# CARDIOVASCULAR RISK IN HYPERTENSIVE PATIENTS REGISTERED IN A HEALTH UNIT IN NORTHERN BRAZIL

## Risco cardiovascular em hipertensos cadastrados em uma unidade de saúde no Norte do Brasil

## Riesgo cardiovascular de pacientes con hipertensión registrados en una unidad de salud en el norte de Brasil

**Sintia Mara Haito** (iD)
Federal University of Rondônia (*Universidade Federal de Rondônia*) - Porto Velho (RO) - Brasil

**Kátia Fernanda Alves Moreira** (iD)
Federal University of Rondônia (*Universidade Federal de Rondônia*) - Porto Velho (RO) - Brasil

**Jeanne Lúcia Gadelha Freitas** (iD)
Federal University of Rondônia (*Universidade Federal de Rondônia*) - Porto Velho (RO) - Brasil

**Rodrigo Almeida de Souza** (iD)
Federal University of Rondônia (*Universidade Federal de Rondônia*) - Porto Velho (RO) - Brasil

**Edson dos Santos Farias** (iD)
Federal University of Rondônia (*Universidade Federal de Rondônia*) - Porto Velho (RO) - Brasil

**ABSTRACT**

**Objective:** To assess cardiovascular risk using the Framingham risk score (FRS) and its possible associated factors in a basic health unit (UBS) in the northern region of Brazil. **Methods:** Cross-sectional study conducted with 55 hypertensive users registered at a UBS, between September 2018 and February 2019, in the municipality of Nova Mamoré, Rondônia, Brazil. The FRS was classified into three categories: low risk (<10% / 10), intermediate (10–20% / 10) and high risk (> 20% / 10). Multinomial logistic regression analysis was used to examine the association of the dependent variable FRS with sociodemographic, behavioral, anthropometric, and biochemical variables. **Results:** It was observed that users had high blood pressure levels of systemic arterial hypertension (SAH) (76.4%), showing a high prevalence of uncontrolled SAH. Exposure to cardiovascular risk factors by the FRS was high, highlighting the components of MS. The prevalence of low (25.5%), intermediate (32.7%), and high (41.8%) risk were found. The factors associated with the risk of cardiovascular disease (CVD) were: male, elderly, inactive, overweight, high triglycerides, high systolic blood pressure, high fasting blood glucose, and high waist circumference. **Conclusion:** The study presented high-pressure levels of hypertension and high risk for cardiovascular events, according to the FRS, in components three and four, associated with the male gender, the elderly population, overweight, increased triglyceride levels, systolic blood pressure, fasting blood glucose and waist circumference.

**Descriptors:** Hypertension; Risk Factors; Primary Health Care.

**RESUMO**

**Objetivo**: Avaliar o risco cardiovascular pelo escore de risco de Framinghan (ERF) e seus possíveis fatores associados em uma unidade básica de saúde (UBS) na região Norte do Brasil. **Métodos:** Estudo transversal realizado com 55 usuários hipertensos cadastrados em uma UBS, entre setembro de 2018 e fevereiro de 2019, no município de Nova Mamoré, Rondônia, Brasil. O ERF foi classificado em três categorias: baixo risco (<10%/10), intermediário (10–20%/10) e alto risco (> 20%/10). A análise de regressão logística multinomial foi utilizada para examinar a associação da variável dependente ERF com as variáveis sociodemográficas, comportamentais, antropométricas e bioquímicas. **Resultados**: Observou-se que os usuários apresentaram níveis pressóricos de hipertensão arterial sistêmica (HAS) elevados (76,4%), exibindo alta prevalência de descontrole da HAS. A exposição a fatores de risco cardiovascular pelo ERF foi elevada, destacando os componentes da SM. Encontraram-se as prevalências

de risco baixo (25,5%), intermediário (32,7%) e alto (41,8%). Os fatores associados ao risco de doença cardiovascular (DCV) foram: sexo masculino, idoso, inativo, excesso de peso, triglicerídeo elevado, pressão arterial sistólica elevada, glicemia em jejum elevada e circunferência da cintura elevada. **Conclusão**: O estudou apresentou níveis pressóricos de hipertensão elevados e alto risco para eventos cardiovasculares, segundo o ERF, nos componentes três e quatro, associados ao sexo masculino, à população idosa, ao excesso de peso, ao aumento dos níveis de triglicerídeos, à pressão arterial sistólica, à glicemia em jejum e à circunferência abdominal.

**Descritores**: Hipertensão; Fatores de Risco; Atenção Primária à Saúde.

**RESUMEN**

**Objetivo**: Evaluar el riesgo cardiovascular a través de la puntuación de riesgo de Framinghan (PRF) y sus posibles factores asociados en una unidad básica de salud (UBS) de la región norte de Brasil. **Métodos:** Estudio transversal realizado con 55 usuarios con hipertensión registrados en una UBS entre septiembre de 2018 y febrero de 2019 en el municipio de Nova Mamoré, Rondônia, Brasil. La PRF ha sido clasificada en tres categorías: bajo riesgo (<10%/10), intermedio (10–20%/10) y alto riesgo (> 20%/10). El análisis de regresión logística multinomial fue utilizada para verificar la asociación de la variable dependiente PRF con las variables sociodemográficas, de conducta, antropométricas y bioquímicas. **Resultados**: Se ha observado que los usuarios presentaron niveles de hipertensión arterial sistémica (HAS) elevados (76,4%) con alta prevalencia de su descontrol. La exposición de factores de riesgo cardiovascular por la PRF ha sido elevada con énfasis para los componentes de la SM. Se ha encontrado las prevalencias de bajo (25,5%), intermedio (32,7%) y alto (41,8%) riesgo. Los factores asociados con el riesgo para la enfermedad cardiovascular (ECV) fueron: el género masculino, ser mayor, inactivo, el exceso de peso, el triglicérido elevado, la tensión arterial sistólica elevada, la glucosa sanguínea en ayunas elevada y la circunferencia de la cintura elevada. **Conclusión**: El estudio presentó niveles de hipertensión elevados y alto riesgo para eventos cardiovasculares según la PRF para los componentes tres y cuatro asociados con el género masculino, la población de mayores, el exceso de peso, el aumento de los niveles de triglicéridos, la presión arterial sistólica, la glucosa sanguínea en ayunas y la circunferencia abdominal.

**Descriptores**: Hipertensión; Factores de Riesgo; Atención Primaria de Salud.

## INTRODUCTION

Systemic arterial hypertension (SAH) is the main risk factor for cardiovascular diseases (CVD), being a clinical condition associated with high mortality[1]. It is also noteworthy that about 80% of hypertensive patients have comorbidities associated with a close relationship with the components of metabolic syndrome (MS) and lifestyle behavioral factors[2-4].

It is estimated that a man with metabolic syndrome (MS) is two to three times more likely to have cardiovascular disease (CVD) than those without MS[5-7]. The Framingham risk score *(FRS)* is a simplified process and a common tool for assessing the CVD risk level over 10 years[1,8].

The FRS considers six risk factors for coronary artery disease (CAD), including age, sex, total cholesterol (TC), high-density lipoprotein cholesterol (HDL), smoking, and systolic blood pressure[9].

Therefore, it is recommended to evaluate the predictive value of FRS in detecting CVD risk in users with MS. Still, because of the difference in the nature of risk factors for CVD in different populations, its replication seems to be necessary for primary care through Family Health teams[9].

In Brazil, the implementation of surveillance systems for these factors is in line with this new approach. However, many challenges remain when confronting CVDs, especially concerning the integration of public policies into health services. In this sense, primary care is shown as a fundamental link between health policies and the community, and the FRS as a potential structure in the consolidation of health promotion. Therefore, the objective of the study was to assess cardiovascular risk by the FRS and its possible associated factors in hypertensive users registered in a basic health unit in the northern region of Brazil.

## METHODS

This is an observational and cross-sectional, non-probabilistic study, carried out in the basic health unit (*Unidade Básica de Saúde - UBS*) of the territory in which the Family Health team works in the municipality of Nova Mamoré, state of Rondônia, with a human development index (HDI) of 0.587, considered low[10]. It has two general practitioners, two nurses, a general surgeon, a nutritionist, a dentist, and a speech therapist.

To meet the study's proposal, 111 users with SAH were registered by the community health agents (CHA), considered a mandatory component, in addition to the presence of at least one more component of MS of both sexes, in the age group of 30 to 74 years old, during the period from September 2018 to February 2019. They participated in all stages of the study: filling out the questionnaire and anthropometric and biochemical tests (49.5%; n = 55) of users registered at UBS.

The diagnosis of MS followed the recommendation proposed by the National Cholesterol Education Program's Adult Treatment Panel (NCEP-ATP III)[11]: high triglycerides (TG) (≥ 150 mg / dL); high systolic blood pressure (SBP) (≥ 130 mg / dL); high diastolic blood pressure (DBP) (≥ 85 mg / dL); low HDL cholesterol for men (<40 mg / dL) and women (<50 mg / dL); high abdomen circumference (abdominal obesity) for men (≥102 cm) and women (≥88 cm); and high fasting blood glucose (mU / L) (≥100 mg/dL). For the categorization of variables, the protocols recommended and proposed by the Brazilian Society of Cardiology were used (SBC)[12].

For the survey of demographic and behavioral data, a self-report questionnaire was developed, applied by the community health agents of the unit after training conducted by the researcher of the study. Demographic variables considered gender, adult age (<60 years) and elderly (≥60) (13), and behavioral variables: smoking and drinking alcohol, categorized as follows: daily smoking, at least one cigarette per day (1 = yes), never smoked (0 = no).

Alcohol abuse, defined as drinking five or more drinks for men and four or more drinks for women, on a single occasion, in the last 30 days[14], was carried out from the following questions: a) "In the last 30 days, did you consume five or more doses of alcoholic drink on a single occasion?", for men; and b) "In the last 30 days, did you consume four or more doses of alcoholic drink on a single occasion?", for women. The answer "yes" to these questions was considered to be abusive alcohol consumption, regardless of the number of times this occurred. A dose of alcoholic beverage is equivalent to a can of beer, a glass of wine or a dose of cachaça, whiskey, or any other distilled alcoholic drink.

To assess the level of physical activity, the official short version, in Portuguese, of the international physical activity questionnaire (IPAQ) was applied in face-to-face interviews, with a recall period of the previous seven days.

The physical activity score was calculated as the sum of the minutes of moderate activity (including fast and moderately fast walking) plus twice the minutes of vigorous activity. The IPAQ defines moderate activities as those that produce a moderate increase in the rate of breathing, heart rate, and sweating for at least 10 minutes in duration.

Vigorous activities are defined as those that produce vigorous increases in the same variables. Inactivity was defined as a score below 150 min sem-[1], according to the recommendations of the US Surgeon General's Report of the American College of Sports Medicine (ACSM) and the CDC[15].

The researcher doctor and the nurse at the health unit performed an anthropometric assessment of weight, height, and waist circumference (WC). To calculate the body mass index (BMI), the formula BMI = [weight / (height) 2] was used, grouped into two categories: adequate weight (BMI <25kg / m2) and overweight (BMI≥25kg / m2)[16].

The Framingham risk equation was computed as the probability of developing more than one coronary event in 10 years, by sex, using the following parameters: age, total cholesterol, HDL cholesterol, smoking, SBP, DBP, and fasting blood glucose[17]. After the calculation, the groups were classified into three categories: low risk (<10% / 10), intermediate (10-20% / 10) and high risk (>20%/10)[17].

Statistical analysis was performed using the Statistical Package for Social Science (SPSS), version 20, for Windows®. Association between FRS categories was analyzed by the number of MS components using the chi-square test and multinomial logistic regression analysis was used to examine the association of the dependent variable FRS (reference / 0 = low risk) between the independent variables categorized: sex, age, physical activity, overweight, consuming alcohol, smoking and cardiovascular risk (CVR) of MS low HD, TG, mU / L, SBP, high DBP, respectively. Adjusted the odds ratio (OR) and 95% confidence intervals (CI$_{95\%}$), different levels for the FRS were calculated. The potential confounding variables in the multiple logistic regression analysis were: age and overweight. P-values less than 0.05 were considered statistically significant.

The study was approved by the Research Ethics Committee with human beings at the Federal University of Rondônia (Opinion No. 2.829.243).

## RESULTS

55 individuals participated in the study, with a mean age of 58.7 ± 10.7 years, with no statistically significant differences between genders (p=0.0445). There was a predominance of females (72.7%; n = 40), and most registered users had high blood pressure levels of 76.4% (n=42).

Figure 1 shows the REF association and the components of MS. The highest prevalence of low risk occurred in components two (35.7%) and three (35.7%); in the intermediate, three (33.3%) and four (22.2%); at high risk, three (39.1%) and four (39.1%), respectively.

In demographic variables, the highest prevalence (%) with the high FRS classification were: male gender (53.3%) and age> 60 years (54.2%). In the behavioral ones, they were: smoking daily (55.6%), being physically inactive (42.2%), and being overweight (42.6%) (Table I).

Through multinomial logistic regression, the variables associated with the risk of MS, according to FRS classified as high risk, were: male gender (OR = 1.40; $CI_{95\%}$ 1.11-1.93), being elderly ( OR = 1.92; $CI_{95\%}$ 1.02-2.39), being physically inactive (OR = 1.32; $CI_{95\%}$ 1.12-159), being overweight (OR = 1.28; $CI_{95\%}$ 1 , 12-1.45), high TG (OR = 1.04; $CI_{95\%}$ 1.01-1.09), high SBP (OR = 1.04; $CI_{95\%}$ 1.01-1.07), mU / Elevated L (OR = 1.02; $CI_{95\%}$ 1.01-1.07) and elevated WC (men ≥102 cm and women ≥ 88 cm) (OR = 1.15; $CI_{95\%}$ 1.05-1.27) (Table II).

In the variables of the components of MS, we found: high TG, high SBP, high DBP, high mU / L, low HDL, and high WC (Table I).
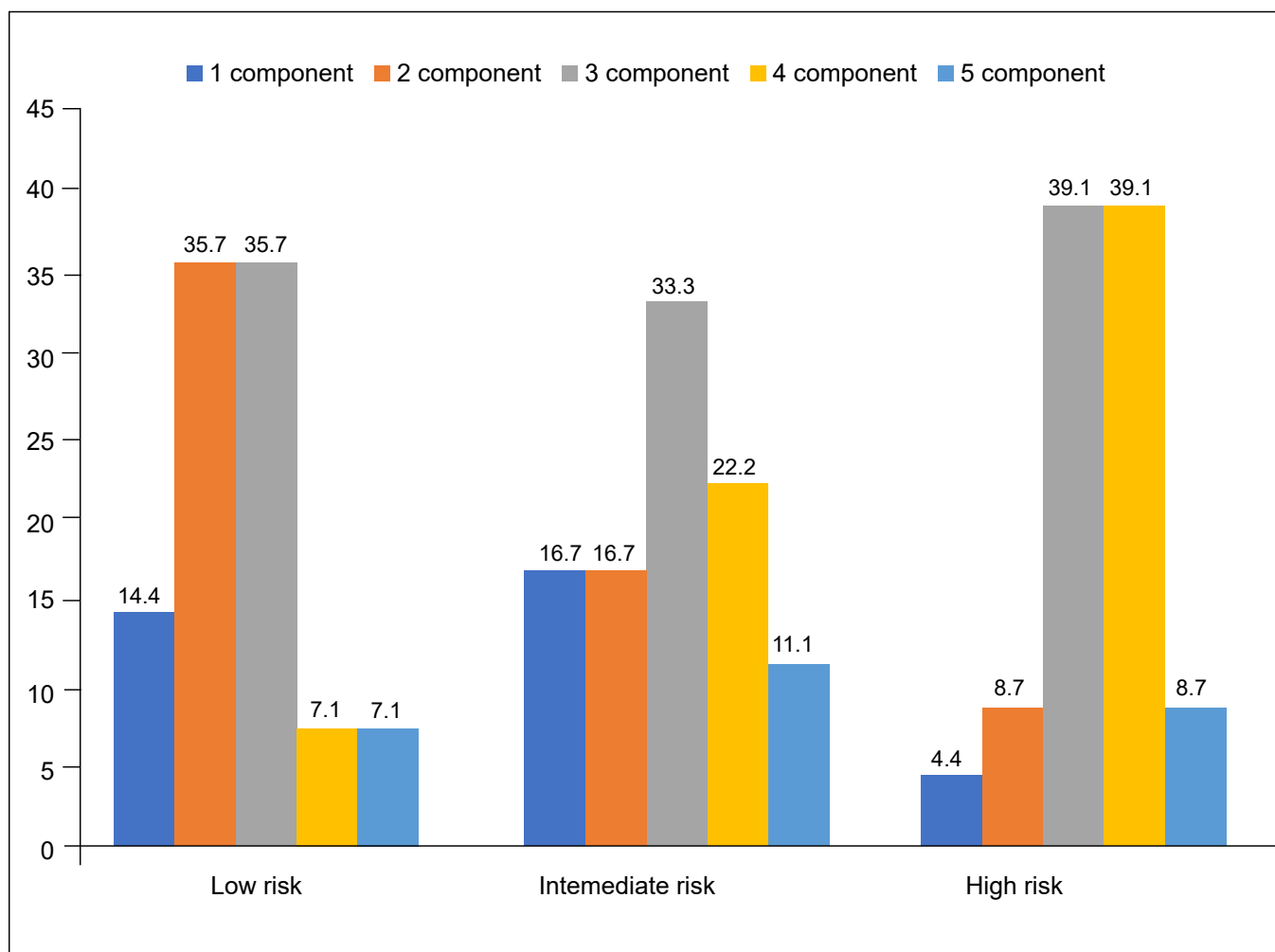


Figure 1 - Association between the categories of the Framingham risk score (FRS) and the number of components of the metabolic syndrome (MS) in users of a basic health unit (UBS) in the municipality of Nova Mamoré, Rondônia, Brazil, 2018- 2019.

Table I - Prevalence (%) of demographic, behavioral and MS components according to the FRS in UBS users in the municipality of Nova Mamoré, Rondônia, Brazil, 2018-2019.

| Variables | | Framingham risk score (FRS) | | | |
| | | Low risk | Intermediate risk | High risk | p |
| | n (%) | n (%) | n (%) | n (%) | |
|---|---|---|---|---|---|
| **Users** | 55 (100) | 14 (25.5) | 18 (32.7) | 23 (41.8) | - |
| **Demografic** | | | | | |
| **Sex** | | | | | 0.036 |
| Male | 15 (27.3) | 1 (6.7) | 6 (40.0) | 8 (53.3) | |
| Female | 40 (72.7) | 13 (32.5) | 12 (30.0) | 15 (37.5) | |
| **Age** | | | | | 0.017 |
| Adult | 31 (56.4) | 11 (35.5) | 10 (32.3) | 10 (32.3) | |
| Elderly | 24 (43.6) | 3 (25.5) | 8 (33.3) | 13 (54.2) | |
| **Behavioral** | | | | | |
| **Smoking daily** | | | | | 0.058 |
| Yes | 9 (16.4) | 1 (11.1) | 3 (33.3) | 5 (55.6) | |
| No | 46 (83.6) | 13 (28.3) | 15 (32.6) | 18 (39.1) | |
| **Consume alcohol daily** | | | | | 0.139 |
| Yes | 13 (23.6) | 4 (30.8) | 4 (30.8) | 5 (38.5) | |
| No | 42 (76.4) | 10 (23.8) | 14 (33.3) | 18 (42.9) | |
| **Physical activity** | | | | | 0.001 |
| Active | 12 (21.8) | 6 (50.0) | 2 (16.7) | 4 (33.3) | |
| Inactive | 43 (78.2) | 8 (18.6) | 16 (37.2) | 19 (44.2) | |
| **Overweight** | | | | | 0.041 |
| Suitable weight | 8 (14.5) | 3 (37.5) | 2 (25.0) | 3 (37.5) | |
| Overweight | 47 (85.5) | 11 (23.4) | 16 (34.0) | 20 (42.6) | |
| **MS components** | | | | | |
| High TG (≥150 mg/dl) | 35 (63.6) | 6 (17.1) | 12 (34.3) | 17 (48.6) | 0.048 |
| High SBP (≥130 mg/dl) | 44 (80.0) | 10 (22.7) | 13 (29.6) | 21 (47.7) | 0.069 |
| High DBP (≥85 mg/dl) | 41 (74.5) | 10 (24.4) | 11 (26.8) | 20 (48.8) | 0.209 |
| high mU / L (≥100 mg/dl) | 21 (38.2) | 2 (9.5) | 6 (28.6) | 13 (61.9) | 0.010 |
| Low HDL (H < 40 mg/dl, M < 50 mg/dl) | 26 (47.3) | 8 9 (30.8) | 8 (30.8) | 10 (38.5) | 0.453 |
| High WC (H ≥102 cm, M ≥ 88 cm) | 42 (76.4) | 10 (23.8) | 15 (35.7) | 17 (40.5) | 0.002 |

Chi-square and Fisher's exact test; TG: triglycerides; SBP: systolic blood pressure; DBP: diastolic blood pressure; mU / L: fasting blood glucose; HDL: high density lipoprotein; WC: abdominal circumference; Overweight: overweight + obesity

Table II - Association between risk factors for MS according to the FRS in users of a UBS in the municipality of Nova Mamoré, Rondônia, Brazil, 2018-2019.

| Variables | | Framingham risk score (FRS) | | |
|---|---|---|---|---|
| | | Low (<10%) | Intermediate (10-20%) | High (>20%) |
| Sex (male) | OR $IC_{95\%}$ | Ref. 1 | 1.05 0.82 – 1.34 | 1.40 1.11 – 1.93 |
| Age (elderly) | OR $IC_{95\%}$ | Ref. | 1.31 1.10 – 1.55 | 1.92 1.02 – 2.39 |
| Physical activity (inactive) | OR $IC_{95\%}$ | Ref. 1 | 1.25 1.11 – 1.39 | 1.32 1.12 – 1.59 |
| Excess weight (S + O) | OR $IC_{95\%}$ | Ref. 1 | 1.27 1.17 – 1.37 | 1.28 1.12 – 1.45 |
| High TG (≥150 mg/dl) | OR $IC_{95\%}$ | Ref. 1 | 1.01 0.99 – 1.02 | 1.04 1.01 – 1.11 |
| High SBP (≥130 mg/dl) | OR $IC_{95\%}$ | Ref. 1 | 1.15 1.02 – 1.39 | 1.21 1.11 – 1.52 |
| High DBP (≥85 mg/dl) | OR $IC_{95\%}$ | Ref. 1 | 0.97 0.92 – 1.02 | 1.03 0.98 – 1.07 |
| high mU / L (≥100 mg/dl) | OR $IC_{95\%}$ | Ref. 1 | 1.01 0.99 – 1.04 | 1.02 1.01 – 1.07 |
| Low HDL (H <40 mg/dl, M <50 mg/dl) | OR $IC_{95\%}$ | Ref. 1 | 0.96 0.89 – 1.05 | 0.95 0.88 – 1.03 |
| High WC (H ≥102 cm, M ≥88 cm) | OR $IC_{95\%}$ | Ref. 1 | 1.01 1.00 – 1.02 | 1.15 1.05 – 1.36 |

Ref.: group reference; TG: triglycerides; SBP: systolic blood pressure; DBP: diastolic blood pressure; mU / L: fasting blood glucose; HDLn: high density lipoprotein; WC: abdominal circumference; Overweight: overweight + obesity.

## DISCUSSION

In the present study, it was observed that users registered at UBS São José, in the municipality of Nova Mamoré, Rondônia, Brazil, had high blood pressure levels (76.4%), showing a high prevalence of uncontrolled SAH. Exposure to cardiovascular risk factors by the FRS was high, highlighting the components of MS. Also, according to the results of the multinomial logistic regression analysis, users with unbalanced SBP became more susceptible to exposure from being classified by the evaluation of the FRS in the intermediate and high-risk components for cardiovascular diseases.

Some studies[3,4,9,18,19] evidence these findings, demonstrating that the prevention of morbidity and mortality in the cardiovascular system implies a stratified approach to hypertension, with objective, goals and preventive actions against the risk of coronary artery disease and cardiovascular diseases, which are generally associated with overweight, SBP, triglycerides, fasting blood glucose, high waist circumference, and low HDL. The variables identified for the components of MS are four times more likely to have a high-risk score for coronary artery disease (CAD).

It should be noted that blood pressure levels influence the improvement of blood pressure and that the control of hypertension is the result of a complex system that includes biological, socioeconomic, cultural, and health structure aspects. Inadequate blood pressure control can be attributed to characteristics related to the provision of health services and the user[4-6].

The cardiovascular risk factors assessed by the FRS were classified as high risk. These data indicate that high blood pressure, in most cases is not just an isolated condition, but is part of the profile of the high cardiovascular risk individual[1,6,9].

Low control rates were related to inadequate user approach, ineffective treatment, low adherence to treatment, difficulty in accessing services, and purchase of medications[20].

The highest prevalence and associated factors belong to the class of male and elderly hypertensive users. This information is very relevant for visualizing the health in the studied population, showing the presence of the components of MS, such as high cholesterol, unbalanced SBP, high fasting blood glucose, high waist circumference, and low HDL. The findings are compatible with studies published in the national[1,3,4,21,22] and international[23,24] literature, showing that cardiovascular disease still affects men more than women, with gender being a risk factor not modifiable.

The higher average age observed in the hypertensive group reflects the rates found in the general population in which there is a tendency to increase SAH in the largest age groups and a high incidence among the elderly[25]. Researchers refer that approximately 65% of the elderly worldwide are hypertensive, but they warn that age-related pressure increase is not considered a physiological condition[26].

With advancing age, chronic degenerative diseases stand out and, among them, coronary disease. The incidence of ischemic heart disease from the age of 60 is 15% in men and 9% in women. With a clinical diagnosis, coronary heart disease increases to 20%, both in men and women. Autopsy studies in clinics of patients 60 years of age or older revealed that 70% of them had one or more coronary vessel occlusions[26,27].

The present finding allows the team of the territory covered by UBS, through information, to plan strategic actions for the prevention and control of cardiovascular risks in registered users classified as hypertensive. With age, obesity has an increasing tendency, resulting from reductions in the levels of physical activity and a decrease in resting metabolism. This association can be observed in studies that obtained results that demonstrated the increased prevalence of excess weight, which occurs from the age of 30, involving several factors (biological, demographic, socio-cultural, and behavioral) associated with weight gain[27,28].

Insufficiently active people increase the risk of mortality by 20% and 30%[25]. It is estimated that 3.2 million people die each year due to physical inactivity[29]. A study carried out in Pelotas showed that spending on hospitalizations by SUS for cardiovascular diseases (R$ 4,250,000.00) could be saved by approximately R $ 2,1000,00 if the physically inactive population were to become active[30].

In Brazil, in a population-based survey, they verified the agglomeration score of cardiovascular risk factors, ranging from zero to three: no exposure or exposure to one, two, and three or more factors, and physical inactivity was the most prevalent factor across all categories. In category three or more risk factors, the prevalence, followed by physical inactivity, were: central obesity, hypertension, and inadequate diet[28].

The prevalence of overweight in the studied group of users was high, being associated with high cardiovascular risk. The occurrence of overweight has aroused the concern of researchers and health professionals due to the increase in morbidities associated with obesity, such as arterial hypertension, heart disease, diabetes, dyslipidemia, among others[30,31]. Excess weight has short and long-term consequences because it is associated with lipid changes, such as an increase in the concentration of total cholesterol, triglycerides, low-density lipoprotein (LDL-c), and a decrease in high-density lipoprotein (HDL-c)[30].

The relevance of dyslipidemia as a public health problem is related to cardiovascular diseases (CVD)[1-4], is classified among the most important risk factors for atherosclerotic cardiovascular disease, together with arterial hypertension, obesity, and diabetes *mellitus*. A study carried out in Northern China describes that the increased BMI is strongly linked to CVR[31].

Epidemiological studies, such as Nurses' Health Study, NHANES, Women's Health Initiative Observational Study and American Cancer Society, established a significant increase in cardiovascular and non-cardiovascular mortality associated with obesity[32]. An increase in years of life lost was found among obese versus non-obese in an NHANES analysis[32].

In the components of MS, the prevalence of triglycerides was high and was associated with FRS. The ratio of triglycerides to HDL-cholesterol (TG / HDL-c) is used as an indicator of dyslipidemia, due to its relationship with increased cardiovascular risk, in addition to being considered an easy and quick indicator to obtain, especially when considering the context of primary health care.

A study shows that having fasting triglycerides in the blood is as dangerous as having high cholesterol, that is, increased triglycerides increase the risk of an ischemic stroke[32]. In women, levels above 442 mg/dl indicated a 3.9 times greater risk of having the problem compared to women with normal levels. At similar levels in men, the risk ranged from one or two to two or three, respectively. Current stroke prevention guidelines provide recommendations on desirable cholesterol levels but do not mention desirable triglyceride levels[4,7,8,11,27].

Elevated SBP (≥130 mg/dl) showed an association with FRS at both intermediate and high-risk levels. In a way, the present study follows the referred data in other populations in other Brazilian regions[1,4,33], with 45% in women over 50 years old and 61% in men over 50 years old. Blood pressure is strongly correlated with the risk of developing coronary heart disease (an increase of 3.67 times in women and 4.38 in men), because, as their values increase, the risk of death also increases[12,27-29].

Hypertension has become a growing public health concern, particularly in developing countries, which have an estimated prevalence of 37.3%, against 22.9% in industrialized countries. There are projections that, by the year 2025, 75.0% of people (or 1.17 billion people) with hypertension in the world will be living in emerging countries[34].

Regarding fasting blood glucose, the prevalence was considered high for 61.9% of users of the UBS studied and was associated with high risk, according to FRS. A meta-analysis study[35] observed that diabetic individuals are three to four times more likely to suffer a cardiovascular event and twice the risk of dying from this event compared to the general population. This increase in the prevalence of altered fasting blood glucose is comparable to what has been observed in some countries[2-6,25].

These increases in the prevalence of diabetes are likely due to the already established increase in the prevalence of obesity in Brazil[36]. Also, overweight individuals have a higher degree of abnormality of glycemic homeostasis (diabetes or impaired fasting glucose) than those with adequate weight.

Based on the findings, abdominal obesity, through the measurement of waist circumference, was considered high, meeting the cutoff criterion for men (102 cm) and women (88 cm). This finding confirms that the WC measurement is important for use as an indicator of CVR, and can be added as a clinical routine and in health units, as an exam for the assessment of CVR, corroborating with other studies published in the literature[24-26,37].

Waist circumference allows you to assess the distribution of body fat. The altered WC reports the fat in the abdominal region, presenting a risk of metabolic alterations in the diagnosis of altered SAH and high CVR, which, in turn, represents a 2.0 and 3.6 times increase of having CVR associated with advancing age[37]. Currently, this measure has received essential attention in the evaluation of cardiovascular risk because it is a strong predictor of the amount of visceral fat, that is, the main responsibility for the appearance of metabolic changes and cardiovascular diseases[38].

The limitations of this study are: it is cross-sectional in nature, making it difficult to better target the cause among the variables, and using a non-probabilistic sample for convenience, which reduces the possibility of inferring the results for the total set of individuals. The FRS has limitations in the real identification of high-risk cardiovascular users, and it is sometimes necessary to reclassify with complimentary exam markers.

It is recommended that studies of this type be carried out and deepened, to perform the classification of global cardiovascular risk, with the FRS inserted as one of the factors to be evaluated, along with other sociodemographic and behavioral variables.

It is also essential to plan health management for public policy actions to install and implement health promotion and disease prevention activities, to intervene in life habits that lead to the emergence of chronic degenerative diseases, such as physical inactivity, poor diet, depression, obesity, and stress, through an interdisciplinary approach and guidelines for self-care, involving local managers in the debate on the National Health Promotion Policy, with all the actors of the UBS health teams.

## CONCLUSION

The studied presented high-pressure levels of hypertension and high risk for cardiovascular events, according to the FRS, in components three and four, associated with the male gender, the elderly population, overweight, increased triglyceride levels, systolic blood pressure, fasting blood glucose, and waist circumference.

## CONTRIBUTIONS

**Sintia Mara Haito** and **Edson dos Santos Farias** contributed to the preparation and design of the study; data acquisition, analysis and interpretation; and the writing of the manuscript. **Kátia Fernanda Alves Moreira**, **Jeanne Lúcia Gadelha Freitas** and **Rodrigo Almeida de Souza** contributed to the acquisition, analysis and interpretation of data; and the writing of the manuscript.

## CONFLICTS OF INTEREST

The authors state that there were no conflicts of interest in carrying out this research.

## REFERENCES

1. Silva EC, Martins MSAS, Guimarães LV, Segril NJ, Lopes MAL, Espinos MM. Prevalência de hipertensão arterial sistêmica e fatores associados em homens e mulheres residentes em municípios da Amazônia Legal. Rev Bras Epidemiol [Internet]. 2016 [accessed on 2020 Abr 14];19(1):38-51. Available from: https://www.scielosp.org/pdf/rbepid/2016.v19n1/38-51/pt

2. Saboya PP, Bodanese LC, Zimmermann PR, Gustavo AD , Assumpção CM, Londero F. Metabolic syndrome and quality of life: a systematic review. Rev Latino-Am Enferm [Internet]. 2016 [accessed on 2018 Nov 17];24:e2848. Available from: http://www.scielo.br/pdf/rlae/v24/pt_0104-1169-rlae-24-02848.pdf

3. Neves CVB, Mambrini JVM, Torres KCL, Teixeira-Carvalho A, Martins-Filho AO, Lima-Costa MF, et al. Associação entre síndrome metabólica e marcadores inflamatórios em idosos residentes na comunidade. Cad Saúde Pública [Internet]. 2019 [accessed on 2020 Abr 14];35(3):e00129918. Available from: https://www.scielosp.org/pdf/csp/2019.v35n3/e00129918/pt

4. Bortoletto MSS, Souza RKT, Cabrera MAS, González AD. Síndrome metabólica, componentes e fatores associados em adultos de 40 anos ou mais de um município da Região Sul do Brasil. Cad Saúde Colet [Internet]. 2016 [accessed on 2019 Abr 04];24(1):32-40. Available from: http://www.scielo.br/pdf/cadsc/v24n1/1414-462X-cadsc-1414-462X201600010123.pdf

5. Sharifi MH, Eftekhari MH, Ostovan MA, Rezaianazadeh A. Effects of a therapeutic lifestyle change diet and supplementation with Q10 plus L-carnitine on quality of life in patients with myocardial infarction: a randomized clinical trial. J Cardiovasc Thorac Res [Internet]. 2017 [accessed on 2018 Dez 07];9(1):21-8. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5402023/pdf/jcvtr-9-21.pdf

6. Aleman-Mateo H, López Teros MJ, UrquidezRomero R, Huesca L. Prevalence of meabolic syndrome and its determinants in older Mexi - can non-diabetic adults. Nutr Hosp [Internet]. 2018 [accessed on 2020 Abr 14];35:294-304. Available from: file:///C:/Users/UNIR/Downloads/MA-01518-01.pdf

7. Mokhayeri Y, Riahi SM, Rahimzadeh S, Pourhoseingholi MA, Hashemi-Nazari SS.  Metabolic syndrome prevalence in the Iranian adult's general population and its trend: A systematic review and meta-analysis of observational studies. Diabetes Metab Syndr [Internet]. 2018 [accessed on 2018 Dez 13];12(3):441-53. Available from: file:///C:/Users/UNIR/Downloads/1-s2.0-S1871402117304290-main1.pdf

8. Navarro JCA, Antoniazzi L, Oki AM, Bonfim MC, Hong V, Bortolotto LA, et al. Prevalência de síndrome metabólica e escore de Framingham em homens vegetarianos e onívaros aparentemente saudáveis. Arq Bras Cardiol [Internet]. 2018 [accessed on 2020 Abr 14];110(5):430-7. Available from: http://www.scielo.br/pdf/abc/v110n5/pt_0066-782X-abc-110-05-0430.pdf

9. Hu B, Haruyama Y, Muto T, Yamasaki A, Tarumi F. Evaluation of a community intervention program in Japan using Framingham risk score and estimated 10-year coronary heart disease risk as outcome variables: a non-randomized controlled trial. BMC Public Health [Internet]. 2013 [accessed on 2018 Dez 15];13:219. Available from: http://www.scielo.br/pdf/csc/v19n6/1413-8123-csc-19-06-01731.pdf

10. Instituto Brasileiro de Geografia e Estatística. Síntese de indicadores sociais: uma análise das condições de vida da população brasileira [Internet]. Rio de Janeiro: IBGE; 2016 [accessed on 07 Mar 2019]. Available from: https://biblioteca.ibge.gov.br/visualizacao/livros/liv98965.pdf

11. National Cholesterol Education Program. Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. Circulation [Internet]. 2002 [accessed on 2019 Nov 10];106(25):3143-421. Available from: https://www.ncbi.nlm.nih.gov/pubmed/12485966

12. Sociedade Brasileira de Cardiologia, Departamento de Hipertensão Arterial. VII Diretrizes brasileiras de hipertensão. Arq Bras Cardiol [Internet]. 2016 [accessed on 2019 Fev 07];107(3). Available from: http://publicacoes.cardiol.br/2014/diretrizes/2016/05_HIPERTENSAO_ARTERIAL.pdf

13. World Health Organization. World report on Ageing and Health [Internet]. Geneva: WHO; 2015 [accessed on 2019 Fev 05]. Available from: https://apps.who.int/iris/bitstream/handle/10665/186463/9789240694811_eng.pdf;jsessionid=8C07302EFDCBA0696F7848353DFDCCB5?sequence=1

14. Ministério da Saúde (BR), Secretaria de Vigilância em Saúde. Vigitel Brasil 2013: vigilância de fatores de risco e proteção para doenças crônicas por inquérito telefônico [Internet]. Brasília: Ministério da Saúde; 2014 [accessed on 2020 Abr 13]. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/vigitel_brasil_2014.pdf

15. Pate RR , Pratt M , Blair SN , Haskell WL , Macera CA , Bouchard C,  et al. Atividade física e saúde pública: uma recomendação dos Centros de Controle e Prevenção de Doenças e da American College of Sports Medicine. JAMA [Internet]. 1995 [accessed on 2020 Abr 13];273:402-7. Available from: https://jamanetwork.com/journals/jama/article-abstract/386766

16. World Health Organization. Obesity: preventing and managing the global epidemic [Internet]. Geneva: WHO; 2000 [accessed on 20 Nov 2018]. Available from: file:///C:/Users/UNIR/Downloads/WHO_TRS_894.pdf

17. Ministério da Saúde (BR), Secretaria de Atenção à Saúde, Departamento de Atenção Básica. Estratégias para o cuidado da pessoa com doença crônica: hipertensão arterial sistêmica [Internet]. Brasília: Ministério da Saúde; 2013 [accessed on 2018 Nov 08]. Available from: http://bvsms.saude.gov.br/bvs/publicacoes/estrategias_cuidado_pessoa_doenca_cronica.pdf

18. Lönnberg L, Ekblom-Bak E, Damberg M. Improved unhealthy lifestyle habits in patients with high cardiovascular risk: results from a structured lifestyle programme in primary care. Ups J Med Sci [Internet]. 2019 [accessed on 2019 Jun 20];124(2):94-104. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6566702/pdf/iups-124-1602088.pdf

19. Yousefzadeh G, Shokoohi M, Najafipour H, Shadkamfarokhi M. Applying the Framingham Risk score for prediction of metabolic syndrome: The Kerman Coronary Artery Disease Risk Study, Iran. ARYA Atheroscler [Internet]. 2015 [accessed on 2019 Mar 30];11(3):179-85. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4568190/pdf/ARYA-11-179.pdf

20. Souza CS, Stein AT, Bastos GA, Pellanda LC. Blood pressure control in hypertensive patients in the "Hiperdia Program": a territory-based study. Arq Bras Cardiol [Internet]. 2014 [accessed on 2019 Abr 07];102(6):571-8. Available from: http://www.scielo.br/pdf/abc/v102n6/pt_0066-782X-abc-102-06-0571.pdf

21. Vieira EC, Peixoto MRG, Silveira EA. Prevalência e fatores associados à Síndrome Metabólica em idosos usuários do Sistema Único de Saúde. Rev Bras Epidemiol [Internet]. 2014 [accessed on 2019 Abr 07];17(4):805-817. Available from: http://www.scielo.br/pdf/rbepid/v17n4/pt_1415-790X-rbepid-17-04-00805.pdf

22. Malta DC, Gonçalves RPF, Machado IE, Freitas MIF, Azeredo C, Szwarcwald CL. Prevalência da hipertensão arterial segundo diferentes critérios diagnósticos, Pesquisa Nacional de Saúde. Rev Bras Epidemiol [Internet]. 2018 [accessed on 2018 out 30];21(Supl 1):E180021. Available from: http://www.scielo.br/pdf/rbepid/v21s1/1980-5497-rbepid-21-s1-e180021.pdf

23. Aleman-Mateo H, López Teros MJ, UrquidezRomero R, Huesca L. Prevalence of meabolic syndrome and its determinants in older Mexi - can non-diabetic adults. Nutr Hosp [Internet].  2018 [accessed on 2020 abr 14];35:294-304. Available from: file:///C:/Users/UNIR/Downloads/MA-01518-01.pdf

24. Mokhayeri Y, Riahi SM, Rahimzadeh S, Pourhoseingholi MA, Hashemi-Nazari SS.  Metabolic syndrome prevalence in the Iranian adult's general population and its trend: a systematic review and meta-analysis of observational studies. Diabetes Metab Syndr [Internet]. 2018 [accessed on 2018 Dez 13];12(3):441-53. Available from: file:///C:/Users/UNIR/Downloads/1-s2.0-S1871402117304290-main1.pdf

25. van Bussel EF, Hoevenaar-Blom MP, Poortvliet RKE, Gussekloo J, van Dalen JW, van Gool WA, et al. Predictive value of traditional risk factors for cardiovascular disease in older people: a systematic review. Prev Med [Internet]. 2020 [accessed on 15 abr 2020];132:105986. Available from: https://www.ncbi.nlm.nih.gov/pubmed/31958478

26. Dias PC, Henrique P, Anjos LA, Burlandy L. Obesidade e políticas públicas: concepções e estratégias adotadas pelo governo brasileiro. Cad Saúde Pública [Internet]. 2017 [accessed on 2019 Maio 02];33(7):e00006016. Available from: http://www.scielo.br/pdf/csp/v33n7/1678-4464-csp-33-07-e00006016.pdf

27. Cichocki M, Fernandes KP, Castro-Alves DC, Gomes MVM. Atividade física e modulação do risco cardiovascular. Rev Bras Med Esporte [Internet]. 2017 [accessed on 2020 abr 15];23(1):21-5. Available from: http://www.scielo.br/pdf/rbme/v23n1/1517-8692-rbme-23-01-00021.pdf

28. Medeiros PA, Cembranell, Figueiró TH, Souza BB, Antes DL, Silva DAS, et al. Prevalência e simultaneidade de fatores de risco cardiovasculares em idosos participantes de um estudo de base populacional no sul do Brasil. Rev Bras Epidemiol [Internet]. 2019 [accessed on 2020 Abr 14];22:E190064. Available from: https://www.scielosp.org/pdf/rbepid/2019.v22/e190064/pt

29. Siqueira ASE, Siqueira-Filho AG, Land MGP. Análise do impacto econômico das doenças cardiovasculares nos últimos cinco anos no Brasil. Arq Bras Cardiol [Internet]. 2017 [accessed on 2020 abr 13];109(1):39-46. Available from: http://www.scielo.br/pdf/abc/v109n1/pt_0066-782X-abc-20170068.pdf

30. Bielemann RM, Knuth A, Hallal PC. Atividade física e redução de custos por doenças crônicas ao sistema Único de saúde. Rev Bras Ativ Fis Saúde [Internet]. 2010 [accessed on 2019 Nov 20];15(1):9-14. Available from: http://observatoriodoesporte.mg.gov.br/wp-content/uploads/2012/07/Reducao-de-custos.pdf

31. Guo X, Li Z, Guo L, Zheng L, Yu S, Yang H, et al. An update on overweight and obesity in rural Northeast China: from lifestyle risk factors to cardiometabolic comorbidities. BMC Public Health [Internet]. 2014 [accessed on 2020 abr 15];14:1046. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4198624/pdf/12889_2014_Article_7153.pdf

32. Sociedade Brasileira de Diabetes. Diretrizes da Sociedade Brasileira de Diabetes 2017-2018 [Internet]. São Paulo: Sociedade Brasileira de Diabetes; 2017 [accessed on 2020 abr 13]. Available from: https://www.diabetes.org.br/profissionais/images/2017/diretrizes/diretrizes-sbd-2017-2018.pdf

33. Soares EFGS, Pardo BLS, Costa AAS. Evidências da interrelação trabalho/ocupação e hipertensão arterial sistêmica: uma revisão integrativa. Rev Bras Promoç Saúde [Internet]. 2017 [accessed on 2020 Abr 17];30(1):102-109. Available from: file:///C:/Users/UNIR/Downloads/4437-23550-1-PB%20(1).pdf

34. Malta DC, Gonçalves RPF, Machado IE, Freitas MIF, Azeredo C, Szwarcwald CL. Prevalência da hipertensão arterial segundo diferentes critérios diagnósticos, Pesquisa Nacional de Saúde. Rev Bras Epidemiol [Internet]. 2018 [accessed on 2018 Out 30];21(Supl 1):E180021. Available from: http://www.scielo.br/pdf/rbepid/v21s1/1980-5497-rbepid-21-s1-e180021.pdf

35. Lee Y, Park S, Lee S, Kim Y, Kang MW, Cho S, et al. Lipid profiles and risk of major adverse cardiovascular events in CKD and diabetes: a nationwide population-based study. PLoS ONE [Internet]. 2020 [accessed on 2020 Abr 17];15(4):e0231328. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7144995/pdf/pone.0231328.pdf

36. Malta DC, Duncan BB, Schmidt MI, Machado IE, Silva AG, Bernal RTI, et al. Prevalência de diabetes mellitus determinada pela hemoglobina glicada na população adulta brasileira, Pesquisa Nacional de Saúde. Rev Bras Epidemiol [Internet]. 2019 [accessed on 2020 Abr 14];22(SUPPL 2):E190006. Available from: http://www.scielo.br/pdf/rbepid/v22s2/1980-5497-rbepid-22-s2-e190006-supl-2.pdf

37. Barroso TA, Marins LB, Alves R, Gonçalves ACS, Barroso SG, Rocha GS. Associação entre a obesidade central e a incidência de doenças e fatores de risco cardiovascular. Int J Cardiovasc Sci [Internet]. 2017 [accessed on 2019 Maio 20];30(5):416-24. Available from: http://www.scielo.br/pdf/ijcs/v30n5/pt_2359-4802-ijcs-30-05-0416.pdf

38. Wang X, Zhang N, Yu C, Ji Z. Evaluation of neck circumference as a predictor of central obesity and insulin resistance in Chinese adults. Int J Clin Exp Med [Internet]. 2015 [accessed on 2020 Abr 12];8(10):19107-13. Available from:  https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4694440/pdf/ijcem0008-19107.pdf

**First author's address:**
Sintia Mara Haito
Universidade Federal de Rondônia
Av. Presidente Dutra, 2965
Bairro: Centro
CEP: 76801-974 - Porto Velho - RO - Brasil
E-mail: drasintiahaito@hotmail.com

**Mailing Address:**
Edson dos Santos Farias
Universidade Federal de Rondônia
Av. Presidente Dutra, 2965
Bairro: Centro
CEP: 76801-974 - Porto Velho - RO - Brasil
E-mail: esfarias@bol.com.br