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RESEARCH ARTICLE

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IDENTIFICATION OF THE PREVALENCE OF RISK FACTORS FOR THE DEVELOPMENT OF METABOLIC SYNDROME IN EMPLOYEES OF A FOOTWEAR COMPANY

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ABSTRACT

Objective: to identify the risk factors for Metabolic Syndrome in employees of a company. **Methods:** cross-sectional descriptive study with the participation of employees of a private shoe company, 2018. An instrument with a self-report on a socio-demographic profile was applied. Body mass index, waist circumference (WC) and blood pressure (BP) were calculated. Blood glucose values were obtained from the casual measurement by rapid tests. The behaviors of practicing physical activity were obtained from the International Physical Activity Questionnaire. The analysis was presented by descriptive statistics from mean and standard deviation, absolute and relative values. **Results:** 61 employees, average age 30 years. Glycemic indexes were higher among men (97.30 mg / dL). The prevalence of overweight (46.7%) and WC (40%) were higher among women. Most workers (62.2%) had normal BP. In both sexes, they were classified as "active". **Conclusion:** the present study contributes to an early performance through educational, behavioral and evaluative measures such as lectures, counseling and health assessments contributing to increased productivity and reduced health costs.

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INTRODUÇÃO

Metabolic Syndrome (MS) corresponds to a disorder represented by multiple cardiovascular risk factors, the most common being central fat deposition and insulin resistance. This syndrome increases 1.5 times the overall mortality⁽¹⁾. According to the National Cholesterol Education Program's Adult Treatment Panel III and the World Health Organization (WHO), the diagnosis of MS is made through the presence of at least three of the following components: abdominal obesity, diabetes mellitus (DM), dyslipidemia and arterial hypertension (AH)⁽¹⁾. Abdominal obesity is determined by measuring waist circumference (WC), when higher than the reference values. Regarding the lipid profile, as recommended by the Update to the Brazilian Dyslipidemia and Atherosclerosis Prevention Directive⁽²⁾, triglycerides with levels above 150 mg / dl and HDL levels below 50 mg / dL in women and 40 mg / dL in men are considered. Fasting blood glucose values greater than 110 mg / dL are significant for the diagnosis of DM, however, reference values for blood glucose can be used at random, according to the Guidelines of the Brazilian Diabetes

NCEP-ATP III determines for the diagnosis of MS Systolic Arterial Pressure (SBP) values ≥ 130 mmHg or Diastolic Blood Pressure (DBP) ≥ 85 mmHg^{(1) (4)}. The identification of risk factors for the development of MS and cardiovascular diseases is essential, since contemporary society often has incongruous lifestyle habits with a life free of comorbidities. It is notorious how modernization and urbanization influence people's eating habits, who are increasingly consuming fastfoods, which in turn are rich in sodium and hydrogenated fats. In addition, any convenience resulting from technological advances, as well as from the hectic pace of life, predisposes people to have a sedentary life^{(5) (6) (7)}. In this context, Occupational Health aims to understand the relationships between the health-disease process and work. In this regard, the environmental and organizational risks to which they are exposed are of great importance⁽⁸⁾. The Organic Health Law (Law n° 8080/90) determines that the worker's health actions follow the general principles of the Unified Health System and recommends the inspection of the work environment and assistance to the worker⁽⁹⁾. The presence of comorbidities can affect the performance of workers, leading to an

early decrease in productive life and, consequently, an economic deficit and an increase in the number of work accidents and absenteeism⁽¹⁰⁾. Therefore, with a focus on worker health, the objective of this study was to identify the prevalent risk factors for the development of Metabolic Syndrome in employees of a private footwear company.

METHODS

This is a cross-sectional study of a descriptive character, applied to employees of a private footwear company in a city in the interior of São Paulo, in 2018. Participants were invited to participate in the research and were approached in the workplace in a previously scheduled period with the owners. Everyone was informed about the objective of the work, as well as its stages and all doubts were clarified. For the assessment of the socio-demographic profile, an instrument with self-declared responses was applied, which contains the following data: gender, age, race / color, marital status, family income (in minimum wages), number of dependents and professional status. To assess the intensity of physical activity and the level of physical inactivity, the International Physical Activity Questionnaire (IPAQ), which is self-administered, developed by WHO⁽¹¹⁾ was applied. Such a questionnaire has limitations, such as, for example, inaccuracy in responses and memory biases, on the other hand, it presents low cost and ease of application, in addition to collecting the type of activity and the context in which it occurs. Participants who performed at least 150 minutes of physical activity weekly for 5 or more days of the week were classified as physically active and sedentary those who performed less than 10 minutes of physical activity daily. Those who reported performing physical activity but did not reach the proposed recommendations were considered insufficiently active.

To measure the Body Mass Index (BMI) and classify whether or not obesity is present, the participants underwent an anthropometric assessment, with a measurement of body weight and height. This index is calculated from the value of body weight (kg) divided by the square of height (cm)⁽¹²⁾. A W903 digital portable scale was used, with capacity to register 180 kg, automatic display activated with the touch of the feet positioned on a straight floor. Participants were positioned in the center of the scale base, barefoot, wearing light clothing. The height was verified with the use of a tape measure, accurate to 0.5 cm, fixed on a smooth wall, where the participant stood, barefoot, with the heels together, back straight and arms extended at the side of the body. From the result, the BMI obtained was classified using constant values. The BMI classification is in accordance with the guidelines established in the 2016 Brazilian Obesity Guidelines⁽¹³⁾. They were classified as having normal weight between 20 and 24.9 kg / m², low weight when less than 20 kg / m², overweight between 25 and 29.9 kg / m², obesity between 30 and 39 kg / m²; severe obesity > 40 kg / m². To obtain the Abdominal Circumference (AC) measurement, the participants remained in an upright position, with the abdomen relaxed, arms at the sides, with the feet together and their weight equally supported by both legs. The measurement was performed following the recommendation of the I Brazilian Guideline for the Diagnosis and Treatment of Metabolic Syndrome⁽¹⁾: at the midpoint between the lower costal margin and the iliac crest. In this way, the costal ridge was first located and marked with the tip of a pen. Soon after, the iliac crest was palpated on the axillary midline and marked. Finally, a measuring tape was placed horizontally on the midline between the costal margin and the iliac crest and maintained in such a way that it remains in position around the abdomen on the level of the umbilical scar, so that the circumference can be read, in the nearest millimeter. Participants were instructed to breathe normally at the time of measurement, to avoid contraction of the muscles by contained breathing. For the classification as to the presence or absence of abdominal obesity, the Guideline establishes values > 102 cm in men and > 88 cm in women⁽¹⁾. To classify blood glucose values, rapid glucose tests were performed using an Accu-Check Active device, with the aid of Accu-Check Active test strips and disposable Accu-Check Safe-T-Pro Uno

lancets. For analysis, the test strip was inserted in the device, when the monitor turns on automatically. From then on, a drop of blood was obtained from the 3rd finger of the left hand and applied to the test strip. The results were provided in approximately 20 seconds. It is of great importance to emphasize that the tests were carried out in the morning and the values adopted as standards were obtained according to the goal of glycemic control of the Guidelines of the Brazilian Diabetes Society of the biennium 2017-2018⁽³⁾, which informs that the normal range of blood glucose values of an adult without diabetes, at random, is greater than 200 mg / dL and the presence of unmistakable symptoms of hyperglycemia. To identify the values and classify the BP, the indirect measurement was performed. First, a non-extensible measuring tape was used to measure the circumference of the participants' arms at the midpoint between the acromion and the olecranon, in order to choose the appropriate cuff. For this study, an automatic digital BP measurement device from OMRON HEM-7200 was used, which operates the oscillometric principle as a measurement method, with the ability to measure BP and heart rate quickly and simply, with comfortable controlled inflation, without the need for pre-configuration or re-inflation.

The monitor consists of a viewfinder, and two clamps to adjust the size of the circumference of the arm (22 to 32 cm and 32 to 42 cm), an air tube and an air plug. The diaphragm was positioned free of clothing. As a general rule, it is recommended that the width of the inflatable bag should correspond to 40% of the circumference of the limb. BP measurements were performed with the participant in a seated position, resting for 5 minutes, feet flat on the floor, uncrossed legs, empty bladder, arm extended at the fourth intercostal space, supported on a flat, solid surface and the palm of the hand facing up and the right arm was preferred, in order to avoid false readings. From the result, the BP obtained using constant values was classified. The BP classification was according to the guidelines established in the 7th Brazilian Guideline for Hypertension⁽⁴⁾: they were considered normotensive when SBP ≤ 120 mmHg and DBP ≤ 80 mmHg, pre-hypertensive (121-139 mmHg / 81-89 mmHg), Type 1 HA (140-159 / 90-99 mmHg), type 2 HA (160-179 / 100-109 mmHg), type 3 HA (SBP ≥ 180 mmHg and DBP ≥ 110 mmHg). Isolated systolic hypertension (HSI) is considered to have SBP ≥ 140 mmHg and DBP < 90 mmHg. As inclusion criteria, participants aged over 18 years were selected and registered with a formal contract with the present shoe company chosen for this study. Exclusion criteria were non-acceptance to participate in this study. All information obtained during data collection was respectively stored in Microsoft Excel software. Quantitative variables: age range, weight, height and BMI were described from the mean and standard deviation (SD), and in absolute and relative values. This study was approved by the Research Ethics Committee CAAE: n°79372017.2.0000.5495.

RESULTS

Sixty one employees participated in this study, of which 46 (75.4%) are men and 15 (24.6%) are women. Regarding socio-demographic characteristics, the main age group is composed of individuals aged > 30 years. It is also noted that 13.3% of women have a family income of more than four minimum wages and 12 women (80%) have an income of between one and four wages, in contrast to the values among men, 2.2% and 84.8%, respectively. Table 1 shows the characterization of professionals based on sociodemographic data and prevalent risk factors for the development of cardiovascular disease. From the identification of risk factors for MS in employees, it is observed that the average of glycemic indexes among men was 97.30 mg / dL and 88.27 mg / dL among women. The female gender did not present any alteration in glycaemia, whereas among men, one participant (2.2%) presented glycaemia above 200 mg / dL. When considering BMI values, the most significant classification among men was normality (41.3%), being, therefore, eutrophic. However, among women, overweight has a higher prevalence with 46.7%. A highly relevant data is that 2 men (4.4%) have severe obesity. The average BMI value for men and women corresponds to 26.67 kg / m² and 23.37 kg / m², respectively.

Table 1. Characterization of employees of a footwear company, regarding socio-demographic characteristics and prevalent risk factors for the development of cardiovascular disease, divided by sex, 2018

Variables	Genre			
	Female		Male	
	n	%	n	%
Age group (years)				
18-22	0	0	0	0
23-26	1	6,7	4	8,5
26-30	5	33,3	8	17,4
>30	9	60	34	74,1
Total	15	100	46	100
Minimum wage range				
<1	1	6,7	6	13
1-4	12	80	39	84,8
>4	2	13,3	1	2,2
Total	15	100	46	100
Glucose at random (mg/dL)				
Normoglycemia	15	100	45	97,8
Hiperglycemia	0	0	1	2,2
Total	15	100	46	100
BMI Classification (kg/cm ²)				
Low weight	0	0	1	2,2
Normality	6	40	19	41,3
Overweight	7	46,7	18	39,1
Obesity	2	13,3	6	13
Severy obesity	0	0	2	4,4
Total	15	100	46	100
Abdominal circumference (cm)				
Normal (<88cm for women and<102cm for men)	9	60	37	80,4
High (>88cm for women and>102cm for men)	6	40	9	19,6
Total	15	100	46	100
BP classification (mmHg)				
Normal	13	86,7	25	54,3
Pre hypertension	0	0	7	15,2
HA stage 1	0	0	2	4,4
HA stage 2	0	0	1	2,2
HA stage 3	0	0	0	0
HSI	2	13,3	11	23,9
Total	15	100	46	100
IPAQ				
Sedentary	2	13,3	11	24
Insufficient Active	5	33,3	11	24
Active	8	53,4	20	43,5
Very Active	0	0	4	8,5
Total	15	100	46	100

mg / dL = milligrams per deciliter; Kg = kilogram; cm = centimeter; mmHg = Millimeters of Mercury.

Table 2. Distribution of employees of a footwear company according to the Average and Standard Deviation in mmHg of the values of Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) divided by sex, 2018

Variables	Genre	
	Female	Male
	Average ± SD	Average ± SD
SBP (mmHg)	120,73 ± 16,85	130,67 ± 19,87
DBP (mmHg)	74,13 ± 14,49	72,83 ± 10,82

mmHg = Millimeters of Mercury; SD = Standard Deviation

Analyzing the abdominal circumference measurements, it is found that 6 (40%) of the women present values higher than that considered appropriate for sex, while this value among men corresponds to 9 (19.6%). The average of these values for women is 81.93 cm and for men it is 91.48 cm. Regarding BP measurements, 25 (54.3%) men and 13 (86.7%) women had normal blood pressure levels. No candidate was classified as hypertensive in stage 3, however 10 (21.8%) men were classified in the categories between prehypertension and HA stage 2, contrasting with the result of 0% of women with these classifications. HSI occurs in 11 (23.9%) men and 2 (13.3%) women. Table 2 shows the mean values of the Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) and the Standard Deviation (SD) for each sex. The mean SBP was higher in males, but the DBP was greater in females. Regarding the results obtained in the IPAQ questionnaire. The most representative level of physical activity was active for both sexes (53.4% of women and 43.5% of men). However,

the number of sedentary employees found was 2 women (13.3%) and 11 men (24%). The distribution of the means and standard deviation of the blood glucose, waist circumference and BMI of the employees are shown in Table 3.

Table 3. Distribution of employees of a footwear company according to the Average and Standard Deviation of blood glucose (mg / dl), waist circumference (cm) and BMI (kg / m²) divided by sex, 2018

Variables	Genre	
	Female	Male
	Average ± SD	Average ± SD
Blood glucose (mg/dl)	89,27 ± 12,85	97,30 ± 23,49
Abdominal circumference (cm)	81,93 ± 9,71	91,48 ± 12,15
Body mass index (kg/m ²)	23,37 ± 2,99	26,67 ± 4,53

mg / dL = milligrams per deciliter; Kg = kilogram; cm = centimeter; mmHg = Millimeters of Mercury.

The results obtained in the two stages of the project allowed feedback to all participants after the procedures carried out in the second stage, on the awareness of changes in lifestyle habits, in an attempt to prevent future cardiac events. In the end, informative and educational booklets were distributed to each participant on all the themes worked on. The doubts presented by the participants were immediately clarified in simple and accessible language.

DISCUSSION

This study indicates the existence of some risk factors for MS among workers in the analyzed industry, which is in agreement with the results of other studies. In a study with the objective of identifying cardiovascular risk factors in workers in an industry in a city in the state of São Paulo (5), 16% of the sample were classified as obese and 46% as overweight, these results being close to obtained in this study that 16.4% of the sample are obese and 41% overweight. Regarding the BP values, a higher percentage of hypertensive (28%) and pre-hypertensive (45%) individuals was obtained as a result than in the present study; a higher percentage of normotensive individuals (62.3%) was obtained than hypertensive (4.92%) and pre-hypertensive (11.48%)⁽⁵⁾. Another divergence occurs in relation to the glycemic values that were more significant among women (10%) with total prevalence among the sample of 9% and in the present study it was more expressive among men. Regarding physical activity levels, 21.3% of workers are considered sedentary⁽⁵⁾. Another study that assessed risk factors for MS in workers in an oil industry quantified 41.3% sedentary⁽¹⁴⁾. Two systematic literature reviews, from 2012 and 2017, point out the importance of integrating Health Promotion practices within the scope of Occupational Health, being in agreement and corroborating to justify the relevance of this work. They declare that such activities contribute to raising people's awareness of behavioral changes and good health practices. This can occur through educational, behavioral and evaluative measures such as lectures, counseling and health assessments. They have the benefit of identifying risk factors for early performance, contributing to increase the company's productivity and decrease health costs⁽¹⁵⁾⁽¹⁶⁾.

CONCLUSION

Based on the data from the present study, it is suggested that the evaluation and identification of risk factors for the development of Metabolic Syndrome is an effective and convenient proposal, since, actions like these, allow the implementation of educational interventions as well as contribute to the modification behavioral, productivity and quality of life of workers.

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