Cardiovascular risk factors in employees of a Alagoas industry

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ABSTRACT

Introduction: Cardiovascular diseases are a serious public health problem in Brazil and comprise one of the causes of absence from work. However, its occurrence can be avoided if there is an early identification of cardiovascular risk factors. **Objective:** To investigate the frequency of cardiovascular risk factors in employees of an industry in Alagoas and to investigate differences in their occurrence between the sectors of work. **Methods:** This is an analytical cross-sectional, carried out in February 2019, with employees from the administrative sector and the operational sector of an industry in Alagoas. Sociodemographic, anthropometric, clinical and lifestyle data were collected. Altered blood pressure, anthropometric indicators of cardiovascular risk, smoking, alcohol consumption, physical inactivity and personal or family history of chronic diseases were considered as cardiovascular risk factors. The statistical analysis was performed with the statistical package R, using the package Rcmdr. In order to ascertain possible differences between risk factors in employees of the administrative sector and the operational sector, the t test for independent samples was performed, when continuous variables, and the Pearson chi-square test was performed, when categorical variables, adopting a level significance of 5%. **Results:** 56 employees were evaluated, with a mean age of 33 ± 8.5 years. Of these, 80.4% were male, 62.5% were overweight, 58.9% consumed alcohol, 53.6% performed some physical activity and 51.8% had a cardiovascular family history. There was no difference in the occurrence of these factors between the sectors of work. **Conclusion:** The most frequent cardiovascular risk factors were overweight, alcohol consumption and presence of family history, with no difference being identified between workers in the operational sector and the administrative sector. However, the presence of these factors is worrying, mainly because it is a relatively young sample.

Keywords: Cardiovascular risk, Occupational health, Risk factors.

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INTRODUCTION

Cardiovascular diseases (CVD) comprise one of the leading causes of death globally, responsible for approximately one-third of the world's deaths[1]. These diseases are triggered by different factors, including smoking, harmful consumption of alcohol, physical inactivity, and lack of a healthy diet, which, in turn, lead to overweight and increased blood pressure and blood glucose[2].

The early identification of these factors is one of the essential aspects for preventing the development of CVD[3]. This is because most cardiovascular risk factors are considered modifiable; that is, they are associated with lifestyle habits[3]. Therefore, the adoption of healthy habits, which include encouraging a healthy diet rich in fruits and vegetables, the abolition of tobacco and alcohol use, and promoting the practice of physical activity, is a preventive measure for CVD[3].

The work environment is ideal for promoting healthy habits[4]. In this context, the Programa de Alimentação do Trabalhador (PAT) stands out, which has as one of its objectives the improvement of workers' nutritional conditions through the provision of adequate meals and the development of food and nutrition education activities. Thus, it aims at the health, well-being, quality of life, and productivity of workers[5].

For the PAT to be properly executed, it is necessary that the nutritionist, who is technically responsible for the program, prepare menus according to the nutritional needs of workers[6]. To do so, it is necessary to carry out a diagnosis of the clientele, knowing their health status[7]. In this sense, knowledge of workers' cardiovascular risk factors is an important aspect to be considered in the preparation of menus, with a view to offering a healthy diet[8,9].

Given this scenario, this study aimed to investigate the frequency of cardiovascular risk factors in employees of an industry in Alagoas. Considering that employees who work in different sectors may be subject to other cardiovascular risk factors, the objective was also to investigate differences in the occurrence of these factors between the work sectors.

METHODS

This is an analytical cross-sectional study, carried out in February 2019, with employees from an industry's administrative and operational sectors located in Marechal Deodoro, Alagoas. The sample was non-probabilistic and for convenience, and the recruitment of participants was through advertisements fixed in the cafeteria and a direct approach to employees. Individuals legally hired by the company, over 19 years of age and of both sexes were included. Pregnant women or people with physical disabilities whose condition made it impossible to perform anthropometry were not included.

Sociodemographic (sex, age, time and sector in which the participants work in the company), anthropometric (weight, height and waist and hip circumference), clinical (blood pressure) and lifestyle (smoking, alcohol consumption and sedentary lifestyle) data were collected. Body weight and height measurements were measured according to the standardization of Lohman et al[10], using, respectively, a Líder® digital scale, with a capacity of 180kg and 100g sensitivity, and a Seca® portable stadiometer equipped with an inelastic measuring tape (2m long and 0.1cm precision). The body mass index (BMI) was calculated and classified according to the World Health Organization (WHO)[11]. Overweight was considered when BMI $\geq 25.0 kg/m^2$.

Waist circumference (WC) and hip circumference (HC) were measured using a Seca® inelastic measuring tape, with WC measured at the largest perimeter between the last rib and the iliac crest and HC at the largest diameter of the gluteal region. The WC cutoff points were analyzed based on the WHO recommendations[11] and with these variables, the waist-hip ratio (WHR)[12] was calculated, using the WHR ≥ 1 cutoff points for men and WHR ≥ 0.85 for women. The conicity index (CI)[12] which was analyzed from the cutoff points CI ≥ 1.25 for men and CI ≥ 1.18 for women and the waist-to-height ratio (WhtR)[13] which used the cutoff points WHtR $\geq 0, 51$ for men and WHtR ≥ 0.53 for women.

Systolic blood pressure (SBP) and diastolic blood pressure (DBP) were measured using a tensiometer (HEM-4030, OMRON, Japan), in two moments, following the procedures of the VI

Brazilian Guidelines on Hypertension[14]. Individuals with SBP≥130mmHg and/or DBP≥85mmHg were considered to have altered blood pressure. Data on personal and family history of dyslipidemia, diabetes mellitus, and systemic arterial hypertension were collected. Individuals were considered alcoholics, smokers, and physical activity practitioners based on their reports, regardless of frequency.

Statistical analysis was performed using the R statistical package (R Foundation for Statistical Computing, Vienna, Austria) (R Core Team, 2018), using the Rcmdr package (FOX, 2005). Continuous variables were tested for normality using the Kolmogorov-Smirnov test. As they presented a normal distribution, they were presented as mean and standard deviation. Categorical variables were presented in absolute and relative frequency. To investigate possible differences between the risk factors in employees of the administrative and operational sectors, the t test was performed for independent samples, when continuous variables, and Pearson's chi-square test, when categorical. The associations that obtained a p<0.2 in the crude analysis were included in a multivariate analysis model, aiming to control for possible confounding factors. A significance level of p<0.05 was adopted. This study was approved by the Ethics Committee of the Universidade Federal de Alagoas (CAAE: 06343319.0.0000.5013). All participants read and signed the Free and Informed Consent Term of the research. The results were delivered individually to each employee, and nutritional guidelines for weight maintenance and lifestyle habits were given.

RESULTS

Fifty-six employees were evaluated, of which 80.4% (n=45) were male. The age ranged between 22 and 62, with a mean of 33.8 ± 8.5 years. Most were from the operational sector (n=40; 71.4%) and had been at the factory for less than 3 years (n=35; 62.5%). From Table 1, it is evident that tobacco use was reported by only 1.8% (n=1), while alcohol consumption was reported by 58.9% (n=33). More than half of the participants (n=30; 53.6%) reported doing some type of physical activity, although 62.5% (n=35) were overweight.

The reference of a family history of risk was reported by 51.8% (n=29). It was identified that 33.9% (n=19) had altered blood pressure.

The CI was the indicator that diagnosed the largest number of employees with cardiovascular risk (n=51; 91.1%), followed by the WHtR (n=44; 47.5%). When comparing the indicators and cardiovascular risk factors analyzed between employees in the operational and administrative sectors, no statistically significant differences were identified (Table 1).

In the adjusted analysis model, which included age, alcohol consumption, family history of risk and altered blood pressure, none of the variables was associated with the sector of work (Table 2). When evaluating the variables in their continuous form, no statistical differences were identified between the employees of the two sectors. Likewise, no clinical differences were observed, based on cardiovascular risk cut-off points (Table 3).

DISCUSSION

In this study, the most frequent cardiovascular risk factors were being overweight, drinking alcohol, and having a family history. No statistical differences were identified in the occurrence of cardiovascular risk factors among employees in the operational and administrative sectors.

The high frequency of overweight found reflects the current situation found in Brazil, where 55.4% of the population is overweight[15]. Similarly, other studies carried out with workers also identified this occurrence. Scarparo, Amaro and Oliveira (2010), when evaluating the nutritional status of workers at university restaurants at the Universidade Federal do Rio Grande do Sul, found that more than 30% of individuals were overweight and around 20% were obese. Lima et al. (2020), in turn, identified a prevalence of overweight in 47.3% of employees among eucalyptus forestry workers in the state of Bahia.

The anthropometric indicators of cardiovascular risk that showed the highest risk were CI and WHtR. The CI is an indicator that is well described in the literature for being strongly correlated with abdominal obesity, which has a risk factor for CVD, diabetes, metabolic syndrome, and dyslipidemia[18,19]. This indicator has already been shown to have the greatest discriminatory power in estimating a cardiovascular event in 10 years[20].

Table 1. Indicators and cardiovascular risk factors of employees in the operational and administrative sectors of an industry in Alagoas.

Variable	Total	Operational sector (n=40)		Administrative sector (n=16)		p**
		n	%	n	%	
Sex						0.52
Male	45	33	82.5	12	75.0	
Female	11	7	17.5	4	25.0	
Age						0.15
≥45 years	8	4	10.0	4	25.0	
<45 years	48	36	90.0	12	75.0	
Smoking[1]						0.52
Yes	1	1	2.5	0	0.0	
No	55	39	97.5	16	100.0	
Alcoholism[1]						0.10
Yes	33	21	52.5	12	75.0	
No	23	19	47.5	4	25.0	
Physical inactivity[1]						0.40
Yes	26	20	50.0	6	37.5	
No	30	20	50.0	10	62.5	
Risk family history*						0.10
Yes	29	18	45.0	11	68.8	
No	27	22	55.0	5	31.3	
Altered blood pressure[2]						0.11
Yes	19	11	27.5	8	50.0	
No	37	29	72.5	8	50.0	
Overweight[3]						1.00
Yes	35	25	62.5	10	62.5	
No	21	15	37.5	6	37.5	
Risk by WC[3]						1.00
Yes	21	15	37.5	6	37.5	
No	35	25	62.5	10	62.5	
Risk by WHR[3]						0.55
Yes	5	3	7.5	2	12.5	
No	51	37	92.5	14	87.5	
Risk by CI[4]						0.65
Yes	51	36	90.0	15	93.8	
No	5	4	10.0	1	6.2	
Risk by WHtR[5]						0.49
Yes	25	19	47.5	6	37.5	
No	31	21	52.5	10	62.5	

* Presence of diabetes, hypertension and/or dyslipidemia; **p value for univariateanalysis. CI - conicity index; WC - waist circumference; WHR - Waist-to-hip ratio; WHtR - Waist-to-height ratio. [1]When there was a report of the habit, regardless of the frequency; [2]SBC (2010); [3]WHO (2000); [4]Pitanga et al (2004); [5]Ashwell et al (2005).

Table 2. Crude and adjusted prevalence ratio for the sector of work, according to age, alcohol consumption, family history of risk and altered blood pressure of employees of an industry in Alagoas.

Variables	n	Operational sector (%)	Administrative sector (%)	Crude analysis			Adjusted analysis		
				PR	95% CI	p	PR	95% CI	p
Age									
≥45 years	8	50.0	50.0	1.20	0.93-1.54	0.15	1.17	0.90 – 1.53	0.23
<45 years	48	75.0	25.0						
Alcoholism[1]									
Yes	33	63.6	36.7	1.16	0.97-1.39	0.10	1.15	0.97 – 1.37	0.11
No	23	82.6	17.4						
Risk family history*									
Yes	29	62.1	37.9	1.16	0.97-1.39	0.10	1.13	0.94 – 1.35	0.20
No	27	81.5	18.5						
Altered blood pressure[2]									
Yes	19	57.9	42.1	1.17	0.97-1.41	0.11	1.12	0.91 – 1.37	0.27
No	37	78.4	21.6						

*Presence of diabetes, hypertension and/or dyslipidemias; [1]Individuals who reported this habit, regardless of frequency; [2]Individuals with SBP≥135mmHg and/or DBP≥85mmHg were considered to have altered blood pressure.

Table 3. Mean ± standard deviation of age, blood pressure and body mass index of employees in the operational and administrative sectors of an industry in Alagoas.

Variáveis	Total	Operational sector (n=40)	Administrative sector (n=16)
Age (years)	33.8 ± 8.5	33.3±8.4	35.1±9.1
Systolic blood pressure (mmHg)	121.9±14.8	121.8±15.9	122.1±12.7
Diastolic blood pressure (mmHg)	79.3±11.2	78.9±12.0	80.31±9.7
Body mass index (kg/m2)	26.8 ± 4.6	27.0±4.4	26.6±5.4

The frequency of workers with cardiovascular risk, according to the CI, found in the present study was higher than the 68% identified by Viana et al. (2018) when evaluating telemarketing workers in the city of São Paulo.

Similar to CI, WHtR is also considered an excellent discriminator of abdominal obesity-related to cardiovascular risk factors[22]. Despite this, the frequency of individuals at cardiovascular risk, according to this indicator, in the studied group was lower than that identified by the CI and the 67.4% found by Pohl et al. (2018), when evaluating rural workers from some municipalities in the state of Rio Grande do Sul.

Since overweight is considered one of the main cardiovascular risk factors, given that adipose tissue induces the production of pro- and anti-inflammatory cytokines, such as tumor necrosis factor-alpha, interleukins 1, 6 and 10, and C-reactive protein, which directly affect the cardiovascular health of individuals[24], the results found are problematic, mainly because it is a relatively young sample and that this condition, identified by BMI, CI, and WHtR, predisposes to numerous diseases.

On the other hand, there was a more significant number of individuals practicing physical activity to the detriment of those who do not perform this type of activity. Nevertheless, the number of sedentary lifestyles evidenced was still higher than that of other studies. A study with employees of a Municipal Center Specialized in Physical and Hearing Rehabilitation in the state of Bahia identified less than 15% of sedentary lifestyle[25]. Another study, carried out with workers at a furniture center in the state of Minas Gerais, found 17.2%[26]. A meta-analysis performed to determine the categorical and quantitative dose-response association between sedentary time and CVD risk concluded that physical inactivity is an independent risk factor for CVD[27]. Thus, the practice of physical activity needs to be encouraged among industry employees.

Additionally, there was a report of frequent alcohol consumption. However, the frequency found was lower than that shown by other authors, such as Santos and Pierin (2008), when evaluating employees of a restaurant at a public university in São Paulo, identified that 74% of individuals used alcoholic beverages[28]. In a public university in a city in Southeast Brazil, Nadeleti et al. (2019), found the equivalent of 80.1%[29]. It should be noted that low and moderate alcohol consumption has no substantial short-term impact on hemodynamics or blood pressure. However, studies suggest that excessive alcohol consumption is associated with transient increases in blood pressure[30].

It was expected that there would be differences between the cardiovascular risk factors of employees in the administrative sector and the operational sector, considering that individuals who work in the administrative sector are seated most of their time. In contrast, those who work in the operational sector need to move to carry out their activities, expending greater energy and effort. Even so, no relationship was identified between risk factors and the work sector. Possibly, the absence of this relationship was due to the uniformity of the sample, which was predominantly male. In addition, the operational work of the industry in question can be considered light.

However, the results found demonstrate the need for health education activities to be carried out with employees to promote healthy habits. At this point, PAT stands out as a fundamental strategy. Through food, you can encourage the consumption of fruits, vegetables, whole grains, olive oil, and nuts. In addition to moderate/high consumption of fish and low consumption of saturated fatty acids, red meat and sausages can be adopted to prevent and treat CVD[31]. At the same time, nutritionists can promote educational activities to prevent these diseases. In this way, the work environment will be a suitable place to promote employee health.

Among the limitations of the present study, we cite the assessment of physical activity, alcohol consumption, and smoking without considering the frequency of practice. In addition, the homogeneity of the sample was a possible limiting factor for the comparison between the sectors. Additionally, the literature lacks studies that assess the risk factors for CVD in workers in the operational and administrative sectors, which implies the difficulty of comparison.

However, carrying out studies like this one is important so that the characteristics of workers are known, and so that possible risk factors that may be associated with the work sector can be investigated.

CONCLUSION

The most frequent cardiovascular risk factors were being overweight, drinking alcohol, and having a family history. No difference was identified between the occurrence of the different factors evaluated between the workers of the operational and administrative services. However, the results found may support health promotion strategies, with emphasis on encouraging healthy eating, following the PAT principles, and the adoption of healthy habits. Since this is a relatively young sample, adopting these strategies is essential to reduce risks and harmful health effects.

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