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DETERMINATION OF CARDIOVASCULAR RISK IN OBESE WOMEN USING THE GLOBORISK SCALE

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SUMMARY

Cardiovascular diseases are the main cause of death in the world, in Mexico the situation is similar, with coronary and cerebrovascular disease responsible for significant morbility and mortality in the Mexican population. The cardiovascular risk factors identified from prospective studies such as the Framingham study explain the growing cardiovascular risk in western population, where the variables inherent to industrialization explain the high incidence and prevalence of these factors. Obesity is considered a cardiovascular risk factor and the lipotoxicity status is associated with it conditions the appearance and persistence of other cardiovascular risk factors such as hypercholesterolemia, hypertension, diabetes mellitus, among others. Therefore, the objective is to determine cardiovascular risk in obese women by a validated instrument for the mexican population. **Method:** An observational, descriptive, cross-sectional, quantitative and qualitative study was carried out in women who participated in the High Obesity (HO) collective in Tehuacán, in the State of Puebla, in the medical-nutritional program (January 1 to June 30, 2022). **Results:** 44 women participated, with an average age of 51.8 years, 100% had some degree of obesity, there was a similar distribution of women stratified according to their body mass index in obesity type I and II, 54.5% and 40.9% respectively. The systolic blood pressure average was 136.3 mm Hg, 29.5% corresponding to 13 women had positive smoking, 61.36% of the sample studied have a positive hereditary history of coronary heart disease or cerebrovascular disease. Regarding cardiovascular risk stratification by office Globorisk, a similar percentage distribution was found in the categories. Category 1: cardiovascular risk less than 5%, 14 women (32%); category 2: cardiovascular risk 5-9%, 16 women (36%); category 3: cardiovascular risk 10-19%, 13 women, (30%), category 4 cardiovascular risk 20-29%: only one woman was stratified (2%). Two important correlations were found, body mass index and cardiovascular risk, which was 0.61, considered moderately high, the other correlation was systolic pressure and cardiovascular risk using Globorisk, which was 0.52, considered moderate. **Conclusions:** 68% of the women had a cardiovascular risk greater than 5%, a high percentage considering the age of the population (40 to 60 years). The body mass index (BMI) is a factor of great relevance in determining cardiovascular risk, a variable that achieved the highest correlation with the Globorisk results. Systolic pressure is the second factor that correlates with an increase in the risk of having a cardiovascular event measured through this instrument. The Globorisk office version model stratified approximately two-thirds of the women studied with a global cardiovascular risk greater than 5%, which is alarming, considering that they are in a productive age group.

INTRODUCTION

The main cause of death on the planet is cardiovascular disease (CVD), with ischemic heart disease being the most predominant, followed by stroke, data from the World Health Organization (WHO).

BACKGROUND

Data provided by the World Health Organization in 2017 show that the number 1 cause of death in the world was heart disease. Every year about 17.7 million people die from these diseases, which represents 31% of all deaths in the world. About 7.5 million were due to coronary heart disease and just over 6.5 million to strokes. More than three quarters of deaths from cardiovascular diseases occur in low income countries such as ours.[1]

The INEGI (2021) indicates that the number 1 cause of death in the world was heart disease. Every year about 17.7 million people die from these diseases, representing 31% of all deaths in the world, of which 7.5 million were due to coronary heart disease and just over 6.5 million to strokes.

Cardiovascular risk factors (CVRF) are classified as non-modifiable such as age, genetic, personal history of cardiovascular diseases and sex.[2,3] Factors that can be modified or controlled include diabetes mellitus, dyslipidemia, obesity, high blood pressure, sedentary lifestyle, smoking, chronic inflammation, infections and immunological damage, polycystic ovary syndrome, non-alcoholic fatty liver disease, as well as acromegaly and Cushing's syndrome.[4,5,6] The risk factors for cardiovascular diseases in Mexican adults show that increased overweight and obesity, sedentary lifestyle, alcohol consumption, high blood pressure and waist circumference measurement are the main cardiovascular risk factors in Mexicans.[6,7]

International consensus has established the risk factors for cardiovascular disease as: obesity, dyslipidemia, smoking, arterial hypertension, diabetes mellitus, in addition to others such as glomerular filtration rate below 60 ml/min, age 65 years in women and 55 in men, history of premature cardiovascular disease CVD, population or ethnicity, biochemical parameters such as elevated C-reactive protein and low HDL.[8]

For the prevention and treatment of CVD, measures aimed at dietary modification and physical activation have been proposed.

The concept of cardiovascular risk is defined as follows: the probability of developing or suffering CVD in a period of 5 to 10 years. To estimate this risk, the sum of the total CVRF is considered.[6] Cardiovascular diseases are a group of heterogeneous conditions that affect the heart and circulatory system; They can be: coronary heart disease that affects cardiac irrigation, cerebral vascular diseases that affect peripheral arteries or pelvic or thoracic limbs or peripheral arterial disease, rheumatic heart disease affects the heart muscle and valves, heart malformations or congenital heart disease and those that have to do with the fibrinolytic process, pulmonary embolisms and deep thromboses.[9]

Cardiovascular disease acute myocardial infarction (AMI) and cerebrovascular accidents (CVA) are acute conditions that obstruct the normal blood flow to the heart muscle or brain and the most important etiological factor is the formation of atheroma plaques in the blood vessels that flow to the heart or brain, the atherosclerosis responsible for these condition, which is a pathology characterized by the presence and accumulation of lipid molecules and remodeling of the vascular wall within the circulatory system.[6]

It has been shown that the majority of cardiovascular diseases can be prevented by detecting and controlling these same CVRFs.[9,10] It is important to know the level of risk of suffering from cardiovascular disease to establish effective prevention actions.[11] The importance of estimating cardiovascular risk has 2 objectives: to identify individuals with high risk of cardiovascular disease and intervene early, the second objective is to encourage those individuals under medical treatment to reduce their cardiovascular risk[12], so the National Cholesterol Education Program in association with American and European groups, use the Framingham score by category, original Framingham, SCORE or European Society of Cardiology model, British Society of Cardiology tables, Shefield, New Zealand and Globorisk.[6]

A study carried out in Mexico states that there are just over 100 models and tools that estimate cardiovascular risk.[13] Despite the high number of models and instruments, not all are valid for the large heterogeneous group of populations around the world, for this reason the Globorisk scale have been published, which were adaptations of the Framingham tables for multiple countries, it was recalibrated for use in Mexico, this study showed that Mexican women in the age group of 40 - 84 years have the second place in risk of suffering from cardiovascular disease.[14,6]

Researchers from Harvard University together with other created the tables for different populations, they were validated with a statistical probability greater than 70% percent of calculating cardiovascular diseases after 10 years[8] this scale stratifies individuals as follows; low risk when it is less than 1%, moderate risk of 1 - 5% and high or very high risk of 6 - 15%, it is also mentioned that there is a proportion of high cardiovascular risk in the Mexican population; 11% in female individuals and 16% in male individuals.[6]

The official Globorisk site defines its cardiovascular risk model as the first to predict strokes or acute myocardial infarction in those individuals who have not had any CVD.[15]

The scale uses parameters and data such as the individual's regional location, sex, age, diabetes, blood pressure and cholesterol to estimate the 10-year probability of cardio vascular disease, heart attack and stroke. It also offers the Globorisk office version that uses BMI and height for those who do not know their cholesterol value or if they have diabetes.[16] CVD is the number one cause of death in women over 50 years of age, only before menopause, cardiovascular risk in females is of a lower degree compared to males. As a result of the biological differences between sex, there are cardiovascular risk factors that are only present in women; such as gestational diabetes, hypertensive diseases of pregnancy and menopause.[17]

These additional CVRFs in women have a high influence on the development of CVD, however, most women ignore the fact that these diseases are the main cause of death in their gender, which makes the role of communication more important.[18] One of the biggest challenges facing the public health system in Mexico is obesity. The WHO (world health organization) defines

obesity as an abnormal accumulation of adipose tissue that is harmful to health.[19,20] At a global level, Mexico occupies second place in obesity in the adult population. Obesity derives from a set of factors: 1) unhealthy or obese genetic environments, 2) inappropriate behavioral responses, including those derived from globalization and urbanization that affect countries development, for example, exposure to processed foods with high energy content, easy access and poor nutritional quality.[21]

Identifying the definition of overweight and obesity as excess or increased fatty tissue within the body that is harmful to health, the WHO has promoted a simple way to classify this disease, the Body Mass Index (BMI) which is obtained by dividing the weight in kilograms by the height (in meters) squared. If a BMI equal to or greater than 25 is obtained, we can consider it overweight, and if it is greater than 30, we will be talking about obesity and its three classifications.[20,22]

A BMI equal or greater than 30 has as related characteristics an increase in visceral fat with its ectopic accumulation in different tissues of the individual and which can also be accompanied by other conditions such as alterations in glucose metabolism, fibrinolytic dysfunction with increase in thrombolysis, increased systemic blood pressure and endothelial inflammation, all of these factors that accompany obesity are related to the appearance of cardiovascular disease.[23,24]

Another way to classify obesity is through indices derived from body circumferences such as waist-height ratio and waist-hip ratio.[23] Fat cells, also called adipocytes, have the ability to secrete molecules, including cytokines, growth factors, and enzymes, that participate in the energy balance of the body. The increase in adipocytes and the increase in the secretion of proinflammatory cytokines cause a lipotoxicity effect, which is the cause of a low-grade systemic inflammatory process.

Some studies show that a greater amount of adipose tissue increases the circulating concentrations of Interleukin 6 (IL-6), C-reactive protein (CRP) and tumor necrosis factor-α (TNF-α). It should be taken into account that the most important cardiovascular risk factors are: sex, age, smoking, systolic blood pressure and total cholesterol or the ratio of total cholesterol to cholesterol and transported by high-density lipoproteins. There are two.[25,8] commonly considered ways to treat obesity, the preventive approach and the therapeutic approach. It is of a general nature to know that the preventive approach may be more efficient and less costly in long term, since it has been shown to prevent secondary conditions of obesity, including hypertension and diabetes mellitus in spite of knowing this information, the therapeutic approach is the most used, it contemplates all the strategies that are directed to modify the lifestyle, modify those behaviors related to the excessive caloric intake and to promote the level of physical activity, it also includes pharmacology with effects on the metabolism of lipids and glucose and surgical procedures which seek to reduce the intake of nutrients.[26]

As described above, we seek to determine the cardiovascular risk in obese women belonging to the High Obesity group of the city of Tehuacán Puebla (Mexico) using the Globorisk office version scale.

METHODOLOGY

An observational, descriptive, cross-sectional, quantitative and qualitative study was carried out. It was carried out at the facilities of the non-governmental organization in the "Alto Obesidad" program in the city of Tehuacán Puebla, from January to June 2022, made up of 44 women who attended the developed program and who met the inclusion criteria such as age (40 and 60 years), degree of obesity, BMI, women who do not have a previous diagnosis of cardiovascular disease, as well as hereditary family history of cardiovascular diseases.

Among the exclusion criteria are women on antihypertensive treatment, anti-obesity treatment, women who do not wish to participate in the study, patients who leave the questionnaires requested for the study incomplete or who did not attend the requested anthropometric measurements and vital signs.

A clinical questionnaire was applied to the women participating in the study where sociodemographic data and cardiovascular risk factors were collected, at the same time anthropometric measurements and blood pressure were taken, using the recommendations of the practical guide of the Mexican clinic for the promotion, prevention and diagnosis of high blood pressure in 2021.

Weight and height were measured according to the protocols of the International Society for the Advancement of Kinanthropometry, women were stratified according to the BMI proposed by the WHO in three obesity categories: grade I (30–34.9) grade II obesity (35–39.9) and grade III obesity (greater than 40), a stadiometer was used to determine height.

The clinical questionnaire included sociodemographic data and cardiovascular risk factors; gender, age, previous diagnosis of diabetes mellitus, high blood pressure or cardiovascular disease, smoking, sedentary lifestyle, family history of first-degree cardiovascular diseases before age 60.

For cardiovascular risk stratification, the Globorisk office instrument was used, using the parameters: ethnicity, gender, age, systolic blood pressure, body mass index and smoking. According to the Globorisk scale, the 10-year cardiovascular risk is classified into the following categories, less than 5%, 5 – 9%, 10 – 19%, 20 – 29%, 30 – 39%, 40 – 49% and greater than 50%. For the purposes of this study, two groups were determined;

women with risk less than 5% and with risk greater than 5% of presenting cardiovascular disease at 10 years.

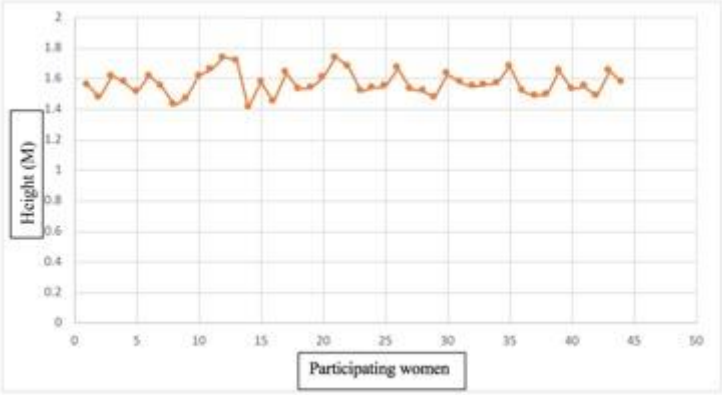
RESULTS

In the present study, a total of 89 women were included with an age range between 40 and 60 years, of which 44 met the inclusion and exclusion criteria determined for this study. The participants attended the registration of measurements and application of the questionnaire in the period from January 1 to June 30, 2022, the participants were classified as having type I, II or III obesity according to the stratification criteria proposed by the WHO.

Regarding nationality, 100% of the participants are Mexican, they belong to the municipality of Tehuacán, state of Puebla. Nationality or ethnicity is a cardiovascular risk factor that cannot be modified unlike other factors, which confers greater protection or, otherwise, increases the risk of certain populations from cardiovascular disease.

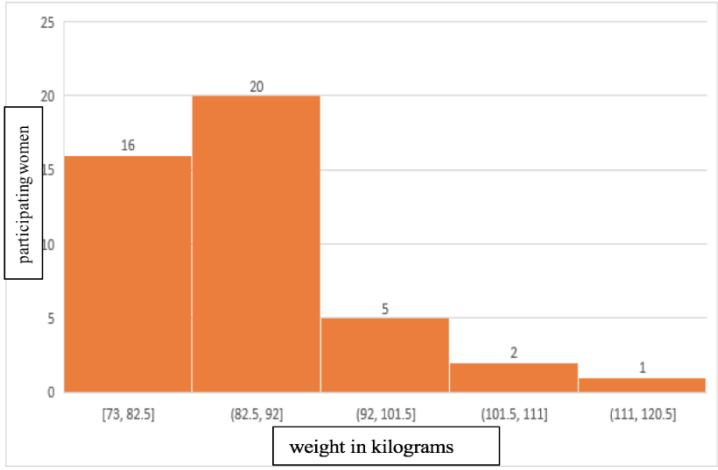
Female sex represents 100%, gender is another cardiovascular risk factor that cannot be modified, there are significant differences with respect to male sex, women maintain a protective factor until before menopause, estrogen hormone levels seem to be the main protective system against degeneration and remodeling of muscle tissue, such as the vascular system and heart muscle.

Graph 1 shows the average height of the group of women who participated in Note. Source and own elaboration the research considered in meters and the average was 1.57 meters.



Note. Source and own elaboration

Graph 1: Height distribution of women participating in the study.



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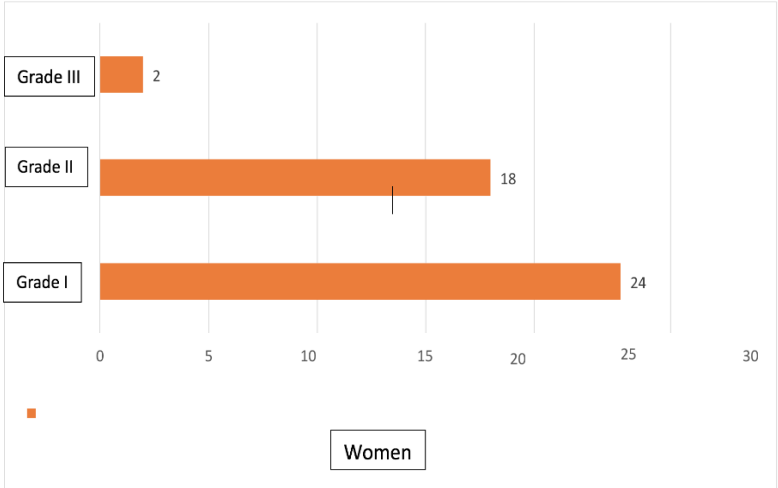
Graph 2: Frequency of participating women in the study according to weight ran.

Regarding the weight range of the group of 44 participating women, the minimum weight was 73 kilograms, the maximum weight corresponded to 115.6 kilograms; The average Weight corresponded to 86.8 kilograms. Graph 2 indicates the number of women according to the average for each weight.

Taking into consideration that the Average height of women is 1.57, 100% of women are overweight studied

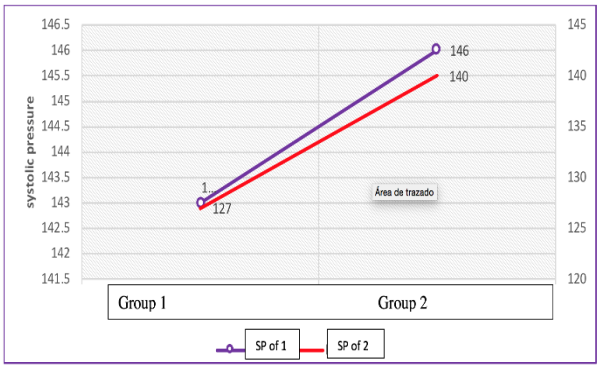
Graph 3 shows the group of women studied with the BMI variable, where the number of women by degree of

obesity is indicated; For analysis, they were divided according to the stratification proposed by the WHO:
Grade III obesity: 2 women were detected, corresponding to 4.5%.
Grade II obesity: 18 women were found, which corresponds to 40.9%.
Grade I obesity: 24 women were found, which corresponds to 54.5%.



Note. Source and own elaboration

Graph 3: Distribution of women according to Body Mass Index.



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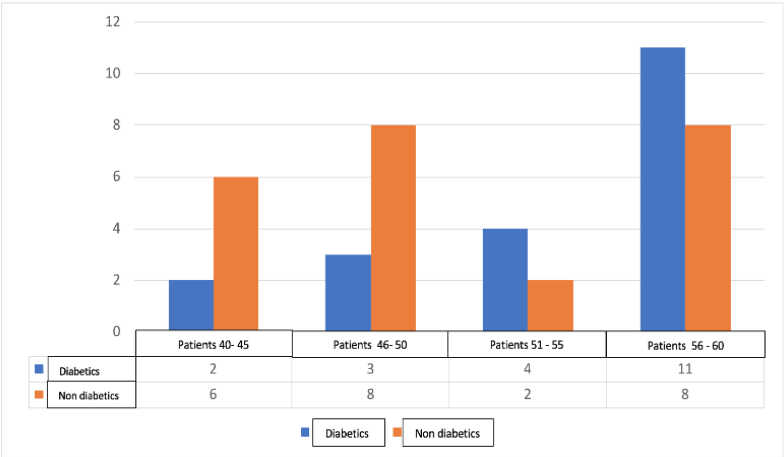
Graph 4. Systolic blood pressure range by age group.

Regarding systolic pressure, (Graph 4) it was analyzed in 2 groups, participants aged 40 to 50 years. Group 1: It was observed that the patients had a pressure range of 143 to 146 and Group 2 from 50 to 60, it was observed who had a systolic pressure range of 127 to 140. Which indicates that the older they are, the lower the systolic pressure.

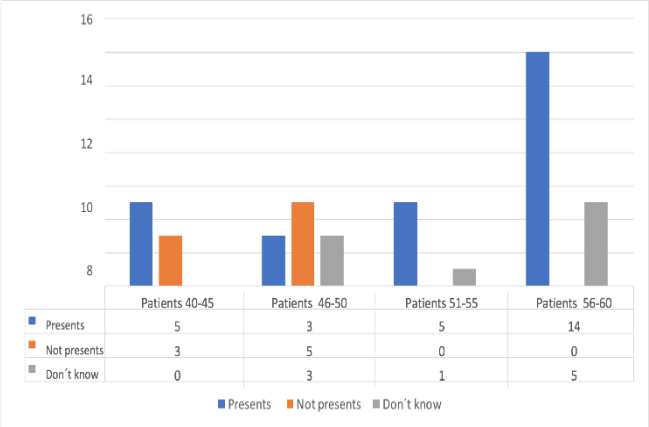
Regarding the link with type II diabetes, the total number of women who indicated this condition was 20, which corresponds to 45.4%, divided by age as shown in graph 5, observing that the older they are, the number of obese diabetic patients increases.

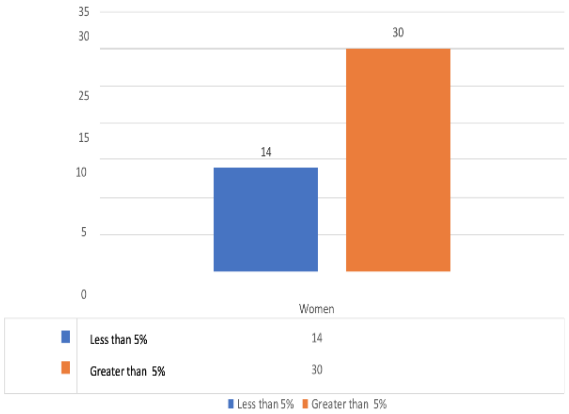
According to the age of the groups that participated, patients with an inherited family history of cardiovascular diseases such as acute myocardial infarction or cerebrovascular disease are described, 27 women with this history (61.36%), and who were also classified by age for analysis.



Graph 5: Presence of type II diabetes by age group.

Of the patients who have a family history, they were identified as having some cardiovascular condition such as: acute myocardial infarction or cerebrovascular disease; a total of 27 women had this history (61.36%) (Graph 6).





Note. Source and own elaboration

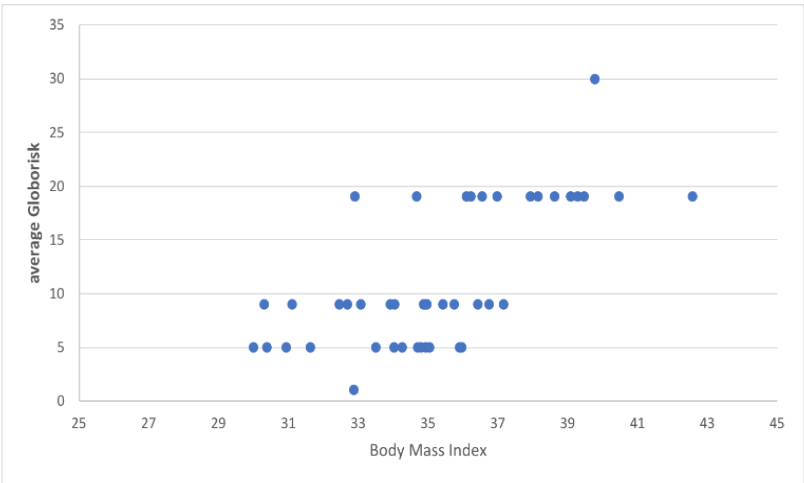
Graph 6. Patients with a cardiovascular Cardiovascular history in family years of age members under 60

Graph 7. Determination of Risk less than and greater than 5% in women studied using Globorisk.

Graph 7 shows the results of participating women, who were grouped into four categories and using Globorisk, the determination of cardiovascular risk less than and greater than 5% was carried out, obtaining the following results: Category 1: Determination of cardiovascular risk less than 5% in obese women using office Globorisk, detecting 14 women out of 44 participants, representing 32% of the total sample studied.

Category 2: Determination of cardiovascular risk greater than 5% in obese women using office Globorisk, detecting 30 women of the 44 participants, which represent 68% of the total sample studied.

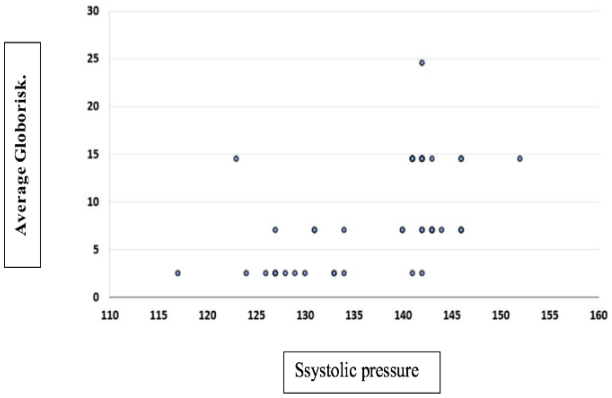
It is important to note that a percentage of cardiovascular risk above 1% may be attributable to modifiable risk factors in a productive population that does not belong to the elderly, such as the population participating in this study.



Note. Source and own elaboration

Graph 8: Correlation between Body Mass Index and percentage of cardiovascular risk by Globorisk.

Graph 8 corresponds to the correlation between BMI and percentage of cardiovascular risk using Globorisk, giving a correlation of 0.61 for the population sample, which can be considered moderately high, and was the highest correlation found in this study. Obesity can be considered one of the most important cardiovascular risk factors in the development of cardiovascular disease. This indicative correlation coincides with the fact that the higher the body mass index, the greater the associated cardiovascular risk in a period of 10 years.

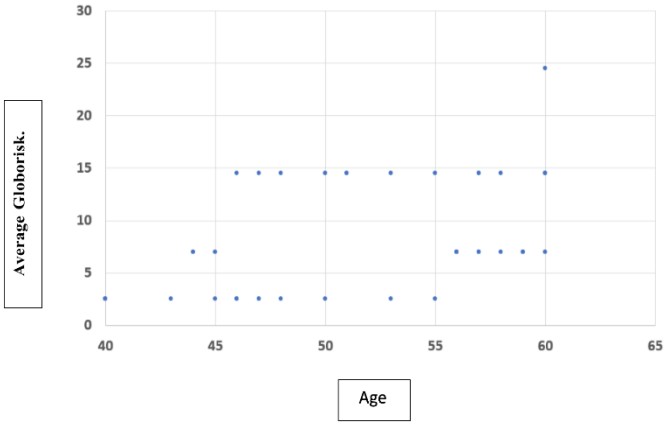


Note. Source and own elaboration

Graph 9: Correlation between systolic pressure and the percentage of cardiovascular risk measured through Globorisk.

Graph 9 shows the correlation between systolic pressure and percentage of cardiovascular risk using Globorisk, reaching a value of 0.52, so both variables can be considered medium or moderate. These results are of great relevance, since high levels of systolic pressure are positioned as the second factor that correlates with a greater cardiovascular risk measured through Globorisk, so attention must be paid to monitoring and controlling blood pressure as a factor. paramount in the prevention of cardiovascular events and accidents.

Graph 10 corresponds to the third correlation of cardiovascular risk measured through the Globorisken in relation to age, reaching a value of 0.45, which is interpreted as a correlation between moderate and low. The result confirms what is documented in the literature at an older age, the possibility of suffering a cardiovascular event or accident tends to increase.



Note. Source and own elaboration

Group 10: Correlation of cardiovascular risk measured through Globorisk and age.

DISCUSSION

Due to the scope of this study, the Globorisk office version was used since it has the advantage of being used in the doctor's office without the requirement of laboratory tests, which gives it great strength at the time of its application, as it is a test that can be applied to large populations, which is practical when considered as a routine test in general medicine consultation, using the following cardiovascular risk factors; population, age, gender, BMI, systolic blood pressure and presence of smoking, for the purpose of this research, those women who presented a risk greater than and less than 5% were considered.

Considering the results, we agree that cardiovascular disease is the main cause of death in women aged 50 years.[16]

It was also possible to observe the studies regarding systolic blood pressure that can be considered high according to criteria established in the Mexican guide for the diagnosis and management of high blood pressure in 2021. Which is similar to what was reported by the National Health and Safety Survey. Nutrition (ENSANUT, 2012) where the prevalence of arterial hypertension in adults is reported, this is 31.5%, while in obese patients it rises to 42% and 65.5 in patients with diabetes.[27]

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