 mg/dl) and high risk (≥ 130 mg/dl). The following values were considered for serum triglycerides: desirable (< 150 mg/dl), high limit (150 - 199 mg/dl), high (200 - 499 mg/dl) and very high (≥ 500 mg/dl) [29].

The study complied with the ethical standards of the Helsinki Declaration of research with human beings; with the provisions of the scientific, technical, and administrative regulations governing internal ethical regulations No. 00002 of 03/15/2011 of the Universidad Simón Bolívar. Classification of research when it involves human beings as a study subject, in accordance with the provisions of Article 11 of Resolution 8430 of 1993 of the Ministry of Health. Informed consent in accordance with current regulations (Resolution 8430 of 1993.) Colombia. Confidentiality statement of each of the researchers. Letter of acceptance from the participating institution in the project [30-32].

The directives of the educational institution were notified about the objectives and purposes of the study, to grant approval for its conduct. They were filled out with the signature of the students who will be part of the study, after having explained the purposes of the study. The confidentiality and anonymity of the person providing the information will be guaranteed. The data obtained in the study was used for research and academic purposes, which will not be disclosed to any person, public, or private agency. In accordance with Resolution No. 008430 of 1993, article 11, this is an investigation with minimal risk, since it involved the procedure of taking weight and height in addition to taking a serum sample by venipuncture, to the study subjects.

III. RESULTS

Body mass index according to age

	Deficit	**Normal**	**Overweight**	**Obesity I**	**Obesity II**
20 to 25	1		20 July	2	0
	3.85%	76.92%	15.38%	3.85%	0.00%
More of 25	0	1	0	4	1
	0.00%	25.00%	0.00%	50.00%	25.00%

Tests of independence

Test	**Statistical**	**Gl**	**P-Value**
Chi-Square	15,989	4	0.0030

Table 1: Age group frequency for regarding BMI. Source: Own elaboration.

	Deficit	**Normal**	**Overweight**	**Obesity I**	**Obesity II**
F		19	6	5	0
	3.70%	70.37%	14.81%	11.11%	0.00%
M	0	2	0	0	3
	0.00%	66.67%	0.00%	0.00%	33.33%

Tests Independence

Tests	**Statistical**	**Gl**	**P-Value**
Chi-Square	9,894	4	0.0422

Table 2: The frequency for SEX regarding BMI. Source: Own elaboration.

Hip waist index (*WHR*) in relation to sex and age (age group)

	Low	**Normal**	**High**
20 to 25	3	19	7
	11.54%	73.08%	15.38%
More than 25	0	3	4
	0.00%	75.00%	25.00%

Tests of independence

Test	**Statistical**	**Gl**	**P-Value**
Chi-Square	0.656	2	0.7205

Table 3: Of frequencies for age group in relation to Source: Own elaboration format.

	Low	**Normal**	**High**
F	3	19	8

	11.11%	70.37%	18.52%
M	0	3	3
	0.00%	100.00%	0.00%

Independence

Tests	Statistical	Gl	P-Value
Chi-Square	1,212	2	0.5455

Table 4: Of frequencies for SEX in relation to Source: Format of own elaboration.

Body fat (Gf) according to sex

	Low	Normal	High	Very high
F	1	11	6	12
	3.70%	40.74%	11.11%	44.44%
M	0	1	0	5
	0.00%	33.33%	0.00%	66.67%

Independence tests

Test	Statistical	Gl	P-value
Chi-Square	0.767	3	0.8573

Table 5: Of frequencies for sex in relation to body fat. Source: Format processing own.

Serum lipids in relation to sex

	High	Normal
F	6	24
	11.11%	88.89%
M	2	4

	0.00%	100.00%

Tests of independence

Test	Statistical	Gl	P-Value
Chi-Square	0.370	1	0.5428

Table 6: Of frequencies for SEX by cholesterol total. Source: Format of own elaboration.

	High	Normal
F	6	25
	11.11%	88.89%
M	0	5
	0.00%	100.00%

Tests of Independence

Test	Statistical	Gl	P-Value
Chi-Square	0.370	1	0.5428

Table 7: Of frequencies for SEX in relation to triglycerides.

Source: Format of own elaboration.

	Altered	Normal
F	16	15
	48.15%	51.85%
M	0	5
	0.00%	100.00%

Tests of independence

Test	Statistical	Gl	P-Value
Chi-Square	2,549	1	0.1104

Table 8: From frequencies for SEX in HDL ratio. COL. Source: Own elaboration format.

	Medium risk	Normal	High risk
F	8	16	7
	22.22%	59.26%	18.52 %
M	2	3	0
	33.33%	66.67%	0.00%

Tests of independence

Test	Statistical	Gl	P-Value
Chi-Square	0.723	2	0.6966

Analysis of the results

From 100 university students. The sample consisted of 36 healthy students of both sexes between 20 to 35 years of age, who met the inclusion criteria. 86% (31) were female and 14% (5) were male. Table 1 shows the (BMI) by age group, individuals between 20 and 25 BMI handle normal values in a (76.92%) and overweight (15.38%), whereas those over 25 are associated with type I and type II obesity values. Table 2 BMI prevalence shows in females: Normal (70.37%), overweight (14.81%) and type I obesity (11.11%) in females, and (33.33%) type II obesity in males. Table 3 waist-hip ratio (), by age group, the p-value of the chi-square test yielded a value greater than 0.05, and this value p = 0.7205 is concluded that age has no influence on the result (*WHR*), also for both male and female was Normal. Table 4 it shows normal values in the female sex in a (70.37%) and high (18.52%). Table 5 shows the body fat ratio (Gf), according to sex, it was found that there is no influence of sex on the (Gf), showing that the value (p > 0.05), this value being p = 0.8573, however, the prevalence was found as Normal (40.74%) and very high (44.44% - 66.67%) in women and men, respectively. Table 6 shows that there is no statistically significant relationship between sex and total cholesterol classification (p-value > 0.05), with p-value = 0.4739, however, a prevalence as Normal between (89% - 100%) and as high in (11.11%) in the female sex group. Table 7 it is evident that there is no or a statistically significant relationship between sex and triglyceride classification (p value> 0.05), with p-value = 0.5428, however, the prevalence was observed both in sex female as male as Normal between (89% - 100%) and high (11.11%) in the female sex group. Table 8 shows not a statistically significant relationship between sex and the result of the HDL col (p value > 0.05), the value of p = 0.1104, however, the prevalence was found both females and in male as Normal between (51.85% to 100%)) and as altered in (48.15%) in the female sex group. Table 9. It was observed that there is no statistically significant relationship between sex and the result of LDLc (p value> 0.05), with the value of p = 0.6966, however it is evidenced as Normal in both the

group female as a male between (59% - 67%), medium risk (33.33%) in male and high risk (18.52%) in female.

IV. Discussion

The sample was comprised of university students between 20 to 35 years of age, with an average age of 22.4 ± 3.51. Of the total number of individuals in the sample, 3 (10%) were male and 27 (90%) were female. The male university students over 25 years evaluated from the anthropometric - nutritional point of view presented a prevalence such as Normal (76.92%), overweight be- tween (14% and 15%), Type I obesity (11.11%) in the elderly 25 years old, mainly in the female sex and type II obesity (33.33%) in the male sex, results similar to those reported by Guamialamá-Martinez., *et al.* 2018, where they found a prevalence of overweight and obesity in the studied population, being higher in men (27.0%) than in women (17.8%), and anthropometric-nutritional diagnostic results Normal 77.5% [33]. The study showed a prevalence of type II obesity in the male sex group (33.33%), higher than that found in the study by Cardozo L., et al. in 2016 where they found a prevalence of overweight and obesity in university students in 20.9% (men), and 46,67% (woman) [34]. The alarming situation, since if actions are not taken to prevent and control these nutritional problems, they can worsen and trigger chronic diseases such as diabetes, cardiovascular dis- ease, high blood pressure, various forms of cancer, osteoporosis, among othersThe prevalence of overweight (49.65% vs. 16.51%) was significantly 0.33-fold higher in males than females (OR: 0.33, 95%CI: 0.19–0.59, p 0.001). Average waist circumference was significantly (p 0.001) higher in males than females, but the waist-to-height ratio (WHtR) slightly higher in males than females (p 0.001).The prevalence of overweight is significantly higher in males than female university students from National University of Center of Peru because women are more concerned in their physical appearance and slim body than men [35].

In relation to the results of Body Mass Index according to age group and sex, the study found that the group between 20 to 25 years showed BMI in normal values, diverging in the results obtained by studies carried out in Colombia with a university population [34], showed 12.4% of students with excess weight, these results less than 21.6% university students aged between 19 and 24 years, from the Universidad Central de Ecuador (UCE) and the Universidad Tecnológica de Ecuador (UTE) of Quito [36] and 31.3% of Venezuela university students from Carabobo [37]. But the latter is similar to the results found in the group of men over 25 years of age from the research where it was shown that BMI is associated with nutritional status of Obesity type I and II. These results are similar to the other Latin American university students from Chile (32.8%) [38] and Colombia (35.1%) [39], elevated compared to university students from Guadalajara, Mexico (25.9%)[40] and very high in relation to Argentine university students where only 18% of university students presented a BMI > 24.38. The results reveal inadequate eating habits possibly influenced by stress, time, and cost; with different prevalence, despite the fact that they were all university students, with similar age and type of activity.

Results obtained by Fernández Lucho., *et al.* 2018, in 52 students of a National Educational Institution were at an overweight level, % fat at an obese level, muscle mass at a low level [41], these results similar to the study where evidenced a higher prevalence of Obesity II in males.

Abdominal obesity is one of the main components of metabolic syndrome, which is currently a major clinical and public health problem, due to its high prevalence worldwide [42]. The increase in adipose tissue in our body as a consequence of hypercaloric diets and low energy expenditure, and in particular the increase in visceral abdominal fat, have a primary role in the pathogenesis and morbidity of MS [43].

Morales Gladis and Cols in 2017 evaluated students from the Universidad de La Frontera, Temuco, Chile with an average age of 20.5 ± 2.5 years. The highest prevalence found were: excess GC (43.4%), malnutrition due to excess (35%), abdominal obesity (30.6%), IR (26.3%) and dyslipidemias (25.7%) [44]. The study showed

that sex and age have no relationship in the results of body fat (GC), however, the male sex group showed a higher percentage (66.67%) as very high in (GC) compared to the sex group female revealing high (11.11%).

Studies carried out by Natalia M., *et al.* 2018 [45], in 26 students, observed simple dyslipidemias (high total cholesterol or high triglycerides). 19.5% corresponded to total cholesterol (13.5% males and 23.5% females) and 4.5% triglycerides (7.7% males and 2.5% females). 2.3% had mixed dyslipidemia (high cholesterol + high triglycerides). These results are contrary to the study where it was evidenced that there is no statistically significant relation- ship between the results obtained from serum lipids in relation to age and sex, however, it coincides with the results obtained in the study, finding a high risk of dyslipidemias in the female sex group. (18.52%).

Education, information, and communication about a healthy lifestyle play a very important role in health. Among other healthy habits, the distribution of time when executing daily activities, the use of free time, active breaks, physical activity, and healthy eating, must have priority in academic programming, so that students do not neglect these and other vital aspects for the human body, such as daily food.

V. Conclusion

The study allowed to make visible the high prevalence of cardio- vascular disease risk factors such as overweight, obesity observed in the results of (BMI, Gf, and FV), found in young male sex (type II obesity). Those who were detected by (BIA), overweight, or obesity also presented high levels of (Gf) and (FV). In addition, the prevalence of dyslipidemia in the female sex was evidenced. However, it is essential to increase the sample for future research.

Recommendations

As established by OPS based on the global strategy on healthy eating, physical activity, and health, some of the specific recommendations on diet and physical activity are as follows [46]:

Increase the consumption of fruits and vegetables, as well as legumes, whole grains and nuts, substantially increase the amount of physical activity throughout life.

Stop consuming saturated fats and Trans fatty acids and re- place them with unsaturated fats and in some cases reduce total fat intake.

Regarding food of animal origin, the consumption of fish, lean meats and low-fat dairy products should be encouraged.

Reduce the intake of “free or refined” sugars.

Reduce salt intake from all sources and ensure that is iodized.

Adequately Inform consumers about food so they can make “healthy choices”.

Reduce the intensive marketing of foods rich in fats and/or sugars for children.

In addition, the use of anthropometric measures in combination and as a regular behavioral activity is recommended for the health team of the Universities of Latin America and the World to offer.

Conflict of Interest

The authors confirm that they have no conflicts of interest for the publication of this article.

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