

Cardiovascular risk factors in a group of adults living in the city of Beni Mellal, Morocco

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Abstract— Cardiovascular disease is a major global public health problem. It is one of the leading causes of morbidity, disability and death. The World Health Organization (WHO) has estimated that approximately 1/3 of all deaths in the world were caused by cardiovascular disease. This work aims to study the cardiovascular risk factors among an adult group in Beni Mellal city (Morocco).

This is a retrospective cross-sectional etiological study involving 210 subjects. The anthropometric data (weight, height), socio-economic, medical history of the participants were collected on a pre-established form. Cardiovascular risk factors have been defined according to international recommendations: hypertension (WHO), overweight and obesity (WHO and the International Obesity Task Force (1998), diabetes (American Diabetes Association ADA).

The excess weight has been recorded in 64.7% of the subjects, 29% of them were obese and 35.77% displayed overweight with a remarkable difference according to the sex especially for obesity (36.8% women vs. 19.8% of men). The prevalence of high blood pressure was 50% (42.7% for men and 56.1% for women) with a notable increase with age. Diabetes mellitus was observed in 54.4% of women and 26% of men with a statistically significant difference by sex. In the sample used in this study, almost all smokers are male (1 woman versus 25 men).

The prevalence of cardiovascular risk factors is significantly elevated in the population in Beni Mellal city, indicating the increased risk of cardiovascular disease, hence the need to reconsider the dietary habits and lifestyle of patients residing in the city of Beni Mellal, in order to reduce the cardiovascular risks.

Index Terms— Beni Mellal, cardiovascular risk, diabetes, excess weight, hypertension, Morocco, smoking.

1 INTRODUCTION

Chronic diseases encompass non-communicable diseases (cardiovascular diseases, and chronic morbidities related to AIDS and genetic diseases) [1]. Chronic non-communicable diseases are often induced by common risk factors of the environment and lifestyle [1].

Whereas the burden of cardiovascular morbidity progresses constantly in some developing countries [2-3] it decreases in contrast in developed countries that are able to overcome the situation based on the prevention approaches adopted [4].

Like other developing countries, Morocco is going through a phase of demographic, economic, social, food, nutritional and epidemiological transitions. These transitions result in profound changes in eating habits and lifestyle of the population, leading to the emergence of numerous problems related to overweight, obesity, diabetes and cardiovascular disease [5].

In Morocco, cardiovascular diseases constitute a public health problem of recognized gravity, which is explained by the high mortality rate, the number of hospitalizations as well as direct and indirect economic costs that they generate [6-7].

Studies dealing with the problem of cardiovascular risk factors in Morocco are very rare [8-9-10-11-12] especially in the Beni Mellal Khenifra region and precisely the city of Beni Mellal.

Several reasons have deeply oriented the choice of the investigation of this problematic of cardiovascular risk factors in the Beni Mellal-Khenifra region and more specifically the city of Beni Mellal. The urbanization rate in the region, which reached 49.1% in 2014, more than two-thirds of the regional urban population is concentrated in the three provinces of Beni Mellal, Khouribga and Khenifra which would house 75% of the total population. urban population of the region with successive urbanization rates of 69.68%, 61.58% and 59.2%

[13]. The population growth of the urban population of the region is more observed in the Beni Mellal province, which recorded a growth rate of 1.21% exceeding the growth rate of the region (0.89%) and national level (1.25%) [13]. Taken together these indicators prompted us to investigate the cardiovascular risk factors in a sample of the population of the city of Beni Mellal.

2 SUBJECTS AND METHODS

2.1 Geographical and economic situation of the study population

The Beni Mellal city is located in center of Morocco and is the capital of Beni Mellal Khenifra region. Its area covers 4,528 km², and 16.12% of the area of the region. The prefecture consists of 4 circles, 11 caïdats, 4 urban communes, and 18 rural communes. The population of Beni Mellal is 326,008 inhabitants in urban areas and 224,670 inhabitants in rural areas (550,678 in total), is 21.98% of all inhabitants of the region (2,520,776 inhabitants). The urban area of the Beni Mellal prefecture is considered as an administrative, commercial, and industrial center [13].

2.2 Inclusion criteria

An epidemiological survey was carried out in 2018 among a group of 210 people living in Beni Mellal city. In order to respect the ethical principles of research, the participants have signed an informed consent and received all the explanations concerning the study. Socio-economic and demographic data were collected using a pre-established questionnaire. The collected data concern the following parameters: age, sex, marital status, level of education, source, and income of the head of

the family, and health and pathological history.

2.3 Questionnaire

The data collection was conducted by a group of investigators who received training on how to take blood pressure, weight and height. To respect confidentiality, questionnaires were filled in private with each participant, and allow them to express themselves freely.

Blood pressure and anthropometric measurements (weight, height) were performed for all participants. The weight (in kg) was determined by a scale, the height by a vertical height meter in m, allowing the calculation of the body mass index (BMI). It was used to identify obese subjects with a BMI higher than or equal to 30. The blood pressure was measured three times and using a "Spengler" hand-held blood pressure monitor, with a rest for at least 15 minutes.

Definition of cardiovascular risk factors

HTA: Considered hypertensive are known and treated subjects and those with a diastolic blood pressure higher than or equal to 95 mmHg and a systolic blood pressure greater than or equal to 160 mmHg (WHO).

Excess weight: is determined by BMI, thus, obesity has been defined by a BMI greater than or equal to 30 and overweight by a BMI between 25.0 and 29.9 (WHO and International Obesity Task Force, 1998).

Diabetes: is defined according to the criteria of the American Diabetes Association (ADA): fasting glucose greater than or equal to 1.26 g /l twice, or ongoing diabetes treatment.

Smoking: assessed through questions about past and current tobacco use. The category of smokers selected are those who smoked for at least one year and who smoke at the time of the survey.

2.4 Statistical analysis

The study data was captured and analyzed by using the SPSS version 10 software for Windows. The results are expressed as mean ± standard deviation, or as a percentage. The chi-square test is used to compare two percentages, while the comparison of the averages is done by Student's test. The level of significance has been set at 0.05.

3 RESULTS

The sample size is 210 subjects aged 20 and over living in Beni Mellal city, the mean age of the study population is 52.87 years (SD = 14.9 years, min = 20 years and max = 95 years). The distribution by sex in the sample is almost balanced (54.3% against 45.7%).

In relation to hypertension, the total prevalence of known, treated and / or detected hypertension was 50%. Prevalence increases with age (Figure 1) in both sexes. It is statistically significant between women (56.1%) and men (42.7%) (Chi-square = 3.76, P = 0.005) (Figure 2).

Diabetes affects women (54.4%) more than men (26%) (Figure 4) and there is a statistically significant association between diabetes and sex (Chi-square = 25.24; P <0.001). Diabetes is found in 41.4% of the population. The age group of 50 to 65 years is the most affected by this pathology with a percentage of 44.2% of diabetics identified in the sample (Figure 3). The prevalence of diabetes increases with age the association dia-

betes age is statistically significant (Chi-square = 17.29, P = 0.008).

The prevalence of the excess weight (overweight and obesity) was 64.7%. Overweight was found in 35.7% of subjects, with no significant difference between women (34.2%) and men (37.5%). Obesity, defined by a body mass index of BMI ≥ 30, was found in 56.6% of cases. It is significantly more common among women (36.8%) than men (19.8%) (Chi-square = 8.17; P = 0.001) (Figure 6). There is a statistically significant association between excess weight and age (Chi-square = 47.22; P = 0.001).

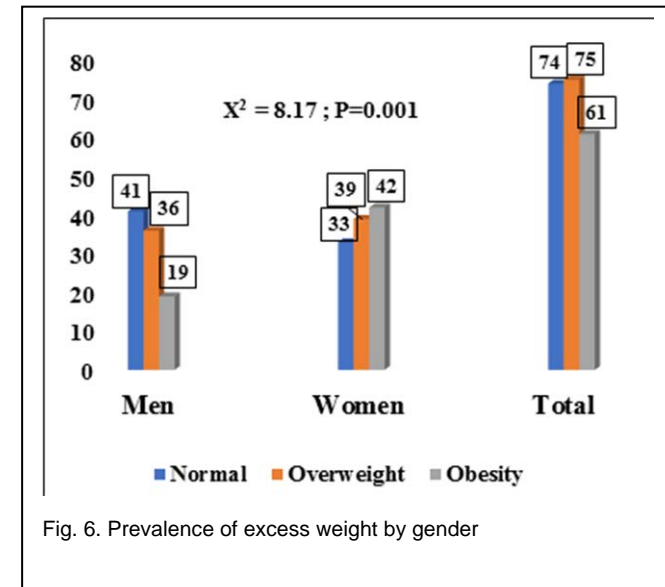
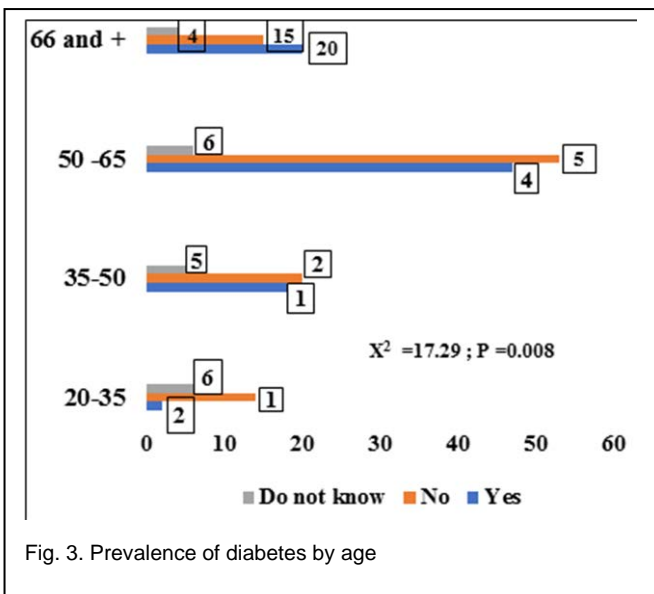
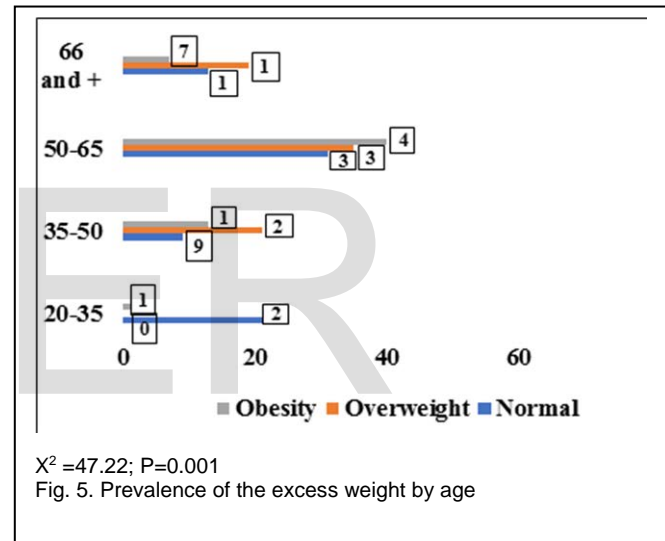
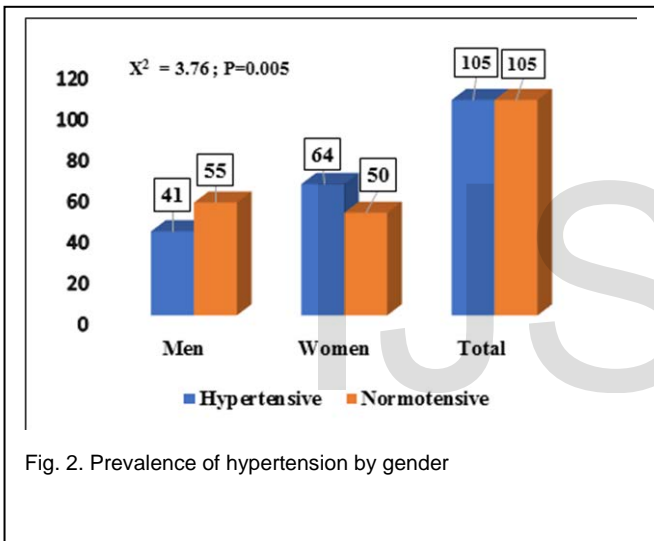
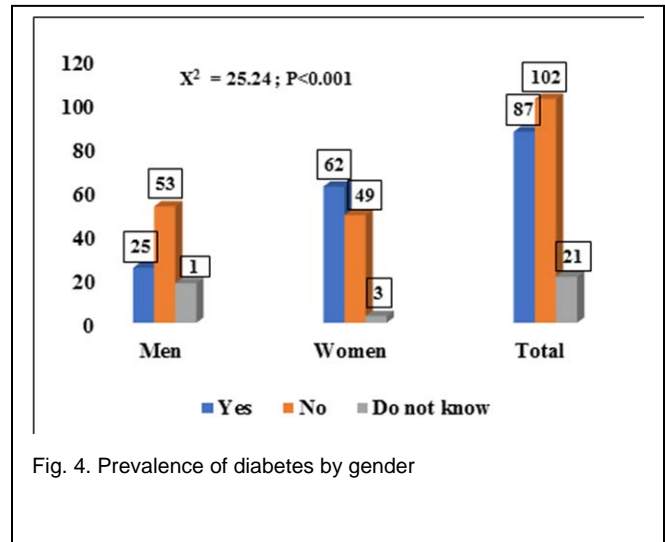
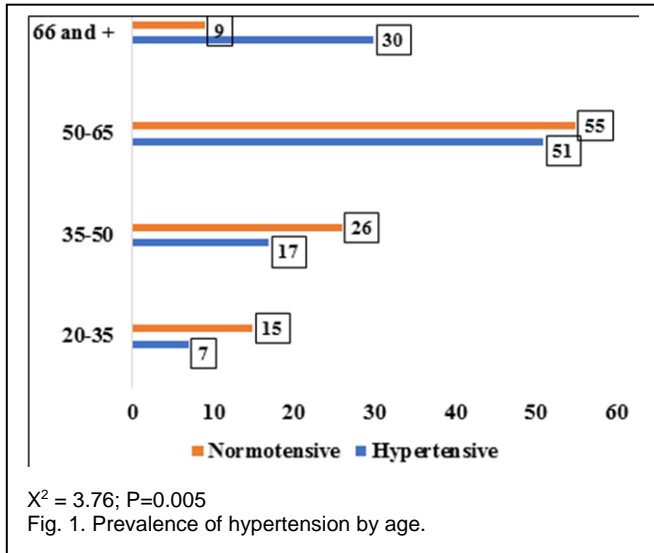
The prevalence of smoking based on current or previous tobacco use was at the level of 12.4% in the investigated population and the group aged 66 and over has the highest smoking rate (38.5%) in our sample. Finally, there is a highly significant association with sex as the prevalence is very high for men, and almost zero for women (96.2% vs 3.8%).

TABLE 1
DISTRIBUTION OF SAMPLE BY AGE AND GENDER.

Age (years)	20-35	36-50	51-65	66 et +	Total
gender	N %	N %	N %	N %	N %
Men	18 18.8%	18 18.8%	44 45.8%	16 16.7%	96 45.7%
Women	4 3.5%	25 21.9%	62 54.4%	23 20.2%	114 54.3%
Total	22 10.47%	43 20.47%	106 50.48%	39 18.58%	210 100%

TABLE 2
OVERALL PREVALENCE OF CVRF IN THE SAMPLE

	HTA		Diabetes		Excess Weight		Smoking	
	N	%	N	%	N	%	N	%
Yes	105	50	87	41.4	136	64.7	26	12.4
No	105	50	102	48.6	74	35.3	184	87.6
Don't know	-	-	21	10	-	-	-	-
Total	210	100	210	100	210	100	210	100



4 DISCUSSION

The data obtained from this study allowed us to determine the prevalence of the main cardiovascular risk factors in a sample of the adult population living in Beni Mellal city. The evaluation of the prevalence of these FDRs in our series, has shown that hypertension, diabetes, excess weight (overweight and obesity) are common among women, and that all of these disorders increase with age. While smoking is more prevalent among men and increase with age.

The prevalence of hypertension in our sample (50%) is consistent with those reported in previous studies conducted Morocco [14-8-9], and in other developing countries [15-2]. In Africa, the prevalence of hypertensive patients aged 20 years and older is 15.1%, 23.9%, 27.50%, 28% and 31.1%, respectively in Cameroon, South Africa, Senegal, Zimbabwe and Tanzania [16]. With regard to gender, our results showed that the prevalence of hypertension is significantly more observed among women than in men (56.1% vs. 42.7%), which is consistent with the results of other studies in many developing countries [17-9-8]. However, in developed countries [18], the prevalence among men increases more [19]. In Iberian countries, the prevalence in Spain per gender is respectively 49.9% in men and 37.1% in women [20] whereas it, reaches 54.7% in men and 41.1% in women aged 35 to 64 in Portugal [21].

The prevalence of diabetes in the investigated population (41.4%) exceeds those reported in other the areas in Morocco which are respectively 27%, 13.8% and 28% in Meknes, Khemisset El Jadida and Marrakech [11-12-8] and that recorded in the countries of the Maghreb Arab [15], and especially higher than those reported in Western countries (3% -10%) [22-23-24].

In our population, the prevalence of diabetes increases with age and is ranged from 2.2% to 44.2% between the age group of 20-35 years and the other group of 50-65 years in agreement with previous reports [25-26].

The significant association of the prevalence of diabetes and sex is controversial in Europe. Thus, in France for example, men have higher rates [27] whereas in our population as in other similar contexts, the prevalence of this factor risk is very high among women (54.3% vs. 45.7%) [8-9-2].

The prevalence of excess weight (overweight and obesity) is recorded in 64.7% of the investigated population and women are more affected than men (80% vs. 57.3%). The prevalence of excess weight and its sex distribution reveal a significant difference between women and men, a difference that has been confirmed by other researchers [28-29-8-9-11-12]. The prevalence of excess weight in the Middle East exceeds those in the industrialized countries [30]. In general, women seemed to be the first to be affected compared to men [31]. Accelerated urbanization and nutrition transition represent the main factors leading to the increase in the prevalence of excess weight in developing countries [32] who are still preoccupied with deficiency diseases [33]. Thus, obesity becomes a major public health problem and a risk factor of extreme danger [34].

Finally, the smoking rate among men in our study population (12.4%) remains low compared to that of Tunisia (55.6%) [35] and Algeria (36.8%) [15], in people aged in the range of 20-35 and 35-50 years (12% of the smokers in our sample), while the

50-65 age group represents only 4%, in agreement with literature in developing countries, showing that the number of young adults starting to smoke has increased [36]. Conscious of the dangers of smoking, industrialized countries have adopted tobacco control strategies for the prevention of cardiovascular and cancerous diseases, which justifies the reduction in the prevalence of smoking in these contexts; such strategies are lacking or not well promoted in developing countries [37-38-39-40].

5 CONCLUSION

The prevalence of cardiovascular risk factors in the adult population of the Beni Mellal city can be described as similar to that reported in the countries of the Arab Maghreb and those around the Mediterranean basin with slight differences. But compared to those recorded in developed countries, the difference was clear. Hypertension is the most prevalent factor with a percentage of 50%, followed by diabetes (41.4%), obesity (29%) and smoking (12.38%).

Hypertension, diabetes and obesity are the most prevalent factors in women. Certain environmental factors such as sedentary lifestyle and certain eating habits could explain these differences. The promotion of healthy lifestyle (physical activity, balanced diet, stopping smoking and alcohol ...) is the only one capable to reduce the prevalence of cardiovascular risk.

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