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Health, work and presence of cardiovascular risk factors in professors at a public university

Saúde, trabalho e presença de fatores de risco cardiovascular em docentes de uma universidade pública

Salud, trabajo y presencia de factores de riesgo cardiovascular en profesores de una universidad pública

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ABSTRACT

Objective: To identify the presence of the main risk factors for cardiovascular diseases in professors at a public university. **Method:** Cross-sectional and quantitative study with professors of a Higher Education Institution based on the evaluation and classification of clinical and sociodemographic variables recorded by the application of a structured form and interpreted according to the level of significance ($p<0.05$) after analysis in the Statistical Package for the Social Sciences version 20.0. Data collection took place from August 2016 to July 2018. **Results:** 261 professors participated. BMI obtained significant results when associated with the age group from 34 to 44 years ($p=0.005$), male sex ($p=0.050$) and change in female waist circumference ($p=0.015$), BP ($p=0.0038$), cholesterol ($p=0.052$) and triglycerides ($p=0.040$) at some point in life. **Conclusion:** Cardiovascular risk factors were significantly relevant in the population studied and showed that sex, changes in BMI, sedentary lifestyle, dyslipidemia, hypertension and stressors are associated with cardiovascular diseases.

Keywords: Risk Factors. Cardiovascular Diseases. Non-communicable Chronic Diseases. Teaching Staff.

RESUMO

Objetivo: identificar a presença dos principais fatores de risco para doenças cardiovasculares em docentes de uma universidade pública. **Método:** Estudo transversal e de natureza quantitativa com docentes de uma Instituição de Ensino Superior a partir da avaliação e classificação de variáveis clínicas e sociodemográficas registradas pela aplicação de formulário estruturado e interpretadas segundo nível de significância ($p\leq0,05$) após apreciação no *Statistical Package for the Social Sciences* versão 20.0. A coleta realizou-se de agosto de 2016 a julho de 2018. **Resultados:** Participaram 261 docentes. O IMC obteve resultados significativos quando associado à faixa etária de 34 a 44 anos ($p=0,005$), sexo masculino ($p=0,050$) e alteração na circunferência abdominal feminina ($p=0,015$), PA ($p=0,0038$), colesterol ($p=0,052$) e triglicerídeos ($p=0,040$) em algum momento da vida. **Conclusão:** Os fatores de risco cardiovascular apresentaram significativa relevância no público estudado e denota que o sexo, alterações do IMC, sedentarismo, dislipidemias, hipertensão e fatores estressores estão associados às doenças cardiovasculares.

Palavras-Chave: Fatores de Risco. Doenças Cardiovasculares. Doenças Crônicas Não Transmissíveis. Docentes.

RESUMÉN

Objetivo: Identificar la presencia de los principales factores de riesgo de enfermedades cardiovasculares en docentes de una universidad pública. **Método**: Estudio transversal y cuantitativo con docentes de una Institución de Educación Superior a partir de la evaluación y clasificación de variables clínicas y sociodemográficas registradas mediante la aplicación de un formulario estructurado e interpretadas según el nivel de significación ($p<0,05$) luego del análisis en el Paquete Estadístico para las Ciencias Sociales versión 20.0. La recolección de datos ocurrió de agosto de 2016 a julio de 2018. **Resultados:** Participaron 261 profesores. El IMC obtuvo resultados significativos cuando se asoció con el grupo de edad de 34 a 44 años ($p=0,005$), sexo masculino ($p=0,050$) y cambio en la circunferencia de cintura femenina ($p=0,015$), PA ($p=0,0038$), colesterol ($p =0,052$) y triglicéridos ($p=0,040$) en algún momento de la vida. **Conclusión:** Los factores de riesgo cardiovascular fueron significativamente relevantes en la población estudiada y demostraron que el sexo, las alteraciones del IMC, el sedentarismo, la dislipidemia, la hipertensión arterial y los estresores se asocian a las enfermedades cardiovasculares.

Palabras Clave: Factores de Riesgo. Enfermedades cardiovasculares. Enfermedades Crónicas No Transmisibles. Personal docente.

INTRODUCTION

In Brazil, 72% of deaths from known causes occur due to non-communicable chronic diseases (NCDs), which are part of a group whose main representatives are cardiovascular diseases (CVD).[1] Among the main CVD, stand out coronary artery disease (CAD), heart failure, angina, arrhythmias, valvular diseases, acute myocardial infarction (AMI) and hypertensive diseases.[2]

Acute myocardial infarction is a risk predictor for cardiovascular mortality in up to 47.9% of the affected population, especially if the event is preceded by an earlier stage of the disease.[3] According to Brazilian national data from 2008 to 2019, 1,123,178 people died in Brazil as a result of AMI, 130,959 in 2019 alone, among the reported cases.[4] These data point to the need for strategies to combat risk factors as a way of reversing this public health problem.

Risk factors for cardiovascular diseases are classified as modifiable, such as hyperlipidemia, smoking, alcoholism, hyperglycemia, obesity, physical inactivity and use of contraceptives, while non-modifiable factors are related to the history of CVD, sex and race[2]. Health promotion strategies are linked to people's lifestyle, diet, work and levels of physical activity, and workers' health directly conditions their production process and their quality of life.[1]

Surveillance of workers' health and assistance to workers who are victims of accidents and work-related diseases are the main demands related to the health service today, especially in secondary care.[5] It should also be noted that one of the main challenges is the recognition and identification of the user as a worker.[6]

With professors, in general, the prevalence of CVD is high and includes risk factors such as hypertension, hypercholesterolemia, smoking, diabetes and chronic kidney disease, and especially overweight and obesity related to changes in body mass index (BMI) increasing the risk of AMI and stroke by up to 19% in up to 10 years.[7]

Research of this nature reveals the factors that lead to an increase in the profile of morbidity and mortality from cardiovascular and cerebrovascular diseases.[8] Thus, there is a need to know whether there is a relationship between the social, demographic and clinical characteristics of individuals and the development of cardiovascular diseases, with a view to developing local plans for primary prevention, in addition to assisting in the structuring of municipal health protection policies.[9] Through this study, the objective was to identify the presence of the main risk factors for cardiovascular diseases in professors at a university public.

METHOD

Cross-sectional and quantitative study, characterized as exploratory. The study was carried out in a public institution of higher education in the countryside of the state of Ceará. There are currently 10 undergraduate courses on the investigated campus of the institution, with a staff of 311 full and substitute professors, according to data provided by the University's Personnel Department (PD).

The population consisted of all the teaching staff professionals working in the university. Although the intention was to carry out a survey of risk factors in the largest possible number of workers, a sample calculation of 272 professors was made. As exclusion criterion, professionals who did not complete the interview or the physical examination at the time of data collection, who were not in the department at the scheduled time and place, or who were away for specialization courses (Master/PhD courses) were excluded. Also, pregnant women and/or people with some impediment to collect anthropometric data were excluded. Thus, after applying the criteria, 261 professors participated in the study.

At first, the work team made visits to the various departments of the institution, aiming to present the research and schedule the days for data collection with the professors. On the scheduled day, the informed consent form was applied together with the data collection instrument of the form type, developed according to the literature and clinical experience of the researchers, previously tested with a similar population that was not part of the final sample. The instrument addressed sociodemographic characteristics (age, sex, color, occupation, education, family income, marital status) and clinical characteristics [weight, height, waist circumference (WC), blood pressure (BP), blood glucose, level of physical activity, drug use, use of contraceptives, lifestyle habits, and family history of CVD]. Data collection took place from August 2016 to July 2018 and during this period, participants who were not at the scheduled time and place were approached again on other occasions; if after up to three attempts they were absent, they were excluded from the research.

Anthropometric data (weight and height) were measured with the participant in the orthostatic position, positioned in the center of the scale with feet together and arms extended along the body. Height was checked using a stadiometer affixed to a wall.

The BMI was calculated in kg/m^2 and the professors were classified considering the cutoff point:[10] Thin or low weight (<18.5); Normal weight (18.5 to 24.9); Overweight or Pre-obese (25.0 to 29.9); Obesity (30.0 to 34.9); Morbid obesity (>40.0).

As for the assessment of the waist circumference, the individuals remained standing with relaxed abdomen and relaxed arms at side of the body. An inelastic measuring tape was placed horizontally at the midpoint between the lower edge of the last rib and the iliac crest and the reading was taken between expiration and inspiration, without tissue compression. For women, the cutoff point was 88 cm and for men, 102 cm.[11]

The blood pressure value was measured at the end of the interview and its parameter was the hypertension guideline[11]: normal (≤ 120 x ≤ 80); prehypertension (≥ 121 x ≥ 81); hypertension (>140 x > 90 mmHg); isolated systolic hypertension (>140 x <

90 mmHg). It is noteworthy that this isolated measure does not complete the clinical diagnosis and that was not the purpose of the study. The participants were only informed and alerted about their blood pressure situation.[11]

Blood glucose was measured using a Roche® Accu-check device and its respective test strips, with a range of parameters for classifying postprandial capillary blood glucose results, namely: normoglycemia (<140 mg/dL); Prediabetes or increased risk (≥ 140 mg/dL and < 200 mg/dL); Established diabetes (≥ 200 mg/dL).[12-13] Regarding cholesterol and triglyceride parameters, the study participants were asked by the researchers if at any time, through routine laboratory tests, they had changes and/or underwent treatment. For the stress variable, it was identified whether or not the professor reported feeling stressed.

The cardiovascular risk factors evaluated are in accordance with those observed in the guideline, listed by: male sex; age (for men ≥ 55 years and women ≥ 65 years); history of premature cardiovascular disease in 1st-degree relatives; smoking; dyslipidemia; insulin resistance and obesity.[1]. For physical activity, the parameters of the International Physical Activity Questionnaire (IPAQ) were followed. Activities are classified as moderate and vigorous and individuals as sedentary, insufficiently active (A and B), and active.[14]

Data were recorded using an spreadsheet of the Excel 2007 for Windows and later submitted to the data normality test with subsequent prevalence and inferential descriptive statistical analysis using Pearson's chi-square or Fisher exact tests depending on the assumptions. The Statistical Package for the Social Sciences (SPSS version 20.0) for Windows® was used in the analyses. In all cases, the significance criteria of 5% were used.

The study was derived from a larger project and met the recommendations of Resolution 466/12 of the National Health Council, referring to research involving human beings. The study was granted a favorable Opinion (protocol 873.625) from the Research Ethics Committee (REC) of the Regional University of the Cariri. The realization of the study in the facilities of the institution was authorized by the administrative sector of the university.

RESULTS

Sociodemographic and clinical-epidemiological data

A total of 261 professors participated in the study, most of them female (55.2%), white (51.3%), with a mean age of 41.5 years, with a partner (61.7%), and with no other occupation besides of teaching (79.7%). When asked about the complete years of schooling, the participants had an mean of 23.8 years, corresponding to the completion of higher education and graduate courses. As for anthropometric data, the means were 1.65m for height, 73.8kg for weight, 27.0 for BMI, and 90.7cm for WC. Fifty-five participants (21%) were classified as obese. When stratifying the results by sex, the mean found in the female population was 87.1 cm, ranging from 50 to 114cm, and in the male population, 96.7cm, ranging from 72 to 135 cm, showing great variation in the values found. As for life habits, of the interviewed women, 22.2% used oral contraceptives. The consumption of alcohol and tobacco were present in 37.9% and 6.8% of the professors, respectively.

Blood pressure was also measured, with a mean of 118.3 mmHg for systolic blood pressure and 77.6 mmHg for diastolic blood pressure. Postprandial capillary blood glucose had a mean of 107.1 mg/dL. Most of the participants were considered normotensive and normoglycemic. Table 1 summarizes the sociodemographic and clinical-epidemiological data.

Prevalence and distribution of cardiovascular risk factors

Regarding the personal history of clinical changes in health, the professors reported that during their lives they had episodes of hypertension (43.3%), altered glycemic levels (18.8%), altered cholesterol levels (32.5%), and altered triglyceride levels (26.8%), as shown in figure 1. These data were not characterized by the researcher, but by the oral report of the interviewees based on the normal values for each variable.

Regarding salt consumption, 34.8% of the professors reported excessive use of salt, 29.5% reported a high-fat diet, 6.8% were smokers, 56.7% reported being stressed, and 40.7% were sedentary. Regarding the frequency of physical exercise, 47% of the respondents were classified as irregularly active or sedentary, as shown in Figure 2.

The non-modifiable risk factor related to cardiovascular diseases associated with the parents (mother and father) and the members of the family nucleus was also evaluated. Parents had systemic arterial hypertension in 78.5% of the cases (45.2% related to the mother and 33.3% to the father); 56.4% had changes in cholesterol and triglyceride levels; and the fathers had diabetes in 38.3% of the cases. Among the components of the family nucleus, the grandparents and uncles stood out due to the frequent history of stroke (13.4% and 8.8%, respectively) and heart attack in grandparents (16.4%) and parents (16%). Uncles, siblings and grandparents stood out with alterations in triglycerides in 11.8%, 12% and 13.7% of the cases, respectively. The information is presented in figure 3.

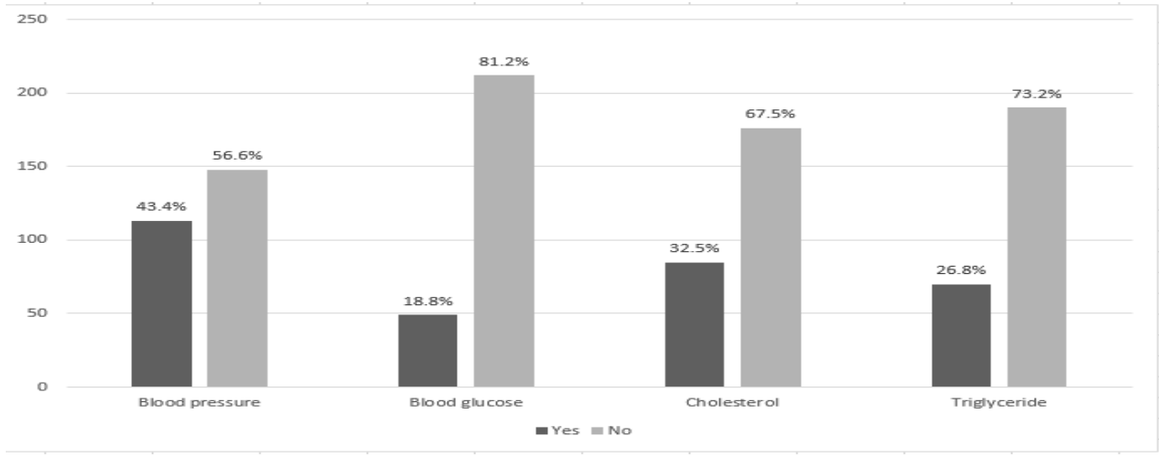
After the identification of the aforementioned parameters, the variables were crossed. As for the intersection of sociodemographic and clinical-epidemiological data with BMI, significant results were obtained when associated with the age group from 34 to 44 years (p=0.005), male sex (p=0.050) and change in female waist circumference (p=0.015), BP (p=0.0038), cholesterol (p=0.052) and triglycerides (p=0.040) at some point in life.

Table 1 - Sociodemographic and clinical characterization of professors (n = 261). Crato, CE, Brazil, 2018.

VARIABLES	F	%	Mean	Median	SD	Interval
Sex						
Female	144	55.2				
Male	117	44.8				
Age (years)			41.5	42	± 11.2	23 – 69
Study years			23.8	23	± 5.3	10 – 50
Color						
White	134	51.3				
Non-white	127	48.7				
Marital status						
With partner	161	61.7				
Without partner	100	38.3				
Anthropometric profile						
Height (cm)			1.65	1.7	± 0.09	1.4 – 1.9
Weight (kg)			73.8	72.4	± 15.2	46.3 – 139.8
BMI			27	26.3	± 4.4	18.1 – 42.5
WC (cm)			90.7	90	± 12.2	50 – 135
Clinical profile						
SBP (mmHg)			118.3	120	± 13.4	90 – 170
DBP (mmHg)			77.6	80	± 10	60– 120
Blood glucose (mg/dL)			107.1	103	± 29.4	43 – 327
Other occupation						
Yes	53	20.3				
No	208	79.7				

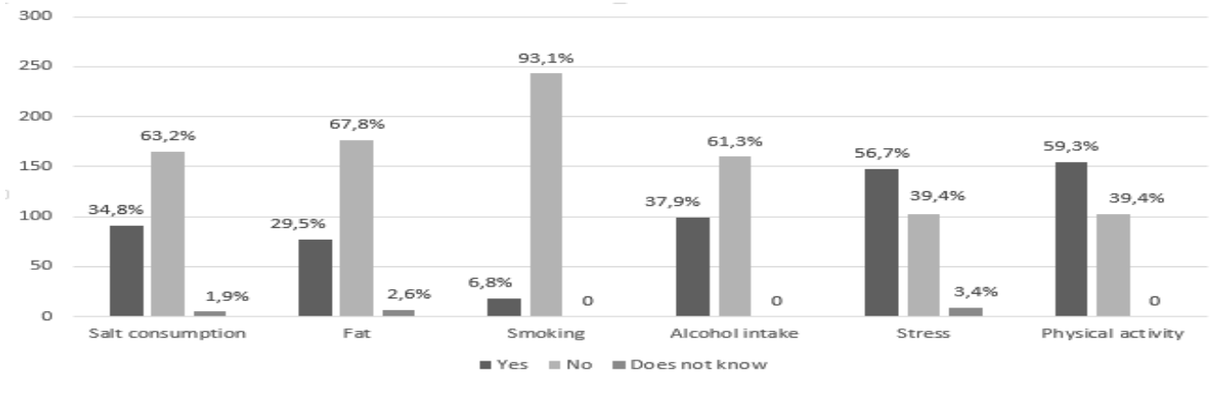
F = Absolute frequency; % = Percentage frequency; SD = Standard Deviation; cm = centimeters; g = grams; BMI = Body Mass Index; WC= waist circumference; SBP = Systolic blood pressure; DBP = diastolic blood pressure; mmHg = millimeters of mercury; mg/dL = milligrams per deciliter; SD = Standard Deviation. Source: Prepared by the authors, 2021.

Figure 1 - Changes in health conditions reported by respondents. Crato, CE, Brazil, 2018.



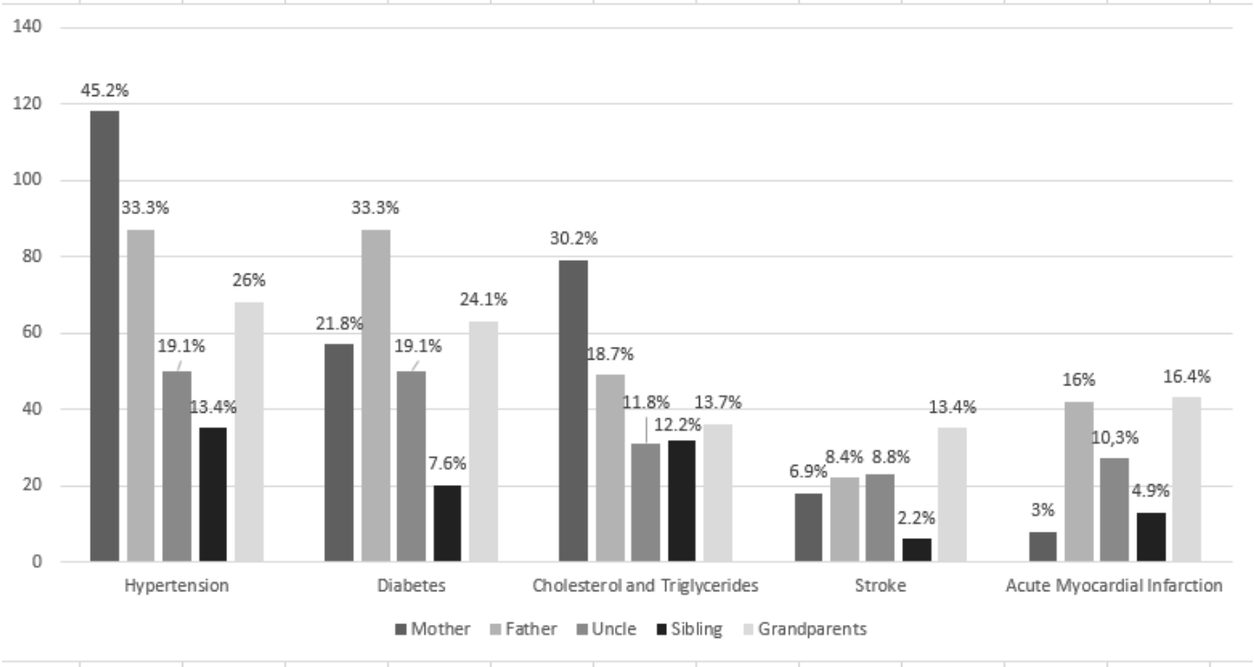
Source: Prepared by the authors, 2021.

Figure 2: Current lifestyle habits and modifiable risk factors in professors. Crato, CE, Brazil, 2018



Source: Prepared by the authors, 2021.

Figure 3 - Family history and non-modifiable risk factors in professors. Crato, CE, Brazil, 2018.



Source: Prepared by the authors, 2020.

The relationship between capillary blood glucose parameters with SBP and DBP values was significant, with p=0.051 and p=0.023, respectively. When the values of SBP and DBP were crossed with sex, it was possible to perceive significance with the male sex (SBP with p=0.000 and DBP with p=0.020).

Finally, the risk stratification for hypertension obtained a sample of two to six indicators for cardiovascular disease. In this sample, 37.6% of the professors had two risk factors, 34.1% had three risk factors, 18.8% had four risk factors, 7.6% of the professors had five risk factors, and 1.7% had more than five risk factors. Therefore, the prevalence of two or more cardiovascular risk factors in professors was 44.8%.

DISCUSSION

Changes in blood pressure, at some point in life, can lead to hypertensive diseases, which are the main causes of death in adults aged 35 to 64 years, reaching 57.87% in the population over 80 years of age,[15] corroborating the findings of the present study. Pressure levels can be monitored and evaluated with daily monitoring and this attitude prevents health problems and helps in maintaining quality of life.[1]

A study with 220 professors in Nigeria showed that there was a higher prevalence of arterial hypertension (AH) in women with a high body mass index and diagnosed with metabolic syndrome.[16] However, in the present study, a greater significance was observed in men.

Regarding skin color, a study with nurse professors identified a higher prevalence of individuals who self-declared as non-white.[17] However, in this study, most participants declared to be white, although 48.7% of those surveyed had brown or black skin as a relevant factor in diseases.

Inadequate nutrition is among the main causes of NCDs. A national study evaluated 380 professors and found that they had never performed a nutritional assessment and showed a lack of knowledge about factors linked to hypercholesterolemia and obesity, leading to susceptibility to CVD.[18]

A study showed that the quality of life of professors is related to the family environment by raising an educational complement in the form of change and developing practices that directly interfere in the appearance of cardiovascular risk factors, especially those related to modifiable risks.[19] Therefore, given this information, the interviewees who answered not having a partner are more likely to not follow an adequate diet or maintain a healthy lifestyle, which can lead to high stress loads.

Excessive work activity, stress and physical/psychic overload are also obstacles with regard to the adoption of healthy practices in professors.[20] When evaluating the stress item, more than half of the interviewees declared themselves stressed. Among the individuals investigated, 20.3% had other professional bonds besides teaching, which predisposed them to burnout, exhaustion and leaded to a low quality diet, in which canned foods, sausages or fast food are preferred.

A good portion of the individuals evaluated in the study were classified as obese. In addition, BMI was significant for age up to 44 years, the male sex, and the presence of change in female waist circumference, in addition to blood pressure. In this sense, obesity is one of the cardiovascular risk

factors present in higher education professors, especially in individuals aged 25 to 34 years in a stable relationship.[21]

Changes in blood glucose, cholesterol and increase in triglycerides together with high BMI values revealed important elements for the development of cardiovascular disease. Studies with professors have identified that visceral obesity, high HDL, high fasting glucose levels, and hypertriglyceridemia were associated with the development of cardiovascular problems and metabolic syndrome.[16,21]

Another important factor was the use of oral contraceptives (OC). A study with professors from Pará showed that 45% of women used OC, which is a considerable factor for the development or potentiation of cardiovascular risk.[17]

Alcohol intake showed significant levels in this research. The consumption of alcoholic beverages was also a concern in a study with 32 professors that identified a prevalence of 72% of this risk factor in people with a predisposition to cardiovascular diseases.[17]

In the study, 47% of the population did not perform physical exercise properly or were sedentary. A study with professors showed that, among those who performed physical activity at least once a week, all had changes in blood pressure due to exposure to stress with direct impacts on quality of life and on the exercise of psychological and physical faculties.[20] Physical inactivity among professors was observed in up to 86% in a study conducted in Malaysia, which increased cholesterol rates, BMI and compulsive smoking.[18] This is due to low wages and leads to greater employment relationships, making it difficult to practice healthy activities due to lack of time.[22]

The family history of arterial hypertension (AH), stroke and acute myocardial infarction (AMI) among parents, uncles or grandparents is considered a significant factor for the development of these diseases in their descendants. [7, 23] In this study, parents were the ones who had the most cases of AH and grandparents were the most prevalent group in the family history of stroke and AMI.

The diagnosis of diabetes becomes more common among older individuals, reaching a lower percentage in individuals between 18 and 29 years of age and more than 40.4% in individuals aged 60 years or older.[24] With regard to professors, there was similarity to that found in other professional categories, with an expressive history of DM in relation to AH[17] and the father represented the affected relative in most cases when examining the family history of diabetes.

The study brought substantial contributions to the area of occupational health, especially in relation to professors and cardiovascular risk factors, and revealed the need for interventions and health promotion practices for this specific public.

The main limitation of the research was the study site, since only one of the university campuses was evaluated. This prevents the generalization of the data found here. There was also a limitation in the verification of capillary blood glucose, which did not allow the collection of fasting blood glucose levels. New approaches are needed with robust studies on the subject in order to observe the difference between professors who practice physical activity with those who do not, their work performance, and quality of life.

CONCLUSION

The data pointed to significant cardiovascular risk factors, especially those that are modifiable, such as high BMI, waist circumference, blood pressure, cholesterol and triglyceride levels, and physical inactivity. These characteristics are considered important contributors to the development of cardiovascular and cerebrovascular diseases. As for the non-modifiable risk factors observed in the professors, age, sex and family history were the main ones.

The analysis presented here also showed that most professors had at least two concomitant risk factors and that changing one of these parameters automatically increased the probability of other factors changing, as occurs with the connection between body mass index and blood glucose and blood pressure values, for example. In addition, it is essential that professors with a family history or a history of diseases related to the circulatory system pay special attention to the slightest changes in their health conditions and clinical parameters, to the detriment of work issues.

In this way, there were cardiovascular risk factors that can be considered a source of concern in the researched public, as they can lead to health problems, decreased quality of life, and increased chances of work absenteeism.

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