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Prevalence of Cardiovascular Risk Factors in Niger According To The May Measurment Month (MMM) Model : Prospective, Descriptive and Cross-Sectional Survey From 2017 To 2021

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Abstract

Introduction:

Noncommunicable diseases (NCDs), particularly cardiovascular diseases (CVDs), represent a growing public health challenge worldwide. In Niger, as in other low- and middle-income countries, the increasing prevalence of CVDs is driven by behavioral and metabolic risk factors such as hypertension, diabetes, obesity, tobacco use, and sedentary lifestyles. This study aimed to assess the prevalence of cardiovascular risk factors (CVRFs) in Niger using data collected from all regions except Diffa over a four-year period (2017–2021).

Methodology:

A cross-sectional survey was conducted among 30,047 participants, with the western zone (NiameyTillabéri-Dosso) being the most represented (55.64%). Participants aged ≥18 years provided informed consent and underwent anthropometric measurements, including blood pressure, blood glucose, and body mass index (BMI). Data were collected via a pre-established questionnaire and analyzed using Microsoft Excel and SPSS Pro 22 software. Statistical significance was set at $p < 0.05$.

Results:

The study revealed a high prevalence of CVRFs, with hypertension affecting 29.08% of participants, diabetes awareness reported in 6.55%, and hyperglycemia in 9.64%. Obesity was prevalent in 36.10% of respondents, with abdominal obesity more common in males (29.14%) than females (23.85%). Tobacco consumption was observed in 8.71% of cases, predominantly among males, while alcohol use was rare (2.30%). Sedentary lifestyle was identified in 25.27% of participants. Hypertension was significantly

associated with age >40 years, female gender, diabetes, obesity, sedentary lifestyle, and tobacco consumption (p=0.001%). Stroke history was reported in 15.41% of respondents, whereas myocardial infarction (MI) history was minimal (0.10%), likely due to underdiagnosis.

Conclusion:

This large-scale study highlights the significant burden of CVRFs in Niger, emphasizing the need for early detection and intervention. The findings underscore the importance of addressing modifiable risk factors through education, awareness campaigns, and policy interventions. Concerted efforts involving the government, healthcare providers, and communities are essential to mitigate the progression of CVDs and improve public health outcomes in Niger.

Keywords : Cardiovascular risk factors, low-income countries, Niger, MMM model method.

Introduction

In the history of humanity, and until the middle of the 20th century, infectious diseases were the cause of countless deaths; Today the biggest public health problem lies in noncommunicable diseases, which are responsible for more than 70% of deaths worldwide, not to mention chronic pain and a reduction in the quality of life that they cause. (1)

In recent years, an epidemiological transition has been experienced in the countries of the South, NCDs formerly the prerogative of rich countries are becoming more and more frequent in developing countries, increasing the risk of mortality in these countries, where life expectancy is already compromised by infectious diseases and limited access to healthcare.

Noncommunicable diseases, also called chronic diseases, are not passed from person to person. They are long-lasting and generally evolve slowly.

The four main types of noncommunicable diseases are cardiovascular diseases (heart or stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease or asthma), and diabetes (1) .

They have a disproportionate impact in low- and middle-income countries, which account for more than three-quarters of deaths linked to these diseases, or 32 million deaths (2).

Cardiovascular diseases are responsible for the largest number of deaths from noncommunicable diseases (17.9 million per year) followed by cancers (9 million), respiratory diseases (3.9 million) and diabetes (1.6 million). (2)

Among these deaths attributable to cardiovascular diseases, it is estimated that 7.4 million are due to ischemic heart disease and 6.7 million to stroke. (3)

The increasing prevalence of noncommunicable diseases and especially CVD is mainly attributable to four behavioral risk factors (smoking, lack of physical activity, excessive alcohol consumption and an inappropriate diet) and four metabolic risk factors. (high blood pressure; overweight/obesity; hyperglycemia and hyperlipidemia).

The outbreak of noncommunicable diseases has devastating consequences for the health of individuals, families and communities and threatens to

overwhelm health systems. The socioeconomic costs associated with these diseases make their prevention and control a major development imperative for the 21st century (4)

In Niger, according to the 2021 WHO STEP WISE survey, the following prevalences emerge among adults: hypertension (27.4%); diabetes (2.3%); overweight (14.8%); smoking (6.2%) (5)

To ensure primary prevention and reduce the impact of CVD we undertook this study which is in fact a global synthesis of several studies carried out in all regions of Niger and which focuses on the prevalence of cardiovascular risk factors in Niger according to the protocol of the MMM 2017-2021.

Methodology

Study framework

The entire Nigerien territory served as a study framework.

General presentation of Niger

Niger is a country in West Africa, bordered by Algeria and Libya to the north, Chad to the east, Nigeria and Benin to the south, and Burkina Faso and Mali to the west. Its capital and largest city is Niamey, on the banks of the Niger River.

This Sahelian country is among the poorest in the world. Its demographic growth is the highest at +3.83% per year (2017) with barely more than one in four people literate (28.4% in 2017)

Niger is an increasingly important uranium producing country, the 4th largest in the world. Its other important natural resources are gold, iron, coal and oil. It also has some gas and oil deposits, the exploitation of which began in 2011, and whose production volumes increase each year, while remaining at a restricted level (80,000 barrels per day in 2014, according to estimates) .

Agriculture occupies a very important place, and provides work for 70% of the active population.

Geographic location

Niger, with an area of 1,267,000 km2, is a continental country located in the heart of West Africa. Located between 11°37 and 23°23 north latitude and between the Greenwich meridian and 16° east longitude, 700 km north of the Gulf of Guinea, 1,900 km east of the Atlantic coast and 1,200 km south of the Mediterranean. Niger is therefore a completely landlocked country, halfway between the Mediterranean and the Gulf of Guinea; Sudano-Sahelian country, it is considered one of the hottest regions on the globe. From a climatic point of view , Niger is characterized by a tropical Sudanian climate which alternates between two seasons, a long dry season from October to May and a short rainy season from May to September. The highest average temperatures are recorded between March and April where they exceed 40°C, while the lowest are from December to February where they can drop below 10°C. The territory is divided into three climatic zones: in the North, an immense Saharan zone, covering three-fifths of the country, populated mainly by nomads and containing the main exploited minerals; in the center, a Sahelian zone, which receives average precipitation of 200 to 300 mm of water per year; to the South, a Sudanian zone; it is the wettest part of the country, with average rainfall amounts of 300 to 650 mm per year. An agricultural area, it is characterized by savannah vegetation and is devoted to crops of millet, sorghum, corn and peanuts. The Nigerien relief is little contrasted. To the north-east, the high plateaus

(800 to 1,000 m above sea level) are bordered by escarpments which make access difficult. To the west and south are low plateaus (200 to 500 m above sea level), while to the north of the 17th parallel extends the A/r massif, bordered to the west and to the South, by a peripheral depression. Niger has only one permanent watercourse, the Niger River, which crosses the country over a length of approximately 500 km in its western part. There are also a few permanent lakes, the main one of which, Lake Chad, is located in the south-western part of the country and several semi-permanent rivers including the tributaries of the right bank of the Niger in the West and the Komadougou. Yobé in the South-East. Despite this, according to specialist estimates, Niger's water resources are quite significant even if they remain unevenly distributed. Thus the irrigation potential is estimated at 270,000 hectares in terms of surface water and groundwater. These, although very abundant, are difficult to exploit because they are essentially made up of fairly deep fossil layers. They are estimated at nearly 36 billion m ^{3}.

Finally, agricultural soils, the main resource for the majority of the population, can be grouped into two main classic soil categories: tropical ferruginous soils or dune soils representing 80 to 85% of the cultivable agricultural area; Hydromorphic soils or " goulbi ", moderately clayey, representing 15 to 20% of the cultivable agricultural area.

Material and method

Type and period of study

This is a prospective, descriptive and transversal survey which was carried out from 2017 to 2021 (except 2020 due to COVID) according to the May Measurment model. Month (MMM). This approach, initiated by the International Society of Hypertension (ISH), consists of reaching out to populations, every May of the calendar year, for systematic screening for hypertension and other associated risk factors in order to reduce them. the harmful effects.

Study population

We collected 30,047 respondents. Our collection took place in the following regions: Agadez; Tahoua; Maradi; Tillabery; Dosso; Zinder and Niamey. For recruitment, subjects were informed in advance and invited to the survey location.

Inclusion and non-inclusion criteria

Inclusion criteria

We conducted an exhaustive survey, addressed to all subjects aged at least 18 years old and who voluntarily agreed to participate in the study.

Non-inclusion criteria

People who did not give their consent were not included.

Data collection

The data was collected by a pre-established questionnaire. In addition to the questionnaire, we collected anthropometric measurements, namely: weight, height, waist circumference; and the measurement of BP (BP was taken after a rest period of 5 to 10 min) and blood sugar.

The equipment used to collect these measurements was OMRON brand electronic blood pressure monitors, bathroom scales, measuring tapes and glycometers. The material is the same for all respondents.

Data collection was carried out in CSIs, hospitals and the compounds of certain village chiefs (to

reach the maximum number of people).

Data collected

The questionnaire consisted of:

Sociodemographic characteristics

- Age
- Sex
- Marital status
- Occupation
- Educational level

Background

- HT
- Diabetes

Habits and lifestyle

- Eating habits
- Toxic habits: smoking and alcoholism
- Physical activity: regular walking and sporting activity

Knowledge of respondents about cardiovascular risk factors.

Anthropometric measurements namely:

- Weight
- Size
- Waistline
- BMI

BP and capillary blood glucose measurements

Data recoding

The explanatory variables:

- Age as a cardiovascular risk factor was used, from 55 years in men and 65 years in women. Active smoking was considered a risk factor when it was current.
- Sedentary lifestyle was defined by the absence of daily physical activity or physical activity lasting < 120 minutes per week.
- Any person with a history of hypertension or with a systolic blood pressure ≥ 140 mm Hg and/or a diastolic blood pressure ≥ 90 mm Hg was considered hypertensive.
- Diabetes was considered in any person known to be diabetic or whose postprandial capillary blood glucose measured was greater than or equal to 2 g/L.
- The body mass index (BMI) calculated by the ratio of weight (in kg) to the square of height (in m2) defined the undernourished individual if BMI less than 16.5 kg/m2, lean if BMI between 16. .5 and 18.5 kg/m2, normal if BMI greater than or equal to` 18.5 and less than 25 kg/m2, overweight between 25 and 30 kg/m2 BMI and obese if BMI greater than or equal at` 30 kg/m2.
- Abdominal obesity was defined according to the (NCEP) by a waist circumference greater than 102 cm in men and 88 cm in women.

Data entry, processing and analysis

We proceeded to describe the population according to the different characteristics. The quantitative variables were described by means and their standard deviation . Qualitative variables were described by percentages.

The data were entered and then analyzed using Microsoft Excel and Spss pro 22 software. The analysis focused on the calculation of the different parameters and the assessment of the existing relationships between them. Statistical tests were carried out to search for relationships or associations between the different variables. A significance level P< of 0.05% was used. The results were presented in the form of tables and graphs. The texts and

tables were processed on Microsoft Office 2019 (Word, Excel, Power Point).

Ethical aspects of the study

We first obtained research authorization from the decanal authorities of the FSS.

Before conducting the survey, it was necessary to obtain the informed consent of the respondents after informing them about the progress and objective of the study.

The questionnaire was written in French, and translated into national languages for respondents who did not understand French.

The personal data of respondents will under no circumstances be disclosed to a third person and the questionnaire will be used anonymously.

Difficulties encountered

In achieving the objectives that we have set for ourselves; We suffered from some difficulties during our work, notably:

- The lack of availability of blood tests which are essential in determining metabolic syndrome and cardiovascular risk
- The difficulty of populations to remain fasting
- A lack of collaboration from the population in certain villages, who thought that a vaccination campaign against covid19 was being carried out
- And insecurity in certain localities.

RESULTS

EPIDEMIOLOGICAL ASPECT

Overall frequency

The 7 regions have been divided into three (3) geographical grouping zones.

- East zone: regions of Zinder and Maradi (5457 or 18.16%)
- North Zone: regions of Agadez and Tahoua; (7872 or 26.20%)
- West Zone: Dosso regions; Tillaberi and Niamey (16,718 or 55.64%) The West zone was the most represented.

Sex

We note a predominance of the female sex **(54.75 %)** with a sex ratio of **0.82.**

Age

Respondents who were aged between **40 and 59** years old represented **37.20%** followed by **32.82%** of respondents who had an age between **20 and 39** years old.

Level of education

There were **15,978** respondents, or **53.18%** were uneducated.

Only 4035, or 13.43%, had a higher education level.

Ethnic group

There were **19,620** respondents, or **65** , **30%** were **Hausa.**

Profession

Housewives represented **52.71%** , **11.50%** were traders and **9.20%** were state employees.

BEHAVIORAL MEASURES

Tobacco consumption

Active smokers accounted for **8.71%.** Among daily smokers, 1396 daily smokers, or 53.34%, had smoked for an average of 10 years.

Alcohol consumption in the past 12 months

There were **691** respondents, or **2.3%** , who con-

sumed alcohol over the last 12 months.

Physical activity

The sedentary represented **25.27%.**

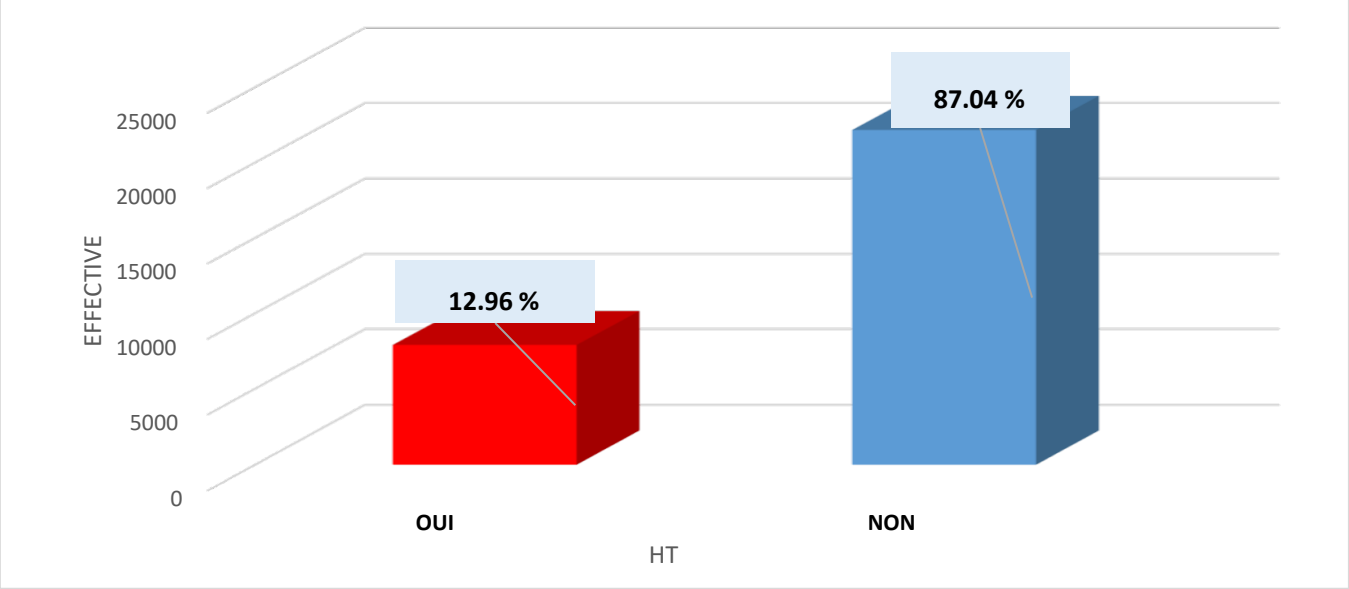
HISTORY

History of high blood pressure

5199 respondents or **17.30%** had a family history of high blood pressure.

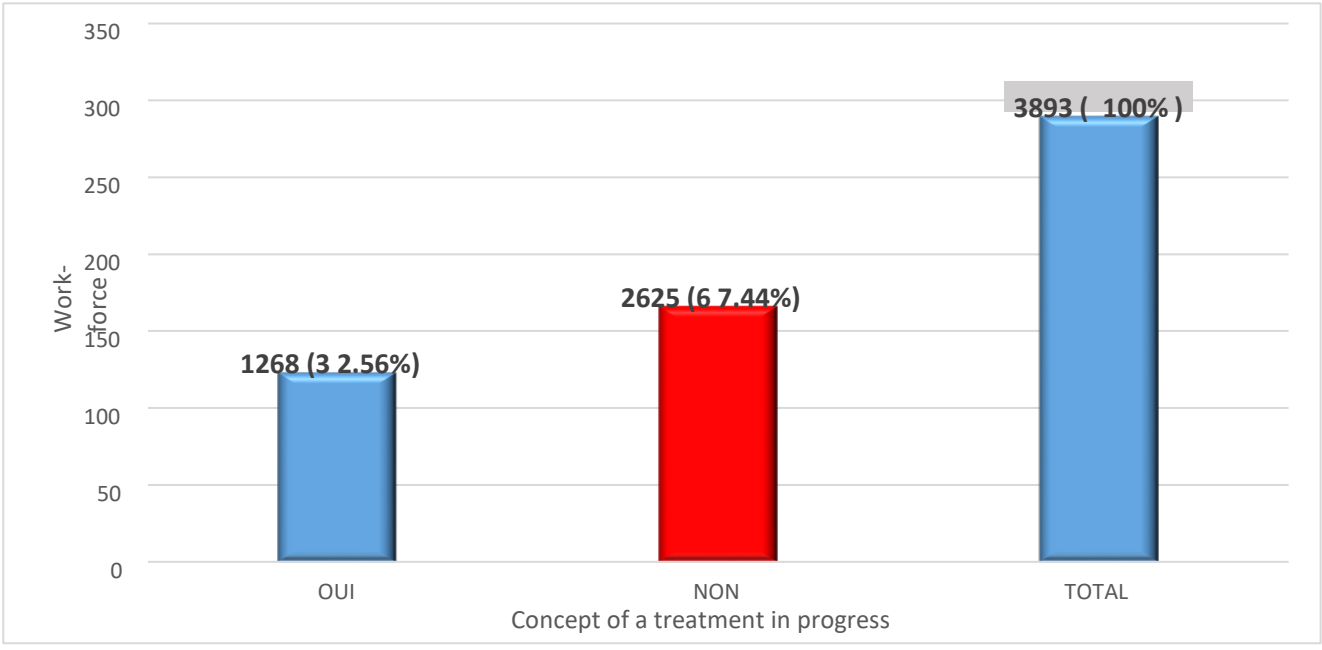
Over the last 12 months there were **3893** respondents, i.e. **12.96%** of respondents had high BP.

Among known hypertensives, **2,625** surveyed, or **67.44%,** were not under treatment.



Among these respondents, 953 or 75.15% are on monotherapy and the majority is represented by loop diuretics (Furosemide).

Among the respondents, 185 or 14.58% were controlled under antihypertensive treatment.



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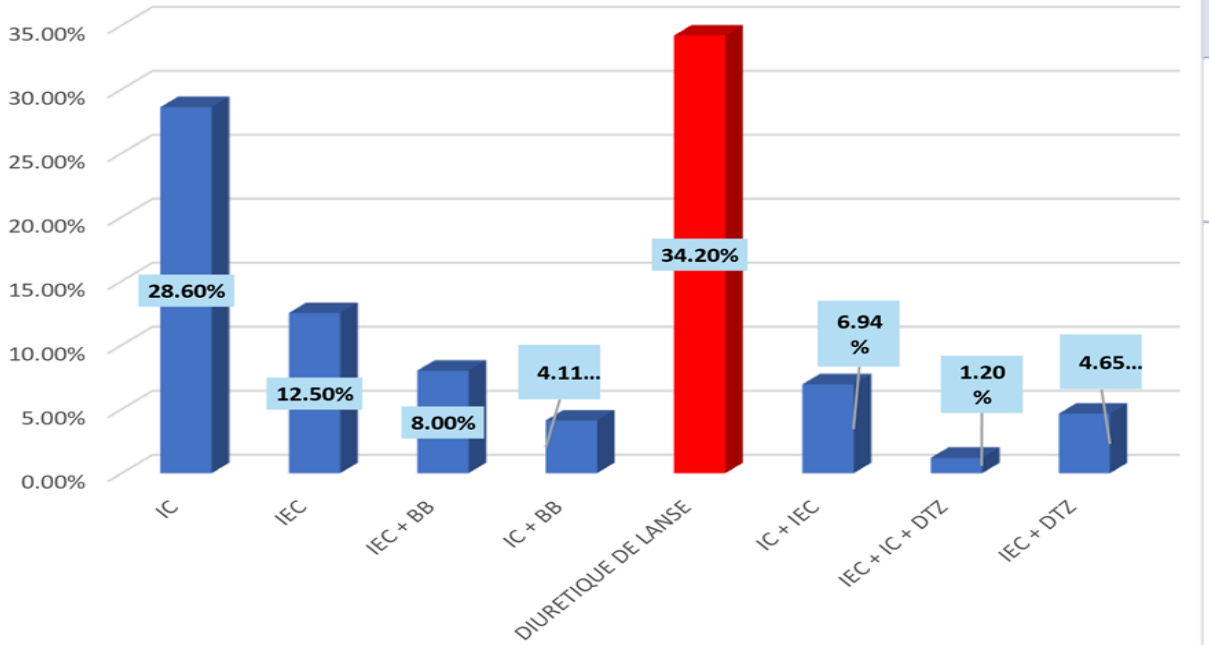

Among the respondents, **2094** , or **53.8%,** who were already hypertensive had taken traditional remedies for hypertension.

History of diabetes

2764 respondents or **9.20%** had a family history of diabetes.

1968 respondents , **6.55%** were diabetic at the time of our study.

Over the last 12 months, **2215** or **73.6%** of respondents had not measured their blood sugar.

15.41% had a history of stroke.

PHYSICAL MEASUREMENTS

The respondents overweight or obese represented **10897** or **36.10 %**.

Male subjects with a high waist circumference represented **8756** or **29.14%** of respondents **.**

Female subjects with a high waist circumference represented **7166** or **23.85%** of those surveyed.

Pregnant women represented **631** or **3.83%** of respondents, among whom **13.31%** were hypertensive.

Among the surveys **8739** or **29.08%** presented arterial hypertension at the time of our study. Which represents approximately **1 in 3 participants** .

PREVALENCE OF ARTERIAL HYPERTENSION BY REGION

The Tillabéry region was the one with the highest rate of hypertensive patients at **42.25%** followed by Maradi with **35.25 %.**

BIOCHEMICAL MEASUREMENTS

There were **2420** or **9.53%** surveyed who had fasting hyperglycemia.

Among the subjects not fasting, **477** or **10.20%** had a blood sugar level above **200 mg/dl.**

Bivariate analysis

Relationship between blood pressure profile and sex

Total Sex			
	P.A. <140/90mmHg	P.A. >140/90mmHg	
Men	10226	**3369(17.87%)**	13595
Women	11082	**5370(11.21%)**	16452
Total	21308	8739(100%)	30047

In our sample there are **5,370** female hypertensives, or **17.87%** , compared to **3,369** males, or **11.21%.** The dependence is very significant (chi2 = 29.32, df = 1, p<0.0001)

Relationship between blood pressure profile and tobacco

Among daily smokers **15.13% (396)** were hypertensive.

The dependence is very significant (chi2 = 27.75, df = 1, p<0.0001).

Relationship between blood pressure profile and age

Total Age			
	P.A. <140/90mmHg	P.A. >140/90mmHg	
Under 20	909	347	1256
20 to 39 years old	7114	2747	9861
40 to 59 years old	7925	**3251(37.20%)**	11176
60 to 79 years old	5072	2247	7319
80 years and over	288	147	435
Total	21308	8739	30047

Subjects aged **over 40** were the most represented ; **3251** respondents, i.e. **37.20%** of subjects whose ages were between **40 and 59 years old,** had high blood pressure.

The dependence is very significant (chi2 = 37.95, df = 4.p<0.0001).

Relationship between blood pressure profile and sedentary lifestyle

Among the sedentary **55.36%** were hypertensive. The dependence is very significant (chi2 = 23.36, df = 1.p<0.0001)

Relationship between blood pressure profile and obesity

Among those with hypertension, there are **4,672** or **53.46%** who are overweight or obese. The dependence is very significant (chi2 = 14.25, df = 1.p<0.001)

Relationship between obesity and diabetes

Among diabetics there are **1134** or **39.14%** of respondents who are overweight or obese. The dependence is significant. (chi2 = 23.29, df = 0.5, p = 0.0006)

Relationship between diabetes and hypertension

Diabetes Total			
	P.A. <140/90 mmHg	P.A. >140/90 mmHg	
Yes	354	**2006**	2360
No	20954	6733	27687
Total	21308	8739	30047

Among hypertensives there are **22.95%** diabetics. The dependence is significant (chi2 = 1.06, df = 1, p = 0000.30)

DISCUSSION

Epidemiological data

Identification

Overall frequency

The size of our sample is 30,047 participants divided into 3 grouping areas; the western zone (Niamey - Tillaberi -Dosso) is the most represented: 55.64%.

Our results are different from the Steps Wise WHO Niger 2021 study (6) whose sample size was 5709 participants and the Eastern zone was the most represented: 44.2%.

This could be explained in the duration of the study which is 4 years in our study and 3 months in the Steps Wise WHO Niger 2021.

Sex

During our study we noted a female predominance of 54.75% compared to 45.75% for men; sex ratio of 0.82.

These results are close to 55.9%; 60.01% and 61.9% found respectively by A SONOU et al in Benin (MMM 2018) (7); Sina Haj Amor et al in Tunisia (MMM 2019) (8) the Steps Wise WHO Niger 2021 study (6).

On the other hand, these results are different from the 66.6% male predominance found in NIAMKEY. JT et al in Ivory Coast (MMM 2018) (7).

In our study, the crossover between sex and hypertension found 17.87% of female hypertensive subjects compared to 11.21% of male hypertensive subjects. The dependence is significant (p=0.001%).

These results are different from the 26.6% (women) and 28.1% (men) found by the Steps Wise WHO Niger 2021 study (6).

The predominance of hypertension among women in our study could be explained by the fact that there were more of them.

Age

The age group between 40-59 years is the most represented in our study with a rate of 37.20%, an average age of 45.68 years and extremes of 18 and 90 years. The predominance of this age group could be explained by the fact that the majority of young people were in exodus in certain localities and also the lack of interest.

This result is comparable to the 42.5 years and 44.2 years found respectively by Elijah N. Ogola et al in Kenya (MMM 2019) (8) and A SONOU et al in Benin (MMM 2018) (7).

These results are higher than the average age of 36.54 years found by the Steps Wise WHO Niger 2021 study (6).

Results superior to ours have been reported by Sina Haj Amor et al in Tunisia (MMM 2019) and Joyce Tik et al in Hong Kong (MMM 2019) (8) which respectively find an average age of 49.5 years and 71.9 years.

In our study, cardiovascular risk factors were more common in the elderly. This could be explained by the natural aging of blood vessels and a change in lifestyle. The Framingham study and the MONICA project had long ago revealed that the risk of coronary heart disease increases markedly with age (9,10) and all international studies currently confirm this.

Educational level

53.18% of the subjects in our study were uneducated.

This result is close to the 50.6% found by the Steps Wise WHO Niger 2021 study (6)

The high level of education promotes better knowledge of the hypertensive status and this has been demonstrated in series in France (Fenech et al, 2020) (11), in China (Chihua et al, 2019) (12) and in Colombia (Lopez et al, 2019) (13). The level of control of hypertension depends on the level of awareness of the status by patients and the level of treatment.

Family history

In our study, we found 17.30% and 9.20% respectively of ATCD of hypertension and diabetes.

These results are far inferior to those of BOUTAHIRI. N in Morocco (14) and J. NKOY BELILA in Congo (MMM 2017) (15) which respectively found 56.6%, 44.3% and 51.2% and 20.4% of cases.

This difference could be explained by the fact that many of our respondents were unaware of their family health status and low level of education.

Habit and lifestyle

Tobacco

Tobacco consumption represents a rate of 8.71% in our study. The average duration of consumption is 8.98 years. Smoking is zero among women, this could be explained by cultural considerations.

Our results are superior to the study Steps Wise OMS Niger 2021 (6), MN MBAYE et al (16), S PESSINABA et al in Senegal (17), YESSITO CNHS et al in Benin (18) who respectively found a rate of 6.2%; 5.8%; 5.8% and 4.3% tobacco con-

sumption.

On the other hand are lower than those found by Sina Haj Amor et al in Tunisia (MMM 2019) (8), Luis Alcocer et all Mexico (MMM 2019) (8) and PAPON C et al in 2014 in France (19) who respectively found a smoking prevalence of 17.6 %, 11.4% and 34%.

Alcohol

In our study, alcohol consumption represents a rate of 2.30% of cases and only concerns the male gender.

Our result is higher than 0.20% found by the Steps Wise WHO Niger 2021 study (6).

Its figures are lower than those of Luis Alcocer et al Mexico (MMM 2019) (8), A SONOU et al in Benin (MMM 2018) (7) : NIAMKEY . JT et al in Ivory Coast (MMM 2018) (7) who found 47% respectively; 16.1%; 7% of cases.

This low rate could be explained by the prohibition of alcohol consumption by religion and Nigerian culture. Which means that few people admit to their alcohol consumption.

Sedentary lifestyle

A sedentary lifestyle is found in 25.27% of cases.

Our result is higher than the 12.6% found by the Steps Wise WHO Niger 2021 study (17) .

It is much lower than that of MBAYE. A et al (17) in Senegal which finds 56.2% of cases of sedentary lifestyle.

In the meta-analysis by JESSE.A et al the relative risk of death from coronary origin is practically doubled in sedentary subjects (21).

On the contrary, regular physical exercise reduces coronary risk and total mortality.

Diabetes

In our study, 1968 respondents knew they were diabetic, a rate of 6.55%. The hyperglycemia rate was 9.64%.

Our result is higher than that of the Steps Wise OMS Niger 2021 study (6), MBAYE.A et al in Senegal (16) and A. YAHIA-BERROUIGUET et al in Algeria (22) which respectively found a rate of 2 .3%, 7.2% and 6.8% cases of hyperglycemia.

Elijah N. Ogola et al in Kenya (MMM 2019) (8) and A SONOU et al in Benin (MMM 2018) (7) found 3% and 4.4% of fasting hyperglycemia, respectively.

Sina Haj Amor et al in Tunisia (MMM 2019) (8) found a rate higher than ours of around 17.6%.

EXAMINATION DATA

Blood pressure profile

In our population the overall prevalence of high blood pressure is 29.08%, or one in three participants.

Our results are close to those of the Steps Wise WHO Niger 2021 study (6) and Elijah N. Ogola et al in Kenya (MMM 2019) (8) which respectively found a prevalence of high blood pressure of 27.4% and 26.1%.

Our results are lower than those LEON KABAMBA et al in DRC (23), MBAYE.A et al in Senegal

(16), Sina Haj Amor et al in Tunisia (MMM 2019) (8); Ogah OS et al in Nigeria (MMM 2019) and A SONOU et al in Benin (MMM 2018) (7) who respectively found a prevalence of 49.3%, 46.4%, 38.1%, 36.2% and 34.8%.

On the other hand, they are higher than the 20.4% found by Kramoh KE et al in Ivory Coast (MMM 2018) (7).

Regarding the diagnosis and control of hypertension; there is still a lot to do in our country compared to the data described below in the literature:

In our study, 12.96% knew they were hypertensive in the 12 months preceding the survey, among whom 32.56% were under treatment, including 75.15% under monotherapy and only 14.58% were well controlled.

Steps Wise WHO Niger 2021 study (6) reports that among the 1,598 subjects with high blood pressure: 89.7% were undiagnosed; 5.9% were diagnosed but received no medication; 3.1% were treated but not controlled; 1.3% were treated and controlled.

In Tunisia (MMM 2019) (8) 72.5% knew their diagnosis, of which 67.5% were treated and 38.2% were checked.

In Benin (MMM 2018) (7) 23.9% were known to be hypertensive, of which 40.3% were treated and 34.6% were controlled.

Elijah N. Ogola et al in Kenya (MMM 2019) (8) and NIAMEY. JT et al in Ivory Coast (MMM 2018) (7) found respectively 59.7% and 77.3% of hypertensives under treatment who are well controlled.

Xin Chen et al in China (MMM 2019) (8) found that the rates of awareness, treatment and control of high blood pressure were 51.5%, 48.4% and 29.1% respectively. .

In our study, 75% of hypertensives already known and under treatment were on monotherapy, the majority of whom were on furosemide-type loop diuretics.

Elijah N. Ogola et al in Kenya (MMM 2019) (8) found 46.60% under dual therapy and 35.43% under monotherapy.

In fact, the latest recommendations recommend starting hypotensive treatment with fixed dual therapy from the outset (except in the elderly or grade I hypertension associated with a low cardiovascular risk) this will allow good control of blood pressure figures and avoid the dreaded complications of high blood pressure such as stroke and MI, to name but a few.

Obesity/overweight

Obesity was found in 36.10% in our study, including 52.9% abdominal obesity. There is a male predominance of 29.14% compared to 23.85% among women.

Our results are higher than the 14.8% of the Steps Wise WHO Niger 2021 study (6); Sina Haj Amor et al in Tunisia (MMM 2019) (8), Elijah N. Ogola et al in Kenya (MMM 2019) (8) and PESSINABA S et al in Senegal in 2013 who respectively found 25.4%, 23% and 8.8% obesity (25).

This could be explained by the high rate of sedentary lifestyle and an inappropriate diet.

According to a meta-analysis performed by Ni

Mhvarchu et al on prospective studies in the Asia-Pacific region, elevated BMI is an important risk factor for cardiovascular disease (25) . Similarly, another meta-analysis by Daphne et al shows that overweight and obesity are associated with the incidence of several comorbidities including type 2 diabetes and cardiovascular disease (27).

Pregnant women

In our study 3.83% of women were pregnant among whom 13.31% were hypertensive. The overall prevalence of hypertensive pregnant women is 2.79%.

Our results are close to the 2.1% overall prevalence found by Elijah N. Ogola et al in Kenya (MMM 2019) (8).

HISTORY OF STROKE OR MI

In our study there were respectively 15.41% and 0.10% of respondents having a history of stroke and MI.

Sina Haj Amor et al in Tunisia (MMM 2019) (8) found 2.3% history of MI and stroke and Elijah N. Ogola et al in Kenya (MMM 2019) (8) found 0.7% history MI and 3.5% stroke.

In Hong Kong (MMM 2019) (8) 9.9% had a history of MI and 4.6% had a history of stroke.

This high rate of stroke found in our study compared to the results above could be explained by the fact that many of our respondents do not know their hypertensive status and among those who are diagnosed, few are under treatment and well controlled on the blood pressure plan.

As for MI, its diagnosis being electrocardiographic makes screening difficult, especially since many medical centers do not have this device; also the majority of chest pains are considered and treated as gastritis.

BIVARIATE ANALYZES

In bivariate analysis, hypertension was significantly associated with age over 40 years, female gender, diabetes, obesity, sedentary lifestyle and tobacco consumption.

Similar results were found by Kingue S et al in Cameroon for age > 40 years, obesity, hyperglycemia and Ogah OS in Nigeria (MMM 2019) (8)for diabetes, obesity, tobacco and alcohol consumption.

CONCLUSION

We conducted a descriptive and analytical cross-sectional study in all regions of Niger (except Diffa) from 2017 to 2021, which made it possible to highlight the extent of cardiovascular risk factors.

Thus the result obtained confirms the burden of risk factors in our country with a high rate of high blood pressure followed by a sedentary lifestyle and obesity. FDRCV are most often asymptomatic and require early detection.

This is a real health problem whose solution must necessarily involve communication and education of all social components.

These results call on the government, health workers and the population to intervene together to slow the progression of these modifiable FDRCVs.

This large-scale study shows the importance of FDRCV in Niger. These worrying results call for concerted, multisectoral actions. It is now essential to place NCDs at a high public health priority.

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