

Obesidade e nível de atividade física em trabalhadores da indústria calçadista

Obesity and physical activity level in employees from footwear industry

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ABSTRACT: Sedentary lifestyle and obesity are important factors that are associated with chronic diseases. The aim of this study was to analyze the body mass index (BMI), physical activity level (PAL) of workers in the footwear industry and to verify the correlation between the variables with age, time in the company and time in function. We analyzed 357 employees in the production sector, which completed a brief questionnaire with information about age, time in the company and time in function. To evaluate the PAL the workers answered to the International Physical Activity Questionnaire (IPAQ) and BMI was calculated by weight and height. The results showed that 17.4% of the employees are sedentary, 24.64% are insufficiently active, 42% are active, and 15.7% are very active. Regarding the classification of BMI, 33.24% of the workers were classified as overweight and 24.3% as obese. There is a significant and positive correlation between age and BMI ($r = 0,309$; $p = 0,0001$); between BMI and time in function ($r = 0,130$; $p = 0,013$) and between PAL and time in function ($r = 0,139$; $p = 0,008$). Most of the employees from footwear sector are sedentary and was classified as overweight. This condition has significant correlation with age and time in function. Thus, it is necessary the implementation of occupational health promotion programs to prevent future complications and the improvement in the quality of life in the footwear sector.

Key Words: Obesity; Physical activity; Health promotion; Sedentary; Workers; Risk factors.

RESUMO: O sedentarismo e a obesidade são importantes fatores que estão associadas com doenças crônicas. O objetivo do estudo foi analisar o índice de massa corporal (IMC), o nível de atividade física (NAF) dos trabalhadores da indústria calçadista, bem como verificar a existência de correlação entre as variáveis com a idade, tempo de empresa e tempo na função. Participaram do estudo 357 funcionários do setor de produção, que responderam a um breve questionário com informações sobre idade, tempo na empresa e tempo na função. Para avaliar o NAF foi aplicado o Questionário Internacional de Atividade Física (IPAQ), e os funcionários tiveram o peso e a altura mensurados para o cálculo do IMC. Os resultados demonstraram que 17,4% foram classificados como sedentários e 24,64% como insuficientemente ativos. Quanto à massa corporal, 33,24% dos trabalhadores foram classificados como sobrepeso e 24,3% como obesos. Foi observado uma correlação positiva e significativa entre idade e IMC ($r = 0,309$; $p = 0,0001$), entre IMC e tempo na função ($r = 0,130$; $p = 0,013$) e entre NAF e tempo na função ($r = 0,139$; $p = 0,008$). A maioria dos funcionários do setor calçadista são sedentários e estão acima do peso corporal. Esta condição está relacionada com a idade e tempo de serviço. Diante dos resultados apontados é necessário a implantação de programas de promoção de saúde do trabalhador, para prevenir futuras complicações e gerar melhorias na qualidade de vida no setor calçadista.

Palavras-chaves: Obesidade; Atividade Física; Promoção da Saúde; Sedentarismo; Trabalhador; Fatores de risco.

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Introduction

The city of Franca is one of the main centers of the footwear production in Brazil, but represents the second national rate of the absenteeism¹. Although technological advancement is present on the industrial sector², the footwear production sector has physical demands on the employees^{3,4}. The activities of the footwear industry workers are cyclical, repetitive and/or static contraction with moderate level of effort that involving mainly upper limbs in sitting or standing position, depending on the activity sector³.

Technological advances and facilities of contemporary life dramatically changed the daily activities of the workers rendering them increasingly hypokinetic, leading to a sedentary lifestyle⁴. The decreased level of physical activity in combination with high caloric diet can lead anthropometric changes (obesity) in workers. This situation have alarming levels in contemporary society and exposed the workers to risk factors such as development of occupational and chronic diseases (diabetes, atherosclerotic and work related musculoskeletal disorders) and, exposes workers to absenteeism, disability and morbidity^{5,6,7}.

Considering the high prevalence of occupational diseases from work in the footwear industry, the companies need to provide better opportunities to encourage employees to have a healthy lifestyle. Thus, the aim of the present study is evaluated the physical activity level (PAL) and body mass index (BMI) of the footwear industry workers. Based on the results of this study will be able to support proposals in health promotion and improve the living conditions of the working population within the conditions proposed by the World Health Organization (WHO).

Methods

Subjects

Participated of this study employees (n=357) from footwear industry of the production sector. This is a descriptive study with representative sample (95% confidence interval and error of 5%) of workers of the footwear industry from Franca, Brazil⁸. We included on

study only employees who worked in the production sector of the footwear industry for at least one year and excluded the workers that were remoteness during the data collection. The study was approved by the Ethics Committee on Research of the University of Franca (protocol n# 080/11). All participants signed the Informed Consent.

Analysis tools

To assess the age, time in the company and time in function (time in months on the specific sector), we applied a brief questionnaire. The employees also answered about the physical activity practical performed at least three times a week and which kind of physical activity their practiced.

We applied the International Physical Activity Questionnaire - IPAQ - 8 short version to evaluate the PAL. This questionnaire has six questions related to the amount of days and minutes about physical activities have being practiced during leisure time, occupational, mobility and housework are performed, with reference to the previous week to the interview. Based on the criteria of frequency, intensity and duration of activity, PAL are classified: sedentary, insufficiently active, active and very active⁹.

The BMI was calculated from the weight and height values, which were measured using a scale and digital stadiometer (WISO - W721®). The BMI values were classified as: <18.5 kg/m² (underweight); 18.5 and 24.9 kg/m² (normal); 25 to 29.9 kg/m² (overweight); and >30 kg/m² (obese) according to the World Organization health¹⁰.

Data collection

The questionnaires were given to employees of companies in the period from December 2011 to February 2012. The companies provided an appropriate place to perform the data collection. The employees were invited to participate characterizing a convenience sample. Initially we explain about the purpose of the study and the questionnaires. If employees have any questions about the

research or completing the questionnaires the researcher was present to clarify. After completed the questionnaire about the personal information and PAL the employees had weight and height measured to calculate BMI.

Statistical Analysis

The data were tabulated in Excel® program to obtain the mean, standard deviation, absolute and relative value. Statistical analysis was performed using Graph Pad Prism 5.0 software. To verify the normal distribution of data we used the Kolmogorov-Smirnov test. To verify the correlation between the variables BMI, PAL, age, time in the company and time in function the Spearman correlation test was used for data that were not normally distributed. The level of significance was $p < 0.05$.

Results

The employees had a mean age of 33.9 ± 10.4 years with time in the company 45.6 ± 49.34 months and time in function of 160.4 ± 110.1 months. The most of employees was classified as overweight $26.9 \pm 5 \text{ kg/m}^2$ (Table 1). The employees were classified by BMI as: 42.45% ($n=152$) normal; 33.24% ($n=118$) overweight; and 24.3% ($n=87$) were classified as obese.

The mean of the PAL was 147 ± 155.8 (weekly minutes) (Table 1). The mean of the PAL measured by the different intensity by week, showed the following results: low-intensity = 42.83 ± 59.92 minutes by week; moderate-intensity = 59.53 ± 85.20 minutes by week; high-intensity = 44.63 ± 72.58 minutes by week. We found that weekly frequency of physical activity by the workers was: low-intensity = 2.86 ± 2.46 days by week; moderate-intensity = 2.15 ± 2.31 days by week; high-intensity = 1.8 ± 1.18 days by week.

Most of the workers (57.7%) had a good PAL by week (42% active and 15.7% very active). However, 42% of the workers had to be below the ideal condition (24.64% insufficiently active and sedentary 17.4%) (Table 2). Walking was the most common kind of exercise reported by employees (21.8%).

Positive and significant correlations between the following variables were observed: age and BMI ($p = 0.0001$; $r = 0.309$); BMI and time in function ($r = 0.130$; $p = 0.013$) and PAL and time in function (0.139 ; $p = 0.008$), as shown in Table 3.

Table 1. Distribution of workers by age, time in the company and in function, BMI and PAL

Variables	Age (years)	TC (months)	TF (months)	BMI (kg/m^2)	PAL (minutes)
Mean	33.8	45.6	106.4	26.9	147
Median	32	31	61	25.7	100
SD	10.4	49.3	110.1	4.9	155.8
IC	[32.8-34.9]	[40.5-50.7]	[94.9-117.9]	[26.4-27.4]	[131-163]

BMI = body mass index; PAL = physical activity level; IC = confidence interval; SD = Standard deviation; TC = Time in company; TF = Time in function.

Table 2. Distribution of workers in absolute and relative values according to the classification of the IPAQ.

Physical Activity Level	N	%
Very active	56	15.7
Active	151	42
Insufficiently active	88	24.6
Sedentary	62	17.4

Table 3. Spearman correlation (r) between the scores: BMI and PAL with age, time in company and time in function.

Variables	BMI	PAL
	r value	r value
Age	*0.309	0.017
Time in company	0.002	0.461
Time in function	*0.130	*0.139
BMI	-	-0.089

BMI = body mass index; PAL = physical activity level; * = $p < 0.05$

Discussion

The footwear industries in Brazil (especially in Franca) provide a manual work style on manufacturing footwear with little technological assistance in the production process¹¹. The current study demonstrates that the PAL performed by employees from footwear industry is not ideal like recommended by WHO¹⁰. This finding can be explained by the activities in the footwear industry be performed in the sitting or standing position that involves little body dynamic movement (lower limbs) such as walking.

Physical inactivity has been identified as the fourth main risk factor for overall mortality, behind hypertension, smoking and hyperglycemia. The fifth leading risk factor for global mortality is overweight and obesity¹². Thus, the economic costs of physical inactivity are substantial and not confined to the footwear industry, but several sectors of the economy which demonstrates the need to implement public policies and especially health promotion programs subvention programs of the footwear industry. Physical inactivity is a modifiable risk factor for chronic disease and obesity; which require direct spending on medical treatments and medications and indirect costs such as absence from work during the period of incapacity¹³.

In this way, the incentive to regular exercise practices may have a positive impact on the footwear industry. However, we observed in this study low correlation between BMI and PAL employees of the time in function. The investment in health promotion programs for the physical activity appears to be sustainable and lucrative suggestion. It is evident that the problems and occupational diseases have multifactorial origin. In this sense, in addition to physical inactivity and obesity, other

factors such as ergonomics, posture, environmental and psychological conditions can also have great influence on the physical integrity of workers in the footwear industry^{11,14,15}.

This study demonstrates that the studied population is mostly in the overweight range. The result points to a worrying situation, since the average age of the study population was 33.8 years and considered by WHO as young adults¹⁶ which aggravates the interpretation of these results.

Alvarenga in 2009 demonstrated in his records that the aging process and also the retirement of labor activities have an impact on quality of life, such as the high rate of overweight and obesity, and also a decrease in physical and social activities, in addition to the link between aging and vulnerability to chronic and occupational diseases¹⁷.

Overweight and obesity are determined by multifactorial conditions and not only by the lack or insufficiency of physical activity^{18,19,20}. However, given the many positive contributions provided by physical activities, and the increasing population trend to physical inactivity and obesity promote regular physical activity are priorities in public health in some countries, and the accession of this and other practices related to health promotion, offered by the footwear industry could contribute positively to improve workers, as it 42% of workers in this sector are considered physically inactive.

The official position of the Brazilian Society of Sports Medicine emphasizes the existence of the dose-response linked to the level of physical fitness and its protective effect with the risk of acquiring chronic non communicable diseases (NCDs) decreased as physical activity increases²¹. According to ACSM²², the individual

is considered active when performing high-intensity physical activity at least three days a week, for a minimum of 20 minutes per session, or perform moderate-intensity activities at least every 5 days per week, and duration not exceeding 30 minutes per session; or when performing activities of varying intensity that total 150 minutes per week or more.

WHO global estimates indicate that NCDs can be prevented by carrying out sufficient volumes and intensities of physical activity²³, and positive results are pointed to the prevention of serious diseases such as cancer²⁴. However, more than a half of evaluated employees do not practice exercises with the minimum of three times a week.

The results of this study showed that 22% of workers who practice physical activities constantly three times a week, have elected to walk and only 6.7% exercise in fitness gyms. These results show the lack of access to suitable places for the practice of oriented physical activity, which indicates the need for companies to think of health promotion strategies such as the deployment of gymnastics creation of specific areas for conducting exercises fitness and muscle stretching or even create agreements with clubs and gyms so that employees have access to the practice of exercises prepared to provide a better quality of life and reduce the demand for health services^{24,25,26}. Duca et al. in 2011²⁷ reported high prevalence of leisure-time physical inactivity among workers of the footwear industry; while men prioritized activities in groups, women prefer to do individual practice.

The number of workers classified as normal by BMI was predominant in all categories of the IPAQ classification in our study, individuals classified as overweight were the second most numerous and obese are the less incidents in all categories. However, in the category of active individuals, there are a higher number of normal individuals in relation to other categories. Similar results to the present study were found in road drivers, in which most workers was overweight and hypertension²⁸.

Given that workers in the footwear industry have an average workload related to eight hours the incentive by the industries, the active lifestyle and regular physical activity may influence PAL of employees and reduce stress level²⁹. The understanding and alteration of this situation require large coverage actions involving professionals from different areas of health that have a common interest in spreading the physical activity in health promotion perspective³⁰. In addition, public policies to promote physical activity should consider socioeconomic differences, gender and the ways in which physical activity is practiced³¹. In this context, interventions targeting the internal policy of these companies are particularly important for actions in the field of health promotion can be implemented in daily life of workers in the footwear industry.

The IPAQ is a questionnaire with low cost tool and good applicability to access the PAL. However, some limitations of the IPAQ, as such subjectivity of the questionnaire needs to be considered when comparing with other instruments that measures PAL like pedometers and accelerometers.

In conclusion, we observed a high percentage of employees of the footwear industry sedentary and overweight. However, these findings showed low correlation with age and time in the work. From these results it is possible to think of interventions with health promotion programs for workers, especially older and more time function to minimize the chronic effects of physical inactivity and obesity and thus improve the quality of life of employees.

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