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Symptoms and risks for musculoskeletal disorders among male and female footwear industry workers

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ABSTRACT

Background: Considering the growing participation of woman in the labor market and the high prevalence of the musculoskeletal disorders (MSD) in the footwear industry workers, the aim of this study was to evaluate and compare female and male footwear industry workers in relation to their demographics, occupational characteristics, stress levels, MSD symptoms prevalence, physical activity levels, alcohol and tobacco use.

Methods: The study included 175 female and 182 male footwear industry workers. Data was collected using the Perceived Stress Scale – 10, the Standardized Nordic Questionnaire, the International Physical Activity Questionnaire, the Alcohol Use Disorders Identification Test, and the Fagerstrom test for Nicotine Dependence.

Results: The female workers were younger, had less time in the company and in the current job. They reported more stress ($p = 0.001$), had less time for physical activity ($p = 0.004$), higher prevalence of MSD symptoms in the last 12 months ($p = 0.003$), and consumed less alcohol ($p = 0.006$) than the male workers.

Conclusions: Female and male footwear industry workers presented significant differences in their demographics, occupational characteristics, stress levels, MSD prevalence, physical activity levels, alcohol and tobacco use. These differences should be taken into consideration in the implementation of intervention programs for optimum outcomes.

Relevance to industry: Female footwear industry workers were more stressed, presented higher prevalence of MSD symptoms, and reported less time for physical activity than male footwear industry workers. The differences between male and female workers should be taken into consideration in the implementation of MSD prevention programs.

1. Introduction

The footwear industry is an important sector in Brazil; in 2009, there were 17,727 workers in the Brazilian footwear manufacturing industry (Abicalçados, 2011). Manufacturing footwear requires intense manual labor with psychological pressure for productivity (Guimaraes et al., 2014). These factors associated with interpersonal relationships and work conditions influence stress and musculoskeletal disorders (MSD) prevalence (Da Costa, 2010; Rivera-Torres et al., 2013; Nimbarte et al., 2012). Work-related stress is defined by the National Institute of Occupational Safety and Health as a result of an imbalance between the demands of work and capabilities/features/needs of the worker (National Institute, 1999). Sedentary lifestyles, alcohol and tobacco use are also related with increased stress, MSD symptoms and productivity loss (Schou et al., 2014).

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MSD significantly affect Brazilian workers of both genders in various occupational groups (Vieira et al., 2011). The high prevalence of MSD in Brazilian footwear industry workers indicates that it is important to investigate what are the related factors (Silva et al., 2012; Gomes de Lima et al., 2012). The relationship between high physical demands and MSD symptoms is well established (Da Costa, 2010). There are also a growing number of studies on differences between male and female workers in relation to MSD symptoms, stress, sedentary lifestyle, alcohol and tobacco use (Lee et al., 2013). However, due to the growing participation of woman in the labor market it is important to carry out further studies to investigate the differences in risk factors for male and female workers in different sectors and countries.

Female workers comprise approximately 40% of the workforce (CIHI, 2010). In Brazil, 55% of women 16 years old or older work (Brazilian Institute of Geography, 2010). However, their increased participation in the workforce did not reduce their roles as mothers, wives and home managers. For the most part women and men still have different roles in many societies, often resulting in women having triple-shifts as a worker, wife and mother as well as performing more repetitive tasks (Coury et al., 2002). Additional studies on the factors that affect female and male workers' health are needed. Therefore, the aim of this study was to evaluate and compare female and male footwear industry workers in relation to demographics and occupational characteristics, stress, MSD symptoms, physical activity, alcohol and tobacco use.

2. Methods

The study was conducted in Franca in the state of Sao Paulo – the main Brazilian footwear manufacturing region. The study was conducted in compliance with the Helsinki Declaration (http://www.wma.net/en/30publications/10policies/b3/index.html) and was approved by the University of Franca's Institutional Review Board (protocol # 0080-11). Data collection was done from January to March 2012.

2.1. Subjects

Footwear companies were selected according their size, using stratified cluster sampling, with 14% of large companies, 35% of medium size companies and 50% of small and micro companies, resulting in 14 participating companies. Employees from all manufacturing departments and both genders with at least one year of working experience in the footwear industry were invited to participate in this study. Footwear production is divided into warehouse, leather cutting, preparation, stitching, assembly and finish (Fig. 1).

The subjects were asked to complete the following instruments: The Perceived Stress Scale-10 (PSS-10), the Standardized Nordic Questionnaire (SNQ), the Short International Physical Activity Questionnaire (IPAQ), the Alcohol Use Disorders Identification Test (AUDIT) and the Fagerstrom Test for Nicotine Dependence (FTND). The questionnaires were distributed to 430 workers and the response rate was 84% (n = 360). Questionnaires from three workers were excluded because they were not complete, which resulted in a final sample of 357 participants (83%) including 182 (51%) male and 175 (49%) female workers. The sample size was determined based on the target population using calculations for observational studies with a margin of error of 5% (CI = 95%). All subjects were voluntary participants and signed an informed consent form.

2.2. Demographic and occupational data

The demographic and behavioral variables (age, marital status, number of children, and physical activity practice), and the occupational information (job title, time on the job and company, and working hours) were collected using a brief questionnaire. Body mass index (BMI = kg/m^2) was calculated using weight and height values measured using a digital scale and a stadiometer (WISO – W 721®). Based on the BMI values, the participants were classified as: underweight<18.5 kg/m^2, normal weight 18.5–24.9 kg/m^2, overweight 25–29.9 kg/m^2 or obese>30 kg/m^2 (Oreopoulos et al., 2008).

2.3. Perceived stress level assessment using the perceived stress scale-10 (PSS-10)

Cohen et al. developed the PSS-10 (Cohen et al., 1983). Reis et al. validated the Brazilian Portuguese version (Reis et al., 2010). The PSS-10 consists of a self-report instrument for general assessment of stress levels based on the responses to 10 items. Each item has five possible answers based on frequency of symptoms. The final perceived stress score ranges from 0 to 40, with higher scores meaning higher stress levels. The perceived stress scores were classified as Low: 0 to 19, or as High/Very High: 20–40. The Portuguese PSS-10 has high internal consistency (Cronbach's alpha = 0.87) and high test-retest reliability (Intraclass Correlation Coefficient = 0.86) (Reis et al., 2010).

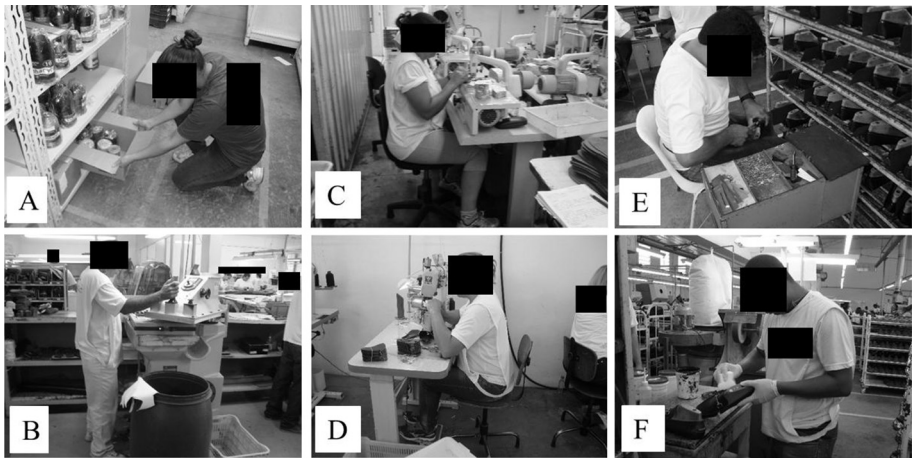

Fig. 1. Footwear manufacturing departments: (A) warehouse; (B) cutting; (C) preparation; (D) stitching; (E) assembly; (F) finishing.