THE PREVALENCE OF METABOLIC SYNDROME COMPARED TO PHYSICAL ACTIVITY IN A POPULATION OF SALE, A NORTH WEST CITY OF MOROCCO

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Abstract

Developing countries are undergoing an epidemiologic transition accompanied by increasing burden of cardiovascular disease (CVD) linked to urbanization and lifestyle modifications.Metabolic syndrome is a cluster of CVD risk factors where the lack of physical activity strongly favorite many associated factors of metabolic syndrome. The aim of this study was to determine the prevalence of metabolic syndrome compared to physical activity in a population of Sale, Morocco.

Keywords: Cardiovascular disease, metabolic syndrome, physical activity.

1. INTRODUCTION

The progressive accumulation of the body weight leading to obesity results, in a schematic but an inevitable way to circumvent, from the long-term imbalance sheet of energy. This situation is initially the consequence of modifications of the most immediate mediators of the assessment of energy who are the dietary habits and the profiles of physical-activity (WHO, 2000). This situation of positive energy balance sheet reflects an imbalanced energy provisions compared with the expense of energy. This situation is the consequence of modifications of the most immediate mediators of the balance sheet of energy, which are food habits and physical activity (WHO, 2000). Metabolic syndrome is an emerging entity that brings together in the same individual several metabolic abnormalities that predispose each at cardiovascular risk; it associates central obesity, hypertriglyceridemia, low HDL cholesterol (cholesterol and high density lipoprotein), hypertension, glucose intolerance. It triples the risk of cardiovascular disease and the risk of new type 2 diabetes (1) Decreased physical activity is likely to be an important etiological factor. Physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure. Physical inactivity (lack of physical activity) has been identified as the fourth leading risk factor for global mortality (6% of deaths globally). Moreover, physical inactivity is estimated to be the main cause for approximately 21–25% of breast and colon cancers, 27% of diabetes and approximately 30% of ischaemic heart disease burden. Regular and adequate levels of physical activity in adults :reduce the risk of hypertension, coronary heart disease, stroke, diabetes, breast and colon cancer, depression and the risk of falls; improve bone and functional health; and are a key determinant of energy expenditure, and thus fundamental to energy balance and weight control (2).

The only practice of moderate physical activity intensity was already associated with a significant reduction in the risk of type 2 diabetes (3).

2. PROBLEM OF THE STUDY

In Morocco, the practice of physical activity has a regression because only 50% of youth reported physical activity (4); even more the complications of diabetes and cardiovascular diseases caused in 2012 a total mortality rate of 46% (5). Morocco, therefore, like other developing countries is undergoing the consequences of a deviation from the Mediterranean dietary pattern (6).

There are no enough studies in this field and especially that combines between physical activity and metabolic syndrome in Morocco.

Objective of the Study:

The objective of this study was to determine the prevalence of metabolic syndrome compared to physical activity in a population of Sale, Morocco.

3. METHODOLOGY

This is a descriptive cross-sectional study, conducted from July to September 2015 taking place in the city of SALE North west of MOROCCO. A total of 300 subjects participated in the study which 46.7 % male and 53.3 % female. The choice of the sample was made by chance.

Data collection was done using a questionnaire developed and validated locally; including social demographic data, with the measures of anthropometric parameters, Weight was measured using an electronic scale (variation 600g). The size was measured by the measuring board. Waist circumference was measured at the navel. The Blood pressure was recorded in a sitting position after 15 minute of rest, at two intervals of 5 minutes. These measurements were performed with a standard mercury sphygmomanometer on the right arm, and the average of the two measures was recorded used for comparison.

To determine the physical activity we used the IPAQ questionnaire short form (the International Physical Activity Questionnaire). The purpose of the International Physical Activity Questionnaires (IPAQ) is to provide a set of well-developed instruments that can be used internationally to obtain comparable estimates of physical activity. There are two versions of the questionnaire. The short version is suitable for use in national and regional surveillance systems and the long version provide more detailed information often required in research work or for evaluation purposes.(7)

A venous blood sample was taken from each subject while sitting from 7:00 to pm 9:00 after 12-14 hours of fasting. All the blood test was measured by Hitachi biochemistry of the PLC 904 using enzymatic methods, all these acts were performed in the laboratory of medical analysis of prefectural hospital of SALE. The diagnosis of metabolic syndrome was selected according to the National definition Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) (National Institutes of Health. Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (8), which requires the combination of at least three of the following five criteria: waist circumference in women ≥ 88 cm in men ≥ 102 cm, Hypertriglyceridemia ≥ 1.5 g / l, HDL cholesterol < 0.50 g / L in women and < 0.40 g / l in men, blood pressure ≥ 130/85 mmHg, fasting glucose ≥ 1.1 g / l (or medications) .With explorations other biological parameters such as uric acid, creatinemy, urea, CRP .

All statistical analyzes were performed using SPSS software, Quantitative variables were described using mean, standard deviation (SD) and limits. Categorical variables were described using proportions and percentages. For the comparison of groups, we used the $\chi 2$ test for frequencies and Student's test for means. The confidence interval was adopted $p < 0.05$.

4. RESULTS

In total ,300 subjects participated in the study which 46.7 % male and 53.3 % female, a sex ratio M / F 0.87 Of these subjects 56 % were in urban areas and 44 % in rural areas, the average age was 31.64 years (standard deviation: 12.47, range: 18-65). Table 1

Table 1: Characteristics of the studied population

Characteristics	**Participants (n = 300)** **Nbre (%)**
Median age (years)	31.63 (SD=12.47)
Sexe Female Male	 160 (53.3) 140 (46.7)
Place of residence Urban Rural	 168 (56) 132(44)
Study level Illiterate Primary Secondary Superior	 40(13.3) 68(22.7) 152(50.7) 40(13.3)
Marital status Single Marry Divorce Widow	 168(56) 124(41.3) 7(2.3) 1(0.3)

BMI	
< 25	141(47)
≥ 25 (overweight)	120(40)
≥ 30 (obesity)	39(13)

BMI: Body mass index; SD= standard deviation

Table 2: Results of comparative data in both groups with and without metabolic syndrome

Parameter	**Group1 without MS (n=274)**	**Group 2 with MS (n=26)**	**p**
Age (years)	31	40.6	< 0.05
Weight (kg)	70	90.4	< 0.05
Height (m)	1.68	1.70	NS
Waist measurement (cm)	69	95.5	< 0.05
Systolic blood pressur(mmHg)	12.2	14.71	< 0.05
diastolic blood-pressure (mmHg)	7	7.7	<0.05
BMI (kg/m²)	24.4	31	<0.05
Cholesterol T (g/l)	1.6	1.80	<0.05
HDL (g/l)	0.62	0.40	<0.05
LDL (g/l)	0.78	1.13	<0.05
TG (g/l)	1.24	1.68	<0.05
Glycemia (g/l)	0.99	1.85	<0.05
uraemia (g/l)	0.30	0.31	NS
Creatinemy (mg/l)	9.08	9.62	NS
Uricemy (mg/l)	45	74	<0.05
CRP (mg/l)	3	18	<0.05

BMI: Body mass index; HDL-chol = high-density lipoprotein cholesterol; LDL-chol = low-density lipoprotein cholesterol;TG: Triglycerides; CRP: c protein reactive. NS: no significant difference**.**

We did a cross between the metabolic syndrome with age. There was a statistically significant difference between age (classified as ≥ 40 and < 40 years) of the participants with metabolic syndrome [mean 40.6 (SD 13.16) years] and participants without metabolic syndrome [mean = 30.77 (SD 12.05) years] (P < 0.05).

By comparing group 2 (metabolic syndrome) in group 1 (without metabolic syndrome) , we found a significant difference in the HTG , hypo- HDL and TT , age, weight , BMI, T Cholesterol , HDL C , LDL -C , uric acid , CRP, blood pressure , but not for blood pressure and blood sugar .We noted no statistically significant difference , sex, uraemia or Creatinemy . The results of the comparison between the two groups are reported in Table 2.

Test Chi - square was conducted to examine each of the four criteria of ATP - III in patients with metabolic syndrome.

Metabolic syndrome:

Twenty-six of the participants (8.6%) had a metabolic syndrome: 15 women (57.7%) and 11 men (42.3%). The omnipresent anomaly was the hyperglycemia (HFBS) found at 100% of them, followed by hypertriglyceridemia (HTG) in 87% of the cases and arterial hypertension (HBP) in 77%. A Low-HDL was found in 73 % of the cases; a high waist measurement (HWC) was found only in 65% of the cases (Figure 1).

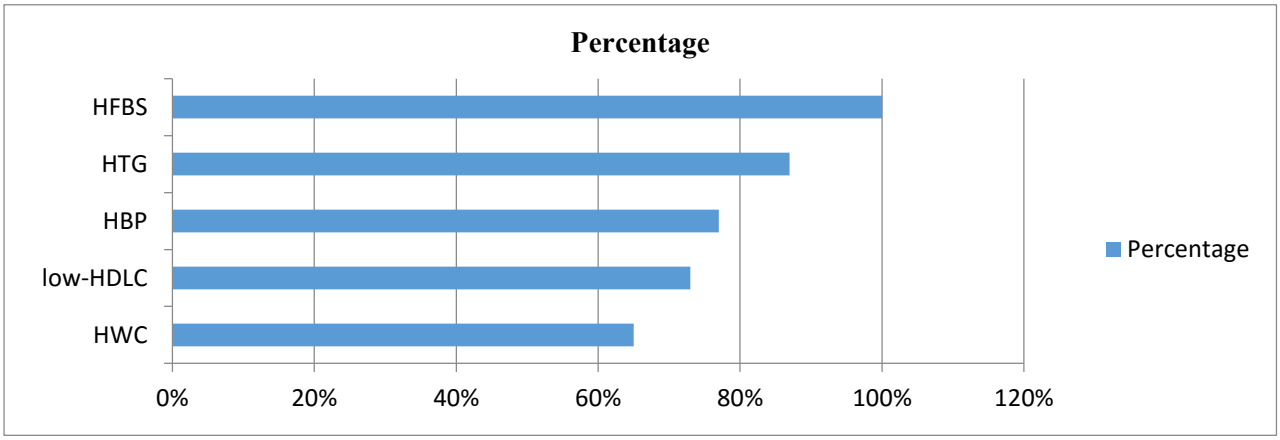

Figure 1: Parameters of metabolic syndrome found in the studied population (having metabolic Syndrome); HFBS: High Fasting blood sugar; HBP: high blood pressure; HWC = High waist circumference;

Physical activity:

33 % of the studied population has a low physical activity, 47% have a moderate activity and only 20 % have a high physical activity, there's no significant deference between male and female.

Table 3: physical activity level compared to syndrome metabolic associated factors

	Low	Moderate	High
HFBS (n=62)	37 (59.7%)	17 (27.4%)	8 (12.9%)
HTG (n=50)	36 (72%)	8 (16%)	6 (12 %)
HBP (n=41)	32 (78%)	6 (14.7%)	3 (7.3%)
Low-HDLC (n=32)	23 (72%)	6 (19%)	3 (9%)
HWC (n=34)	30 (88%)	4 (12%)	0

The results shows in table 3 that 88 % of our sample that have a high waist circumference declared a Low physical activity, followed by High blood pressure with 78%, High triglycerides and Low –HDL has both declared 72%, and finally only 59.7 % for those with High fasting blood sugar .

Table 4: Results of comparative data in both groups with and without metabolic syndrome according to physical activity level

Level of physical activity	Group1 without MS (n=274)	Group 2 with MS (n=26)	P
Low	74	25	<0.05
Moderate	140	1	<0.05
High	60	0	<0.05

The table 4 shows that there's a significant relation between level of physical activity and the presence or, the absence of metabolic syndrome, 96% of patients who has metabolic syndrome have a low physical activity, and 4% with a moderate level.

5. DISCUSSION

Our study found a prevalence (8.6 %) of metabolic syndrome, with hyperglycemia as the most encountered associated factor; it increases with age and BMI (Body mass indicator).We found a preponderance of the lipidic metabolism disorders among patients with metabolic syndrome: 87% had HTG and more than a had 73% hypo-HDLemy. The dyslipidemias are often caused by a single or multiple gene mutations that result in either overproduction or defective clearance of TG and LDL cholesterol, or in

underproduction or excessive clearance of HDL and as Secondary causes sedentary lifestyle with excessive dietary intake of saturated fat, cholesterol, and Trans fats (9). The metabolic syndrome is strongly related on obesity and in particular to visceral obesity (10). In our study, it was found at 65%. It seems wellness the central anomaly in the genesis of the metabolic syndrome; increase in visceral grease induced an increase in the free fatty-acids towards the liver, as well as an insulino resistance. These two relays will induce themselves a cascade of anomalies touching of many pro atheromatous risk factors as well as the glycoregulation, explaining the evolutionary risk towards the diabetes of the type 2 and the complications cardiovascular(11-12-13).

Our study shows that a low physical activity increases the risk of getting metabolic syndrome by affecting its associated factors, as it shows in table 3, so a high and moderate level of physical activity can reduce many risk factors. The regular practice of physical activity promotes metabolic adaptations that facilitate the regulation of energy and fat balance. These effects are important for a better control of body weight in the obese individual and should enable him or her to involve adipose tissue to a lesser extent in this regulation. Physical activity favors a negative energy and fat balance, particularly if activities are prolonged and vigorous. The achievement of a negative energy and fat balance with physical activity also strongly depends on the nutritional context in which it is performed. In the long term, an active lifestyle and low-fat food habits are expected to induce a substantial body weight loss in the obese. This weight loss is progressively attenuated over time, presumably because of the decreased impact of a reduced adipose tissue mass on the regulation of energy and fat balance. For the obese individual complying with an activity program and healthy food habits, a body weight loss of 10% is a realistic goal before the occurrence of resistance to further loss of body fat.(14).

6. CONCLUSION

Metabolic syndrome is installing slowly but certainly in Morocco, and his both a threat and an opportunity: while it clarifies the danger of spectacular increase in cardiovascular disorders, of the diabetes of type 2 and their consequences, it also constitute an opportunity to identify the people at the risk and to implement strategies of prevention while acting early on its parameters. Physical activity is an important key to many health problems that is in relation with MS,

Encouraging Physical activities and healthy life styles will surely minimize serious public health problems in this country.

7. RECOMMENDATIONS

-A Comparison between metabolic syndrome other definitions and Physical activity is recommended.

- Making more researches and studies using other methods for measuring physical activity.

- Further research can be done in other cities

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