Cardiometabolic Risk Screening of Students Attending School of Health Technology, Minna, Niger State, Nigeria

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ABSTRACT

Aim: The present study reveals the cardiometabolic risk factor among students of Health Technology Minna Niger State. The purpose of the study is to screen for the cardiometabolic risk factors among students of the institution to determine the prevalence rate. Prevalence of cardiometabolic risk factor was determined on 100 randomly selected students (47 males and 53 females). Method: The study used standard methods for all factors that were examined. Blood samples were collected from the subjects, stored and subsequently, tests were conducted. Other relevant information were obtained using questionnaire. Data were analyzed using Microsoft Excel SPSS computer software program verse 18.0. Statistical correlation of comparison was put at P<0.05. **Results:** The overall prevalence was 100(100%) out of which 47(47%) were males and 53(53%) were female. Prevalence of risk factor in relation to gender showed the males and female condition as follows: Hypertension4.3%,5.7%, Diabetes 0.0%,3.8%, Hypercholesteremia 0.0%,0.0%, Hypertriglyceride 0.0%,3.8%, Low HDL 4.3%,5.7%, LDL 4.3%,3.8%, High BMI 4.3%, 1.9%. In relation to age showed that subjects within the ages 25-34 years were more affected with 15(34.7%) followed by those with ages 18-24 years with 8 (15.2%) and those within 35-44 years with 3(75.0%) are the least affected. The prevalence of multiple cardiometabolic risk factor are as follows: Those with 2,3 and ≥4 risk factors are 5%, 2% and 1% respectively. **Conclusion:** The multiple risk factors of 18-24 years of age is 3.2%, 25-34 years of age is 12.2% and 35-44 years of age is 50.0% respectively. The burden of Cardiometabolic risk factor in school of health Technology Minna is fairly reasonable. CMR factor is considerably more in female students and in ages 25-34 years. This may be due to their life style. Two (2) is the highest multiple risk factor. The outcome of this study could serve as a footing for advocacy with an exigent call for active for the development of national programs that would advance the control and management of Cardiometabolic risk factors.

Keywords: Cardiometabolic risk, Hypercholesteremia, Hypertriglyceride

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INTRODUCTION

Cardiometabolic risk (CMR) refers to risk factors that increase the likelihood of experiencing vascular events or developing diabetes [1]. This concept encompasses cardiometabolic risk factors such as hypertension, dyslipidemia and smoking, as well as emerging risk factors, such as abdominal obesity, inflammatory profile, and ethnicity. Cardiometabolic Health problems have become a major focus for clinical care and research. Cardiometabolic risk has a significant increase in morbidity and mortality rate worldwide.[2]. These risk factors are specifically frequent in patients diagnosed as having metabolic syndrome.

In addition, the existence of these risk factors is associated by a significant enhancement in the risk of developing chronic kidney disease, albuminuria, and/or a diminished estimated glomerular filtration rate (GFR) [3]. Early discovery and management of abnormalities can prevent development of cardiovascular diseases. The cardiometabolic factors are divided into two categories the modifiable which includes: Overweight, Abnormal lipid metabolism, Inflammation, hyper coagulation Hypertension Smoking, Physical inactivity, Unhealthy diet Insulin resistance and the Non-modifiable which also includes the following: Age, Race/ethnicity, Gender, Family history

Hyperglycaemia is an important risk factor for diabetes and in the long run heart disease and stroke may emerge. Subject with pre-diabetes are now described as impaired fasting glucose (IFG) or impaired glucose tolerance (IGT) state in which ones blood glucose level is elevated than normal but not yet high enough to be classified as diabetes. There is an estimate of fifty-four million individuals with pre-diabetes in the US. Pre-diabetes is an important risk factor for future diabetes and cardiovascular diseases and presents an opportunity for prevention. Without treatment, several of these patients will progress to type two (2) diabetes within ten years. Studies as well show that patients with impaired fasting glucose have a higher incidence of cardiometabolic risk factors and atherosclerosis than patient with normal glucose levels.[4-5] Losing 5-7% of total weight and exercising 30 minutes a day, 5days a week has been shown to reduce the progression to diabetes by 58% [6] over a 3years period.

Dyslipidemia has a strong relationship with cardiovascular diseases. Virtually 25% of US adult had elevated cholesterol levels or were being treated with medication for these conditions between 1999 and 2000[1]. According to the CDC, a 10% decrease in serum cholesterol levels may possibly reduce the occurrence of coronary heart disease by as much as 30%[1].Abnormal lipid metabolism is usually asymptomatic. So many patients go undiagnosed unless screening test is performed. Lipoprotein measurement is used to enhance assessment of cardiometabolic risk and prescribe fitted therapies to manage blood lipids to lessen the risk of disease and associated complications.[7]

LDL-Cholesterol is a more accurate predicator of CV risk than serum total-Cholesterol level is often the initial target for therapy. High level of LDL-C can lead to an advance atherosclerosis. [7] .Regular activity reduces VLDL levels, raises HDL cholesterol and may also lower LDL levels [8].

Hypertension leads to elevated risk for myocardial infarction, stroke, eye problems and kidney diseases. Hypertension is refers to as systolic blood pressure ≥140mmHg or diastolic blood pressure ≥ 90mmhg (> 130mmHg or ≥80mmHg in people with diabetes).

In Nigeria, Hypertension is the most frequent non- communicable disease and it has become known as the most significance risk factor for CVD, affecting 15 to 30% of the population [9] .Cardiovascular disease is the fourth among the top twenty disease responsible for mortality in Nigeria [10]. Its often a silent disease, one- third of people with high blood pressure are oblivious of this condition, until they are informed by their health care provider [11]. Estimated 65milllion American adults 1 in 3 have hypertension. Individuals who are normotensive at 55years old have a 90% lifetime risk for hypertension [1].The diagnosis and effective management of hypertension is challenging because it is relatively asymptomatic. Surveys suggested that two-third of patients with hypertension are untreated or undertreated in the U.S [12]. A 12 to13 point reduction in blood pressure can reduce risk of myocardial infarction by 21%, stroke by 37%, and all death from cardiovascular disease by 25% [1]. The

MATERIALS AND METHOD

Study Area
This study was carried out in School of Health Technology Minna, Niger state.

Study Population
The research population consists of 100 students which includes 47 males and 53 females in School of Health Technology Minna, Niger State.

Inclusion Criteria
This includes the male and female students between 18 to 44 years that were present during the study and gave consent to be used as subjects in the study.

Exclusion Criteria
This includes the male and female students between 18 to 44 years that were absent

prevalence and harmful effects of hypertension reinforce the need for apt screening and treatment. Behavioral or lifestyle modification remains the basis of managing hypertension. [13]

Adulthood overweight and obesity is associated with an increase prevalence of numerous cardiometabolic risk factors. Body mass index (kg/m^2) is a common substitute measure of adiposity in Adult. The U.S. centers for disease control and prevention, and the world health organization based age- and sex – specific normal distribution for BMI. It is an established correlate of numerous adiposity- related cardiometabolic risk factor in the adult population [14] and numerous committee and organizations have endorsed its use [15] The study objectives are to screen for lipid profiles among the students, to determine the age range that is mostly at risk, to determine the gender who are more at risk, to determine multiple risk factors among students and to determine the effect of these risk factor on students.

during the study and gave no consent to be used as subjects in the study.

Study Design
Descriptive study design was used for the study. Primary data was collected using a simple random sampling technique to select the subjects whose blood samples were used for the analysis. Data was presented using tables and charts.

Data Collection and Analysis
The socio-demographic data and other relevant information of each participant were obtained using self-administered questionnaire. Subsequently, data where analyzed using SPSS computer software program version 18.0.

Ethical Consideration
Ethical clearance for the research was sought and obtained from the ethical committee of

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school of health technology Minna Niger state. (Date of Issue: 3 March 2015)

Laboratory Methods
Specimen
Blood specimen was collected from each participant for various blood investigation.
PROCEDURE OF COLLECTION OF BLOOD & SEPARATION OF SERUM

Informed consent was taken from participants before collection of sample. A sample of 5ml venous blood was collected from each participant for analysis. After the collection of the blood sample it was allowed to clot at 4°c and serum was later separated. The samples were stored and subsequently, test was conducted.

RESULTS

Table I: Distribution of selected cardiometabolic risk factors in the study population

Variables	Mean	SD
Age (years)	23.7	4.1
Body mass index (kg/m^2) Men	22.7	2.4
Body mass index (kg/m^2) Women	24.1	5.2
Systolic blood pressure (mmHg)	124.7	15.9
Diastolic blood pressure (mmHg)	82.0	9.5
Fasting blood sugar (mg/dl)	85.8	19.5
Total cholesterol (mg/dl)	143.7	47.2
Triglyceride (mg/dl)	119.9	24.5
HDL-C (mg/dl)	50.9	8.6
LDL-C (mg/dl)	69.5	46.8

Table 2 shows the percentage normal patients

Normal	Males (n=47)%	Female (n=53) %	Overall (n=100)
Blood pressure (130/85mmHg)	(41) 87.2	(49) 92.5	(90) 90.0
Fasting blood sugar (115mg/dl)	(45) 95.7	(43) 81.1	(88) 88.0
Total cholesterol (240 mg/dl)	(42) 89.4	(53) 100	(95) 95.0
Triglyceride (150 mg/dl)	(47) 100	(51) 96.2	(98) 98.0
HDL-C (40 mg/dl)	(37) 78.7	(47) 88.7	(84) 84.0
LDL- C (130mg/dl)	(10) 2.3	(20) 37.7	(30) 30.0
BMI (28kg/m^2)	(47) 100	(39) 73.6	(86) 86.6

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Table 3: Prevalence of selected cardiometabolic risk factor in males and females in the study population

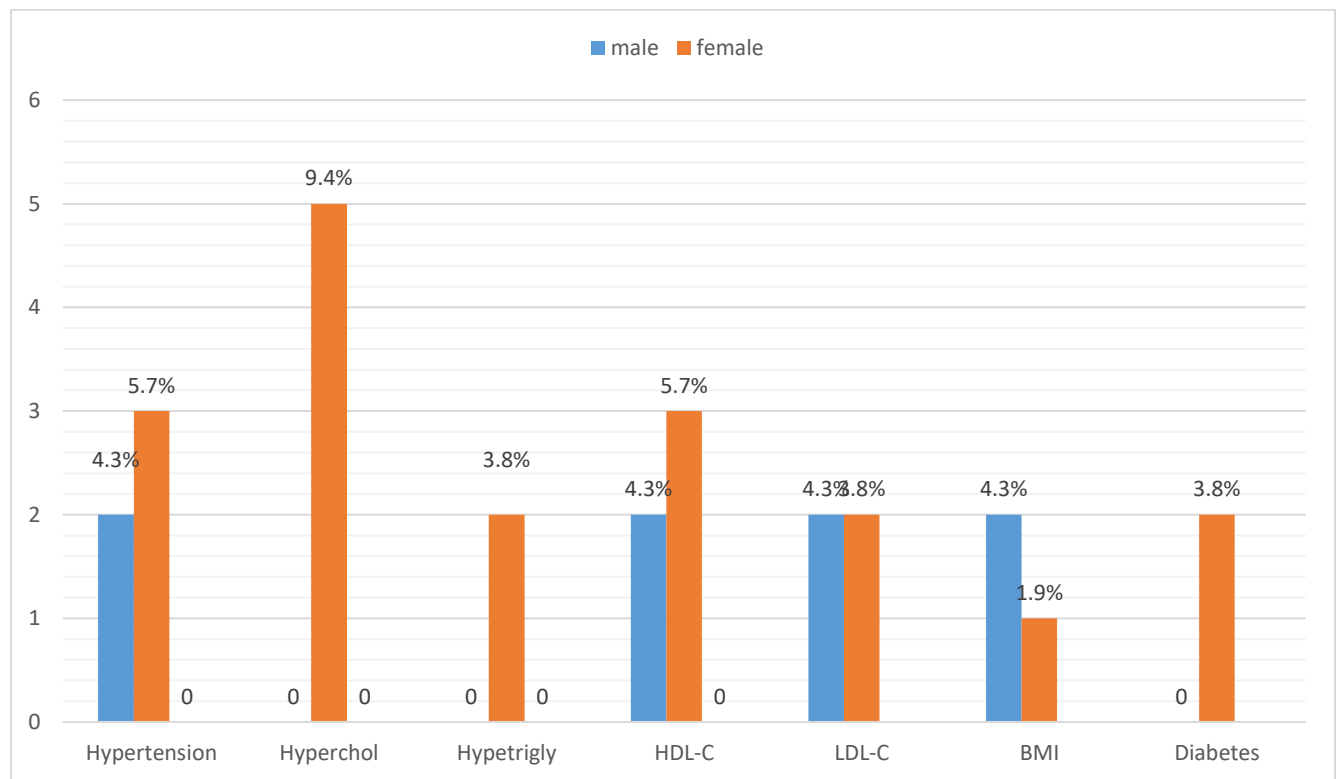| Risk factor		Males (n=47)%	Female (n=53) %	Overall (n=100)
Hypertension	(≥ 140/100mmHg)	(2)4.3	(3) 5.7	(5) 5.0
Diabetes (≥ 120mg/dl)		(0) 0.0	(2) 3.8	(2) 2.0
Hypercholesterolemia (≥240mgdl)		(0) 00	(0) 00	(0) 5.0
Hypertriglyceride (≥150 mg/dl)		(0) 00	(2) 3.8	(2) 2.0
Low HDL-C (≥40 mg/dl)		(2) 4.3	(3) 5.7	(5) 5.0
LDL- C (≥130mg/dl)		(2) 4.3	(2) 3.8	(4) 4.0
High BMI (≥28kg/m^2)		(2) 4.3	(1) 1.9	(3) 3.0

Figure 1: Showing the abnormalities in male and female in the study population

Table 4: Indicating the age group of the population having normal value

Normal	(18-24)%	(25-34)%	(35-44)%	Overall(n)%
Blood pressure (130/85mmHg)	(57)90.5	(31)93.9	(2)50.0	(90)90.0
Fasting blood sugar (115mg/dl)	(55)87.3	(29)87.9	(4)100.0	(88)88.0
Total cholesterol (240 mg/dl)	(59)93.7	(32)97.0	(4)100.0	(95)95.0
Triglyceride (150 mg/dl)	(63)100.0	(31)93.9	(4)100.0	(98)98.0
HDL-C (40 mg/dl)	(53)84.1	(27)81.8	(4)100.0	(84)84.0
LDL- C (130mg/dl)	(20)31.7	(10)30.3	(0)100.0	(30)30.0
BMI (28kg/m^2)	(55)87.3	(27)81.8	(4)100.0	(86)86.0

Table 5: Prevalence of selected cardiometabolic risk factors by age in the study population

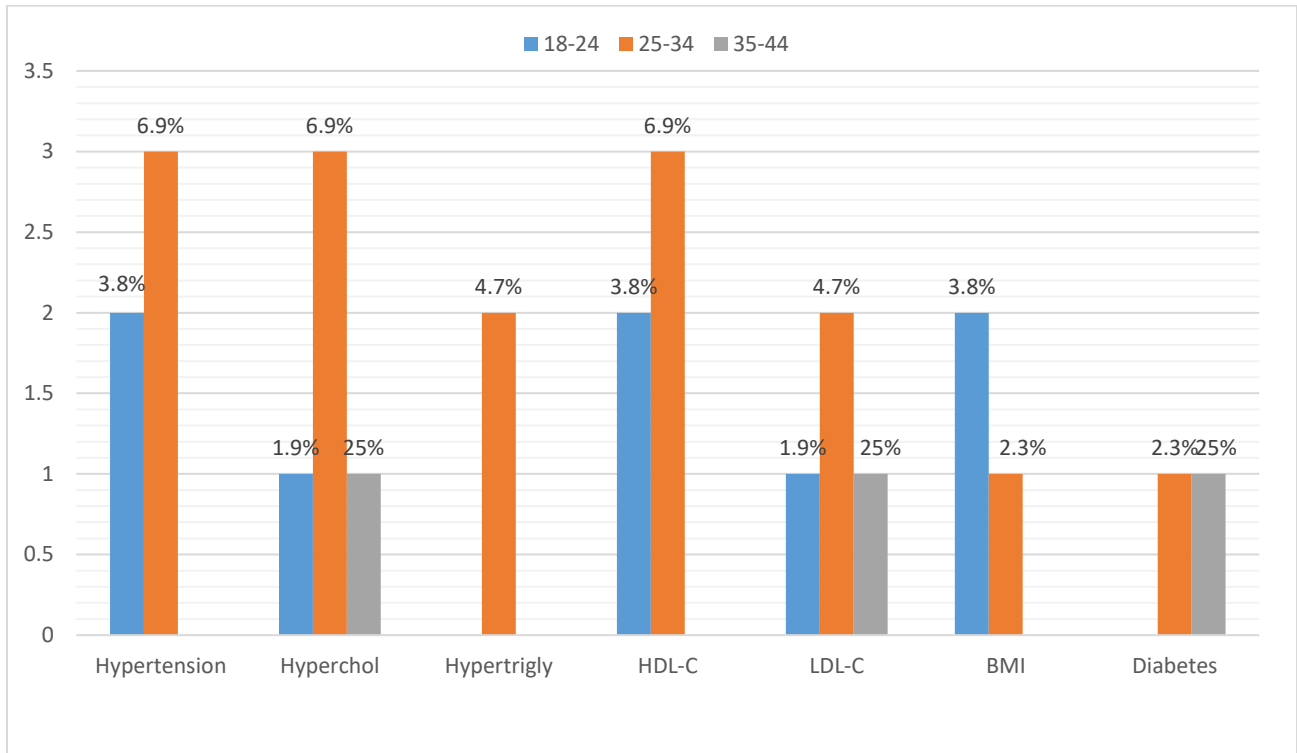| Risk factor	(18-24)%	(25-34)%	(35-44)%	(Overall)%
Hypertension	(2) 3.8	(3) 6.9	(0) 0.0	(5) 5.0
Diabetes	(0) 0.0	(1) 2.3	(1) 25.0	(2) 2.0
Hypercholesterol	(1) 1.9	(3) 6.9	(1) 25.0	(5) 5.0
Hypertriglyceride	(0) 0.0	(2) 4.7	(0) 0.0	(2) 2.0
Low HDL-C	(2) 3.8	(3) 6.9	(0) 0.0	(5) 5.0
LDL –C	(1) 1.9	(2) 4.7	(1) 25.0	(4) 4.0
BMI	(2) 3.8	(1) 2.3	(0) 0.0	(3) 3.0

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Figure 2: Showing the abnormalities within the 18-24, 25 – 34 and 35-44 year of age groups of the sample

Table 6: Prevalence of multiple risk factors

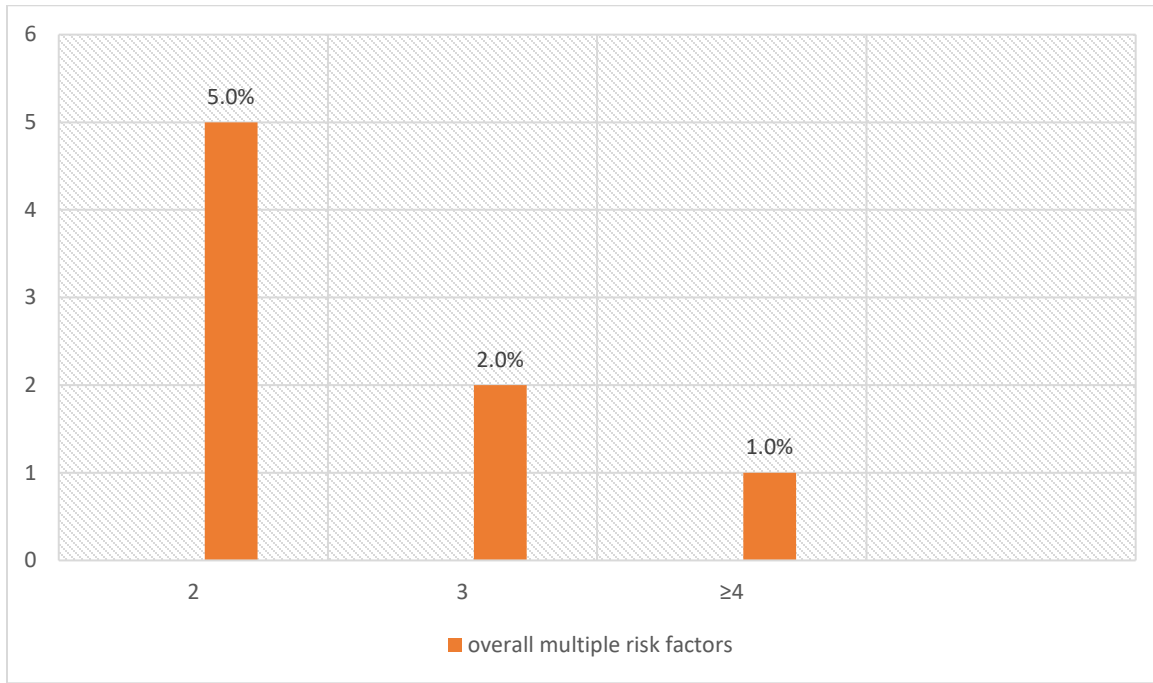| Risk factor	18-24 (n)%	25-34 (n)%	35-44 (n)%	Overall(n)%
2	(2) 3.2	(2) 6.1	(1) 25	(5) 5.0
3	(0)0.0	(2) 6.1	(0) 0.0	(2) 2.0
≥4	(0) 0.0	(0) 0.0	(1) 25	(1) 1.0

Figure 3: Representing the prevalence of multiple rick factor

DISCUSSION

There have been several reports on cardiometabolic risk factors and cardiovascular disease [16] Cardiovascular and its risk factors can acutely have an effect on quality of life. The risk outline of population can be used to propose the burden of atherosclerosis and its problems e.g. stroke. The incidence and number of CAD risk factors envisage occasion cardiovascular events, such as heart attack and stroke in individuals with such risk factors [17]

The current study was a population based screening undertaken to detect or discover the cardiometabolic risk factors in School of Health Technology student's population, aged 18 to 44 years. The findings of the study disclose a moderately elevated prevalence of hypertension (BP ≥140/100 mmHg) affecting 5.0% of the study population, low level of HDL-C affecting 5.0 %, LDL-C affecting

4.0%. The pattern observed propose that the health evolution may be going on at a velocity faster than what should be seen in the population at the early stage of transition. This may aggravate the rate of stroke and other cardiovascular event in the future. The study has further enlightened the burden of risk factors among students with the age range of 18 – 44 years. Preceding researches were made on elderly Nigerians beyond 55years of age in the south- western area of Nigeria.

The prevalence of hypertension (HBP) in this research was 5.0%, indication which shows that hypertension affects a moderately percentage of the adults population in School of Health Technology Minna. Earlier national study [18] and other studies [19] discovered the frequency rate between from 7.0% in the rural area population to 20% of the urban area population. High blood

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pressure as also had been referring to as a key risk factor for cardiometabolic events [9]. The risk factors will perhaps add to the weight of cardiovascular diseases in the near future if primordial and major prevention is not put in place early enough. Therefore, there is an exigencies are required for early diagnosis and treatment of individuals in the pre-hypertensive state using non pharmacological methods of weight reduction.

The clustering of CMR factors in middle age is also worthy of note, signifying the need for a covering completely and integrated approach to tackle CVD. Most frequently an average human being might experience an

increased in body weight and blood pressure with age under the state of contemporary life [16].The testing of lipid profile has also shown some fraction of risk which may result to CVD, Low level of HDL-C were found to be 6.0% of the study population and the relatively high levels of total cholesterol to be 5.0% and triglycerides 2.0% respectively. In south Asians 70.3% were found to have HDL-C Lower than 40mg/dl. [19]

Three percent of the study populations were obese with BMI > 28kg/m2. The study shows that more women were more obese than men. Abnormal obesity had also been used in defining CVD risk factors in this population, rather than overall obesity [20]

CONCLUSION

The fairly high rate of Cardiometabolic risk factors in School of Health Technology population is a sign that the pestilent Cardiovascular disease is frightening in Nigeria, a nation whose health services are before now heavily overburdened by some other challenging public health matters which

are yet to be fully conquered such as in tuberculosis, HIV/AIDS and several other epidemics. The outcome of this study could serve as a footing for advocacy with an exigent call for active for the development of national programs that would advance the control and management of Cardiometabolic risk factors.

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