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Risk factors for chronic non-diseases and cardiovascular risk anthropometric indices: is there a correlation?

Abstract

It aimed to correlate the prevalence of risk factors with the anthropometric indices of risk analysis for CVD in employees of a university center in Fortaleza/CE. It was a cross-sectional, observational, quantitative, descriptive, and analytical study, carried out in a Higher Education Institution. Sociodemographic, food consumption and anthropometric data were collected, in addition to the self-reported presence of any chronic disease, from August 2019 to January 2020. Anthropometric data were classified according to the WHO, characterizing the nutritional status and the presence of risk for CVD. Food frequency was analyzed by food groups, correlated with risk for CVD (eg consumption of soft drinks and sweets, whole milk, red meat with apparent fat and added salt). Data tabulation was performed in Microsoft Excel 2019 and statistical analyzes in SPSS 22.0. All data were collected after approval by the ethics committee and participants signed an informed consent form. Eighty employees were evaluated, 65% women, aged between 20 and 29 years old (50%, 62.5%), brown with 56.70% and with at least complete high school (52.5%). In the BMI, 68.75% were overweight (p= 0.172). Regarding the classification of WC, 62.5% of the population has a moderate to high risk according to their classification, with a difference between genders (p=0.00). In PC, 77.5% are obese and overweight (p=0.639). In WHtR, 75% of women and 60.7% of men had risk values, with no difference between genders (p=0.184). In both sexes, they ingested soda and artificial drinks from 1 to 2 days a week, where 42.9% were men and 30.8% were women (p = 0.654), consuming sweets 1 to 2 days a week, with the percentage of 37,5% (p=0.431). Vegetables and vegetables cooked, 3 to 4 times a week, 45% of the population consumed and 26.25% rarely consumed these raw foods. In red meat with visible fat, it was observed that most of the population consumes (57.5%) and whole milk (70%). Employees also presented as a protective factor for hypertension and dyslipidemia the presence of milk consumption and as a risk, and a higher risk when they had a BMI >25kg/m2. Thus, it could be observed that there is a large consumption of foods with saturated fats such as red meat and sugars such as soft drinks, sweets and artificial drinks that end up contributing to excess weight, cardiovascular risks and it is possible to identify how eating habits and the indicators are related to the development of chronic diseases.

Keywords: cardiovascular diseases, anthropometry, risk factors

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Abbreviations: NCDs, non-communicable diseases; BMI, body mass index; WC,waist circumference; NC, neck circumference; WHtR, waist-to-height ratio; CVD, cardiovascular diseases; WHO, World Health Organization; CI, confidence interval; DM, diabetes mellitus; SBP, systolic blood pressure; SAH, systemic arterial hypertension; CVA, cerebrovascular accident, AMI, acute myocardial infarction

Introduction

As a major public health problem, Chronic Non-Communicable Diseases (NCDs) are the ones that most cause premature deaths in Brazil and in the world, directly affecting people's quality of life. In Brazil, 52% of the population reports having some chronic disease.[1,2]

Brazil has already undergone several changes in the political, social and economic perspective. These changes alter the lifestyle and generate changes in the population's eating habits, with a diet richer in foods that are sources of saturated fats, sugars and refined grains, which contribute to an increased risk of NCD.[3]

The main risk factors for the development of CNCDs are:smoking, regular and excessive consumption of alcoholic beverages, overweight and obesity, sedentary lifestyle and inadequate diet.[4]

Given these factors, nutrition plays an extremely important role in the prevention of CNCDs, as the nutritionist is able to identify some of these risk factors through nutritional assessment, performing the assessment of food consumption and the analysis of anthropometric measurements, in addition to physical examination. and the interpretation of biochemical tests. Such an assessment makes it possible to identify the conditions that increase the risks for the appearance of CNCD.[5]

Therefore, the present study aimed to correlate the prevalence of risk factors with the anthropometric indices of risk analysis for Cardiovascular Diseases (CVD) in employees of a university center in Fortaleza/CE, Brazil. Studies like this are essential for the development of actions, aiming to know the distribution, magnitude and tendency of these diseases and their risk factors to support the planning, execution and monitoring of actions for their control and prevention of NCDs.

Materials and methods

The study is cross-sectional, observational, quantitative, descriptive and analytical. It was carried out with employees of a Higher Education Institution, between August 2019 and January 2020.

A total of 80 employees aged between 18 and 59 years were evaluated. Each employee was submitted to a questionnaire to assess the risk factor for NCDs, containing questions about sociodemographic data, consumption of alcoholic beverages, smoking, level of physical activity, food consumption, clinical diagnosis of any chronic disease already installed and anthropometric data.

The anthropometric data measured were weight, height, body mass index (BMI), waist circumference (WC), neck circumference (NC) and waist-to-height ratio (WHtR).

Weight was measured with the G-Tech BALGL10 digital scale and height was measured with the Personal Caprice Sanny portable stadiometer. With these values, the BMI classification was made according to the World Health Organization (WHO), characterizing the nutritional status of the population.[6,7]

Detailed by callaway et al. (1991) with a CC inelastic measuring tape held in the smallest portion of the trunk, classifying according to the WHO by the moderate risk or high risk of developing CVD.[8,9] PC measured at the base of the neck and in men below the laryngeal prominence and classified as overweight according to the values described by Ben-Noun; Laor.[10] The ratio of WC with height, in centimeters, determined the WHtR and values greater than 0.510.11 were classified with risk of CVD.

Food consumption was analyzed through the intake of certain groups that are related to risk factors, such as the consumption of salads and raw and cooked vegetables and fruits, consumption of soft drinks and sweets, in addition to the intake of whole milk, red meat with apparent fat and added salt.

For the self-reported clinical diagnosis, employees were asked about the presence of any NCDs or the use of medication for their control and treatment.

Data analysis and tabulation was performed using the Microsoft Excel 2019 program with the SPSS 22.0 software, expressing the results as frequency, mean and standard deviation, and parametric and correlation statistical tests considering $p<0.05$ for statistical difference. In addition to the estimate in oudds ration with a confidence interval (CI) of 95%.

Approved by the Research Ethics Committee (CEP) of Universitário Christus Center (Unichristus), with opinion number 3.322.621.

Results

Conducted with 80 employees of the institution, Table 1 shows the main sociodemographic characteristics, where most of the sample was of women with 65%, the most prevalent age group was 20 to 29years old (40%) in relation to color most of them declared themselves as brown with 56.70% and with at least completed high school (52.5%) (Table 1).

Table 1 Sociodemographic profile of employees of a university center, Fortaleza, Brazil, 2020

Sociodemographic variables	Men		Women		Total		
	N	%	n	%	n	%	p*
Age Group (years)							
< 20	0	0	1	1.9	1	1.3	0.223
20 – 29	22	78.6	28	53.8	50	40	
30 – 39	5	17.9	15	28.8	20	25	
40 – 49	1	3.6	5	9.6	6	7.5	
≥ 50	0	0	3	5.8	3	3.8	
Ethnicity							
Branca	9	32.1	7	13.7	16	20	0.128
Preto	2	7.1	2	3.9	4	5	
Amarelo	0	0	3	5.9	3	3.8	
Pardo	17	60.7	39	76.5	56	70	
Education							
ES incomplete	1	3.6	2	3.8	3	3.8	0.773
ES complete	2	7.1	1	1.9	3	3.8	
HS incomplete	12	42.9	20	38.5	32	40	
HS complete	6	21.4	12	23.1	18	22.5	
HE complette	7	25	17	32.7	24	30	
Family income							
up to 1 MW	9	32.1	16	30.8	25	31.3	0.912
1 - 2 MW	9	32.1	13	25	22	27.5	
2 - 3 MW	6	21.4	16	30.8	22	27.5	
3 - 4 MW	2	7.1	4	7.7	6	7.5	
Above 4 MW	2	7.1	3	5.8	5	6.3	

ES, elementary school; HS, high school; HE, higher education; MW, minimum wage; *Pearson's chi square

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Regarding the nutritional status by the BMI classification values, it was observed that most of the collaborators were overweight with 68.75%, between the classifications of overweight and the degrees of obesity, with no difference between the sexes (p = 0.172). In addition, this percentage (68.75%) shows that the population has an increased to very severe risk for the development of NCDs by BMI (Table 2).

Table 2 Classification of anthropometric data and risk for chronic diseases in employees of a university center, Fortaleza, Brazil, 2020

Anthropometric variables	Men		Women		Total		
	n	%	n	%	n	%	p*
Nutritional Status							
Classification by BMI							
Thinness I	2	7.1	0	0	2	2.5	0.172
Eutrophy	9	32.1	14	26.9	23	28.75	
Overweight	11	39.3	17	32.7	28	35	
Obesity I	6	21.4	15	28.8	21	26.25	
Obesity II	0	0	5	9,6	5	6.25	
Obesity III	0	0	1	1.9	1	1.25	
NCD Risk							
Classification by BMI							
No risck	11	39.3	14	2.9	25	31.25	0.316
increased	11	39.3	17	32.7	28	35	
Moderate	6	21.4	15	28.8	21	26.25	
Serious	0	0	5	9.6	5	6.25	
Very serious	0	0	1	1.9	1	1.25	
Classification by WC							
Normal	19	67.9	11	21.2	30	37.5	0.000*
Moderate Risk	6	21.4	18	34.6	24	30	
High risk	3	10.7	23	44.2	26	32.5	
Classification by NC							
Normal	5	17.9	13	25	18	22.5	0.639
Overweight	10	35.7	20	38.5	30	37.5	
Obesity	13	46.4	19	36.5	32	40	
Classification by WHtR							
Sem risco	11	39.3	13	25.0	24	30.0	0.184
Risco	17	60.7	39	75.0	56	70.0	

BMI, Body Mass Index; WC, Waist circumference; NC, neck circumference; WHtR, waist-to-height ratio; NCDs, non-communicable chronic diseases. *Pearson chi-square

In Table 2, in the WC, it is observed that 62.5% of the population has a moderate to high risk according to their classification, with a difference between the sexes (p=0.000) (Table 2).

In the PC, it was observed that, according to the risk classification, 77.5% of the individuals are obese and overweight, with no difference between the sexes (p=0.639). In the WHtR, women represented a higher percentage of risk with 75% and men with 60.7% in which they are at risk for the development of chronic diseases, with no difference between the sexes (p=0.184) (Table 2).

In the food consumption data in Table 3, both sexes showed a frequency of 1 to 2 days a week of consumption of soft drinks and artificiais drinks, where 42.9% were men and 30.8% were women, with no statistical difference (p=0.654). With a percentage of 37.5% of the total sample consuming sweets 1 to 2 days a week, also with no difference between the sexes (p = 0.431) (Table 3).

As for the consumption of cooked and raw vegetables and vegetables, 3 to 4 times a week 45% of the population consumed them, while 26.25% of the total rarely consumed these raw foods. Regarding fruit consumption, 30% of the employees consumed it daily, with no differences between the sexes (p=0.543) (Table 3).

In Table 3, the consumption of red meat with visible fat, it was observed that the vast majority of the population consumes (57.5%) and whole milk (70%) without differences between the sexes.

Table 3 Frequency and food consumption of employees of a university center, Fortaleza, Brazil, 2021

Variables	Men	Women	Total	
	n (%)	n (%)	n (%)	p*
Frequency of consumption of soda and artificial drinks				
1 to 2 days	12 (42.9%)	16 (30.8%)	28 (35%)	0.654
3 to 4 days	3 (10.7%)	3 (5.8%)	6 (7.5%)	
5 to 6 days	1 (3.6%)	5 (9.6%)	6 (7.5%)	
Every day	3 (10.7%)	4 (7.7%)	7 (8.75%)	
Rarely	6 (21.4%)	16 (30.8%)	22 (27.5%)	
Never	3 (10.7%)	8 (15.4%)	11 (13.75%)	
Frequency of consumption of sweets				
1 to 2 days	10 (35.7%)	20 (38.5%)	30 (37.5%)	0.431
3 to 4 days	9 (32.1%))	10 (19.2%)	19 (23.75%)	
5 to 6 days	3 (10.7%)	2 (3.8%)	5 (6.25%)	
Every day	4 (14.3%)	13 (25%)	17 (21.25%)	
Rarely	2 (7.1%)	5 (9.6%)	7 (8.75%)	
Never	0	2 (3.8%)	2 (2.5%)	
Frequency of consumption of vegetables and cooked vegetables				
1 to 2 days	4 (14.3%)	12 (23.1%)	16 (20%)	0.194
3 to 4 days	9 (32.1%)	10 (19.2%)	19 23.75%)	
5 to 6 days	1 (3.6%)	6 (11.5%)	7 (8.75%)	
Every day	5 (17.9%)	15 (28.8%)	20 (25%)	
Rarely	8 (28.6%)	6 (11.5%)	14 (17.5%)	
Never	1 (3.6%)	3 (5.8%)	4 (5%)	
Frequency of consumption of raw vegetables and vegetables				
1 to 2 days	7 (25%)	12 (23.1%)	19 (23.75%)	0.135
3 to 4 days	7 (25%)	10 (19.2%)	17 (21.25%)	
5 to 6 days	0	4 (7,7%)	4 (5%)	
Every day	2 (7.1%)	9 (17.3%)	11 (13.75%)	
Rarely	11 (39.3%)	10 (19.2%)	21 (26.25%)	
Never	1 (3.6%)	7 (13.5%)	8 (10%)	
Frequency of fruit consumption				
1 to 2 days	9 (32.1%)	14 (26.9%)	23 (28.75%)	0.543
3 to 4 days	5 (17.9%)	7 (13.5%)	12 (15%)	
5 to 6 days	4 (14.3%)	3 (5.8%)	7 (8.75%)	
Every day	5 (17.9%)	19 (36.5%)	24 (30%)	
Rarely	4 (14.3%)	7 (13.5%)	11 (13.75%)	
Never	1 (3.6%)	2 (3.8%)	3 (3.75%)	
Consumption of red meat with visible fat				
Yes	20 (71.4%)	26 (50%)	46 (57.5%)	0.064
No	8 (28.6%)	26 (50%)	34 (42.5%)	
Whole milk consumption				
Yes	19 (67.9%)	37 (71.2%)	56 (70%)	0.759
No	9 (32.1%)	15 (28.8%)	24 (30%)	

P, significance values obtained by the chi-square test; adopting a confidence interval of 95%. N, sample quantity; %, sample percentage

In Table 4, it is observed that employees have as a protective factor for hypertension and dyslipidemia in the presence of whole milk consumption (OR = 0.872; 95%CI: 0.773 - 0.983), while a higher risk for hypertension and dyslipidemia was found in the presence of BMI>25 kg/m² (OR = 1.135; 95%CI: 1.016-1.269).

Table 4 Chance of risk for developing systemic arterial hypertension and dyslipidemia

	Presence of hypertension and/or dyslipidemia	OR (95% IC)
	n (%)	
whole milk		
Absence	5 (12.8%)	0.872 (0.773 – 0.983)
Consumption		
Presencee consumption	0 (0.0%)	
BMI		
< 24.99 kg/m²	0	1.135 (1.016 – 1.269)
> 25 kg/m²	5 (11.9%)	

OR, chance of risk odds ratio; CI, confidence interval; n, number of people exposed; %, percentage of exposed; BMI, body mass index

Discussion

Being overweight and BMI one of those responsible for the risk of chronic diseases, according to Melo et al.[11] showed that there is a greater prevalence of CNCDs in people who had a BMI ≥ 25kg/m² and overweight, where in the research findings in the individuals studied, it was observed that 68.75% are overweight, representing a risk of more than half of this population for the emergence of CNCD.[12]

Regarding the WC and WHtR variables, in a study with 685 adults and 1.020 elderly people, in the adult population, with these indices above the classification, they also showed an average of altered triglycerides and cholesterol, as with the Institution's employees, most of them had moderate to high risk in WC and WHtR, most of them have some degree of excess weight, which contributes to the increase in abdominal adipose tissue, related to metabolic imbalance and lipid profile.[13]

CP evaluates excess weight as visceral fat and upper subcutaneous fat in the neck region, having its CP values increased, and there is the manifestation of fat on the walls of the carotid arteries, triggering CVD and insulin resistance. With this, it is possible to verify that 77.5% of employees can develop these diseases, as there are findings in which PC is directly related to blood glucose and lipid indicators, corroborating these comorbidities.[14]

Due to the transitions and nutritional changes that took place in Brazil, people's food consumption has changed, making a diet with a positive energy balance composed of foods with simple carbohydrates and saturated fats.[15]

Since in the population studied, 72.5% consume sweets, soft drinks and artificiais drinks. These ultra-processed or processed foods contain refined carbohydrates, low fiber content and high energy value that are related to glucose metabolism and can lead to hyperinsulinemia that results in excess weight, diabetes mellitus (DM), and imbalance. metabolism trigger several other chronic diseases. There is a positive relationship between carbohydrates and blood glucose levels, since the increase in this biochemical parameter, according to the reference, can identify risk for diabetes.[16] There is a study with an association

between the consumption of these industrialized foods with WC and BMI in high values in addition to being overweight.[17]

Foods with saturated and trans fats are directly related to the emergence of risk factors for hypertension, insulin resistance, in addition to increasing the possibility of developing atherosclerosis. In the present study, it is shown that the consumption of red meat with visible fat was 57.5%, revealing that more than half of the employees have habits that can have major consequences in the development of NCDs. According to Teixeira et al.[18] in a study with adult and elderly women, it was shown that in addition to physical inactivity being directly related to the consumption of trans fats, WC and overweight are directly related to the consumption of total fats, contributing even more for the presence of CVD.[18]

In view of this, it is observed in the research findings that the consumption of raw vegetables is insufficient. In Brazil, in some regions, household spending on foods such as vegetables showed very low percentages, making these foods that are sources of antioxidants, anti-inflammatory drugs, vitamins and minerals not present in the daily life of the population and with this contributing to overweight and the development of CVD, since they are foods that can help in the modulation of these diseases. In the findings of Cembranel et al.[19] a relationship was observed with the low consumption of foods with a source of calcium, vitamin A and vitamin D with higher values of BMI and WC.[19,20]

The consumption of dairy foods is shown as an ally to reduce the levels of Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP), in a study it was observed that their consumption reduced SBP and DBP, this due to calcium, potassium and magnesium present in these foods forming bioactive peptides. In addition, there are components such as the amino acid cysteine that can cause vasodilation and, as a consequence, reduce blood pressure.[21,22]

In addition, low consumption of calcium-rich foods can interfere with adipocytes, which benefit the metabolic pathways related to body fat and can increase parathyroid hormone and vitamin D levels, stimulating enzymes that promote lipogenesis and prevent lipolysis.[23]

Systemic Arterial Hypertension(SAH) has several risk factors for obesity, dyslipidemia, diabetes and socioeconomic factors. BMI can be a predictor for the development of hypertension, as well as age and economic class. Dyslipidemia as a risk factor for SAH is also related to increased BMI values, which can lead to other pathologies such as cerebrovascular accident (CVA), acute myocardial infarction (AMI), among others.

However, due to the small population of the study, there is a great limitation for the correlations of the variables studied, with a larger sample there would be greater chances of associations.

In this way, we see that it is of great importance to care for employees in the work environment, where it is often not possible to have adequate food due to being rushed or even due to the environment, and also showing how it is necessary to promote forms of nutritional education, emphasizing the importance of a healthy diet with practical measures, this as a form of prevention for monitoring and control of these pathologies.

Conclusion

Identified that there is a large consumption of foods that can contribute to the development of chronic diseases, such as foods with saturated fat and refined carbohydrates, and on the other hand, the low consumption of foods that can be avoided, such as insufficient consumption of raw vegetables and vegetables, with this, having a positive relationship with CVD indicators, mainly BMI and WC.

However, it was also found that the presence of milk consumption can be a protective factor for the development of these diseases, due to its compounds that can help in the modulation and in the emergence of factors for these diseases, being also a form of control and prevention in the adequate amounts.[24,25]

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Conflicts of interest

The author states there are no conflicts of interest.

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