Revista Psicologia: Organizações & Trabalho (rPOT)
Psychology: Organizations and Work Journal
Revista Psicología: Organizaciones y Trabajo
ISSN 1984-6657 - https://doi.org/10.5935/rpot/2022.1.22829

Presenteeism in the Footwear Industry: an Analysis of the Workloads

Wilza Karla dos Santos Leite[1], Anísio José da Silva Araújo[2], Luiz Bueno da Silva[3], Jonhatan Magno Norte da Silva[4], Erivaldo Lopes de Souza[5], Arielson Santos Alves da Silva[6], Robson da Fonseca Neves[7], Elamara Marama de Araujo Vieira[8]

[1] http://orcid.org/0000-0002-1405-1672 / Universidade Federal da Paraíba (UFPB), Brasil
[2] http://orcid.org/0000-0002-3128-3897/ Universidade Federal da Paraíba (UFPB), Brasil
[3] http://orcid.org/0000-0003-4624-2075 / Universidade Federal da Paraíba (UFPB), Brasil
[4] http://orcid.org/0000-0003-4084-9511 / Universidade Federal de Alagoas (UFAL), Brasil
[5] http://orcid.org/0000-0002-7098-9438 / Universidade Federal da Paraíba (UFPB), Brasil
[6] http://orcid.org/0000-0002-3246-2176 / Universidade Federal da Paraíba (UFPB), Brasil
[7] http://orcid.org/0000-0002-3889-560X / Universidade Federal da Paraíba (UFPB), Brasil
[8] http://orcid.org/0000-0002-1904-0489 / Universidade Federal da Paraíba (UFPB), Brasil

Abstract

Presenteeism represents the fact of being at work in adverse health and well-being conditions. The objective was to analyze the factors related to health complaints and severity of recurrence among workers in the footwear industry over a two-year period. A total of 9106 cases were investigated, in which the physical loads were assessed using the Occupational Repetitive Actions method, and the psychological loads using the Job Stress scale. Univariate models were used to verify the risk of illness and the effects in terms of recurrence. Tasks present a risk for musculoskeletal disorders and low decision latitude for workers; women, productive sectors, and the second shift of work have a higher recurrence estimate; dysfunctions of the neuromusculoskeletal system and prescription of muscle relaxants are among the most recurrent; and, the illness is seasonal, increasing with time and demands. Complaints may be related to inappropriate range of motion, short cycles, repetitiveness, and low autonomy.

Keywords: occupational diseases, working conditions, musculoskeletal disorders, pain.

Presenteísmo na Indústria Calçadista: uma Análise das Cargas de Trabalho

Resumo

Presenteísmo corresponde ao fato de estar no trabalho em condições adversas de saúde e bem-estar. Objetivou-se analisar os fatores relacionados às queixas de saúde e gravidade de recorrência em trabalhadores da indústria calçadista durante dois anos. Foram averiguados 9106 casos, cujas cargas físicas foram avaliadas pelo *Occupational Repetitive Actions* e as psicológicas, pela *Job Stress Scale*. Foram utilizados modelos univariados para verificar o risco de adoecimento e os efeitos em termos de recorrência. As atividades apresentam risco para distúrbios osteomusculares e os trabalhadores, baixa latitude decisória; mulheres, setores produtivos e segundo turno de trabalho apresentam uma estimativa de recorrência maior; disfunções do sistema neuromusculoesquelético e prescrição de relaxantes musculares estão entre os mais recorrentes; e, o adoecimento é sazonal, aumentando conforme o tempo e as demandas. As queixas podem estar relacionadas a amplitudes de movimentos não recomendadas, ciclos curtos, repetitividade e baixa autonomia.

Palavras-chave: doenças ocupacionais, condições de trabalho, desordens musculoesqueléticas, dor.

Presenteismo en la Industria del Calzado: un Análisis de las Cargas de Trabajo

Resumen

El Presenteismo es el hecho de estar en el trabajo bajo condiciones adversas de salud y bienestar. El objetivo ha sido analizar los factores relacionados con las quejas de salud y la gravedad de la recurrencia en trabajadores de la industria del calzado durante dos años. Se investigaron 9106 casos, cuyas cargas físicas fueron evaluadas mediante el *Occupational Repetitive Actions* y las psicológicas mediante la *Job Stress Scale*. Se utilizaron modelos univariados para verificar el riesgo de enfermedad y los efectos en términos de recurrencia. Las actividades presentan riesgos de trastornos osteomusculares y los trabajadores baja latitud decisoria; las mujeres, los sectores productivos y el segundo turno de trabajo presentan una estimación de recurrencia mayor; las disfunciones del sistema neuromusculoesquelético y la prescripción de relajantes musculares se encuentran entre los más recurrentes; además, la enfermedad es estacional, aumentando con el tiempo y las demandas. Las quejas pueden estar relacionadas con amplitudes de movimientos no recomendados, ciclos cortos, repetitividad y baja autonomía.

Palabras clave: enfermedades ocupacionales, condiciones de trabajo, trastornos musculoesqueléticos, dolor.

Submission: 04/03/2021
First Editorial Decisionl: 07/12/2021
Final Version: 06/03/2022
Accepted in: 10/03/2022

How to cite this article:
Leite, W. K. S., Araújo, A. J. S., Silva, L. B., Silva, J. M. N., Souza, E. L. Silva, A. S. A., . . . & Vieira, E. M. A. (2022). Presenteeism in the Footwear Industry: an Analysis of the Workloads. *Revista Psicologia: Organizações e Trabalho, 22*(1), 1804-1814. https://doi.org/10.5935/rpot/2022.1.22829

The consumption of footwear industry products has been growing in recent years. The production process of a shoe demands different raw materials that generate intermediate, accessory, ornamental, and packaging products. These processes are confined to different sectors with intense manual, repetitive and low variability tasks (Carvalho Filho, Nunhes, & Oliveira, 2019). The footwear industry is interconnected to other industrial branches and is strongly influenced by seasonal collections and by the seasonality of the hot and cold seasons of the year. The production volume varies according to the orders and the footwear model. Traditional models tend to keep stable volumes and stocks while modern models are custom made and differ each season or over shorter periods (Sadeghi, Rebelo, & Ferreira, 2018). Work in the footwear industry presents several occupational risks, low technological investment, low compensation, and high prevalence of occupational diseases (Leite et al., 2019).

Presenteeism is the condition in which the worker continues to perform his or her professional activities even when one or more bodily functions are compromised. It has a multifactorial origin and can be related to diseases or injuries, affecting the ability to work with consequences for workers and companies. Symptoms can present in acute, episodic, or chronic forms (Freeling, Rainbow, & Chamberlain, 2020; Rainbow & Steege, 2017). This topic is recent, as research on work-related illness traditionally emphasizes absenteeism. However, studies suggest that presenteeism precedes absenteeism and is a risk management indicator used to prevent sick leave (Dietz et al., 2020).

Health complaints in workplaces provide information for surveillance of workers' health and clues about presenteeism. The risk of working ill varies according to the nature of these complaints (Rainbow & Steege, 2017). In this sense, longitudinal research is recommended to better assess the factors related to presenteeism and to direct effective actions for organizations and social institutions. More than understanding the relationship between presenteeism and health complaints, these studies provide evidence of the association between presenteeism and absenteeism (Lohaus & Habermann, 2019). This study has two main objectives. First, it seeks to evaluate the physical and psychological burdens of work in the footwear industry. Second, it seeks to understand the association between workers' reported complaints and individual, labor, and seasonal factors over a two-year period. It intends to investigate (1) which physiological and psychological dysfunctions are associated with these factors, and (2) what the effects of these factors are in terms of the recurrence of health complaints.

Method

Participants

Workers from a shoe production unit located in Brazil participated in this study. This study evaluated the physical and psychological burdens of the activities performed by these workers. Due to the number of workers in the production unit, it was necessary to stipulate a representative number of participants for conducting the interviews (including a questionnaire and conversational action) and for the delimitation in terms of observation, filming and photography. There are 1750 employees working in this unit. From January/2018 to December/2019, 1517 workers were admitted to the unit's outpatient service. For the interviews, the number of workers was calculated to provide a representative sample of the population of the unit (Hedayat & Sinha, 1991):

$$n = \frac{N \times Z_{\alpha}^2 \times p \times q}{d^2 \times (N-1) + Z_{\alpha}^2 \times p \times q}$$

in which n = size of the sample; N = total population of the production unit studied;

$$Z_{\alpha}^2 = 1962$$

with a confidence interval of 95% (CI); p = expected frequency (when unknown, a value of 50% is used, maximizing the sample size); $q = 1–p$; d = acceptable error (d = 5.55% for CI 95% and $p = 0.50$). Therefore, a minimum of 264 workers is required as detailed below:

$$n = \frac{1.750 \times 1.962^2 \times 0.5 \times 0.5}{0.0555^2 \times (1.750 - 1) + 1.962^2 \times 0.5 \times 0.5} = 263.83$$

Workers of both sexes aged 18 years or older, who did not undergo surgery in a period less than or equal to 6 months from the start of this research and who signed the Free and Informed Consent Form were included. Those who underwent surgery during the research, pregnant women, workers undergoing training and minor apprentices were excluded. Although the representativeness of the sample was satisfied with 264 workers, a total of 307 were eligible and accepted to participate in evaluation phase of work-related physical and psychological loads.

Mapping of health complaints. The health complaints of the medical sector of the production unit notified by the Specialized Service in Engineering and Occupational Medicine in the period from January/2018 to December/2019 were mapped. The medical sector consists of a doctor, a nurse, and two nursing technicians. It is located inside the production unit and receives workers by spontaneous demand.

Instruments

Workload assessment. As the most required body segment in the footwear industry is the upper limb, the physical workloads were evaluated by the Occupational Repetitive Actions (OCRA) Index. The OCRA is described in the standard ISO 11228-3 and the ergonomic risk is classified into five categories: (1) acceptable, whose index ranges from 0 to 2.2; (2) doubtful or very slight, from 2.3 to 3.5; (3) slight, from 3.6 to 4.5; (4) medium, from 4.6 to 9.0; and, (5) intense, with indices above 9.0 (Micheli & Marzorati, 2018). The psychological workloads were evaluated by the short and adapted to Portuguese version of the Job Stress Scale (JSS). The JSS allows categorizing the work in high job strain, passive, active and low job strain besides indicating possible moderating effects of social support (Alves, Choe, Faerstein, Lopes, & Werneck, 2004; Karasek, 1979).

Data Collection Procedures and Ethical Considerations

Observational and interactional methods were mobilized in the different sectors of the production unit. For observational methods, recording techniques involved instantaneous and continuous observations, photographic resources, video recordings and manual recordings. For the interactional methods, conversational actions were carried out with the workers to understand the unobservable aspects of their activities and the conditions under which they are carried out (Guérin, Laville, Daniellou, Duraffourg, & Kerguelen, 2001). The objective was

to understand the functioning and integration of the different work sectors as well as the characteristics, production flow, constraints, variability, and the possible consequences for the health and performance of the tasks that constitute each of the sectors in the production unit. The methods were conducted simultaneously with the mapping of health complaints over the two years.

Variables. This study analyzed individual, labor and seasonal variables (Table 1). The International Classification of Functioning, Disability and Health (ICF, 2001) was considered for the motivation to go to the outpatient clinic. The medication administered by the outpatient clinic staff was categorized into groups, according to their active agents and effects on the body, according to information from each manufacturer. The commercial names of the medications were suppressed.

This study was approved by the Research Ethics Committee of the Federal University of Paraíba (Reference number: 89029818.0.0000.5188). All participants voluntarily agreed to participate in the research and signed the informed consent form, ensuring anonymity.

Data Analysis Procedures

The data were analyzed in R software version R 3.4.4 (Team, 2018). To analyze the factors associated with health complaints, we used a binary logistic regression model, whose dependent variable was the occurrence of body dysfunctions. Thus, the odds ratio expresses the risk for an impairment in health status in a given category compared to a reference category. The recurrence of complaints was analyzed using Poisson models, representing the expected effect in terms of severity. In this case, we took as dependent variable the recurrence of the complaint in terms of event records (Fávero, 2015). Recurrence is understood as the same worker going to the outpatient clinic more than once with the same health problem during the period delimited in this study. The events in which the visit to the outpatient clinic was related to the request for personal hygiene products and adhesive dressings were excluded from the models. The reference categories adopted were male gender, administrative sector, third work shift, month of January, year 2018, medication group 7, and neuromusculoskeletal and movement-related functions.

Results

Work in the Footwear Industry

The production unit is responsible for manufacturing footwear. The shoes are produced in men's and women's versions, while the safety boots have a unisex standard. In the company there are two types of production units: head office and satellite. This study took place in the head office, the most complex in terms of production. The satellites are smaller units and produce part of the uppers. The headquarters operates six days a week, five of them in three production shifts. Generally, the production target is 600 pairs of shoes/production cell/shift. The work in the sheds is organized according to their constituent units. A shed is divided into work sectors and these, in turn, into production cells. Most tasks are sequential and interdependent. Most cell operators are monofunctional (one worker/one task/one workstation). The process in the cells can be manual, semi-automatic or automated.

Workloads in the Footwear Industry

Regarding physical workloads, 104 tasks developed by the workers were evaluated. Of these, only 8.7% were within the acceptable risk limits for Work-Related Musculoskeletal Disorders (WMSDs) in the upper limbs". The averages for cycle time and exposure indices for the left and right limbs were 22.20 (*SD* = 28.45) seconds, 5.09 (*SD* = 4.30), and 6.40 (*SD* = 5.93), in that order. The number of actions per cycle obtained an average of 15.77 (*SD* = 21.87) for the left limb and 22.20 (*SD*

Table 1
Variables analyzed in the study

Variables	Categories
Gender	Male and female.
Work sector	Administrative, storage, rubber; distribution center; quality control; cutting, assembly and finishing; preparation and sewing; injection molding; molding and maintenance; prefabrication; and, presses.
Work shift	Zero (8 a.m. to 5 p.m.), first shift (5h30 a.m. to 2 p.m.), second shift (2 p.m. to 10h26 p.m.) and third shift (10h26 p.m. to 5h30 a.m.).
Body function affected	Mental functions; sensory functions and pain; functions of the cardiovascular, haematological, immunological and respiratory systems; functions of the digestive, metabolic and endocrine systems; genitourinary and reproductive systems; neuromusculoskeletal and movement-related systems; functions of the skin and related structures; and, others in cases where the health complaint was not related to the ICF categorization (2001).
Medication group	Group 0: no medication was administered; Group 1 (anti-flu/antiallergic): four oral medications with a base of paracetamol, chlorpheniramine maleate, phenylephrine hydrochloride, ebastine, pseudoephedrine hydrochloride, and propylene glycol were administered; Group 2 (antispasmodic/antiflatulent): six oral medications were administered, one of which was a herbal medicine. The active agents included domperidone, simethicone/dimethicone, and aluminum hydroxide. The herbal medicine had as base an opium camphor tincture extracted from Papaver somniferum L.; Group 3 (relaxant): Two herbal medicines for oral use with medicinal plants (Passiflora Incarnata L., Crataegus oxyacantha L. and Salix alba L.) as base were administered; Group 4 (antipyretic/analgesic): two oral medications with a base of paracetamol were administered; Group 5 (cardiovascular regulator): three oral medications with a base of captopril and furosemide were administered; Group 6 (anti-inflammatory/analgesic): three oral medications with a base of scopolamine butylbromide and mefenamic acid were administered; Group 7 (muscle relaxant/anti-inflammatory/analgesic): eight drugs were administered, six oral and two topical. The active ingredients included diclofenac sodium, caffeine, carisoprodol, paracetamol, betamethasone dipropionate, betamethasone disodium phosphate, meloxicam, mefenamic acid, methyl salicylate, camphor, menthol, and turpentine; Group 8 (antiemetic/antivertiginous/anticinetics/anti-acid/rehydration/maintenance of hydration): four oral medications were administered with a base of meclizine hydrochloride, omeprazole, pantoprazole, sodium chloride, potassium chloride, sodium citrate dihydrate, and glucose; and, Group 9 (antibacterial/anti-inflammatory): four external use drugs with a base of sodium sulfacetamide, trolamine, neomycin sulfate, hydrocortisone, polymyxin B sulfate, naphazoline hydrochloride, and zinc sulfate heptetrahydrate were administered.
Month of the health complaint	January, February, March, April, May, June, July, August, September, October, November, and December.
Year of the health complaint	2018 and 2019.
Production fluctuation	Fluctuations in production demands throughout 2018 and 2019.

Table 2
Physical and psychological workloads in the footwear industry

Work demands / Type of work	Description	*n*(%)
Physical workloads		
Risk level OCRA Index		
Acceptable	No consequences.	9(8.7)
Doubtful or very slight	Conduct new assessments and health surveillance	20(19.2)
Slight	Redesign tasks and workstations according to priorities, train workers, and conduct health surveillance	8(7.7)
Medium		39(37.5)
Intense		28(26.9)
Psychological workloads		
Low job strain with high social support	Low demand and low work control.	35(11.4)
Low job strain with low social support		41(13.4)
Active with high social support	High demand and low work control	41(13.4)
Active with low social support		37(12.1)
Passive with high social support	Low demand and low control	63(20.5)
Passive with low social support		26(8.5)
High job strain with high social support	High demand and high control	45(14.7)
High job strain with low social support		19(6.2)

= 28.45) for the right limb. It was found that workers spend an average of 284.98 (*SD* = 81.27) minutes of their shift performing repetitive movements. It was observed that 75% of the tasks presented repetitiveness greater than or equal to 51%. As for the psychological workloads, 307 workers responded to the JSS, being for most of them passive work with high social support (Table 2).

Health Complaints Reported by the Workers

No complaints regarding the functions of sound and speech production were reported. All outpatient complaints are listed in Table 3.

Women are at higher risk for genitourinary and reproductive disorders; mental disorders; and disorders of the digestive, metabolic, and endocrine systems. In contrast, they have a

Table 3
Affected body functions in the shoe production unit

Description of body functions	Health complaints
Mental: Global brain functions (consciousness; orientation; intellectual; global psychosocial; temperament and personality; energy and impulses; and, sleep); specific mental (attention; memory; psychomotor; emotional; perception; thinking; higher level cognitive; language mental; calculation; mental for the sequence of complex movements; and, personal experience and time) and other specified or unspecified mental functions.	Stress, nervousness, anguish, anxiety, emotional instability, and a crying episode.
Sensory and pain: Functions associated with the sensory organs (vision, hearing, taste, vestibular, olfactory, proprioception, tactile, and related to temperature or other stimuli), painful sensations (generalized and localized), and other specified or unspecified sensory and pain functions.	Irritation, inflammation, and pain in the eyes and ears; dizziness; nausea associated with dizziness or lightheadedness; localized pain sensations in the head, neck, chest, stomach, abdomen, back (thoracic and lumbar region), upper limbs (shoulder, arm, elbow, wrist, hand, and fingers), lower limbs (hip, thigh, knee, and foot); pain in the jaw, scapular, and sacrolumbar joints; generalized pain in the entire body; and, unspecified pain.
Cardiovascular, haematological, immunological and respiratory systems: Cardiac, blood vessel, blood pressure; blood and body defense functions; respiratory, respiratory muscles, exercise tolerance; and, other cardiovascular, hematological, immune and respiratory functions as well as specified and unspecified cardiovascular and respiratory sensations.	High blood pressure, tachycardia, flu symptoms (runny nose, malaise, cold, nasal congestion, cough, sore throat, and upper airway inflammation), allergic processes or reactions, intoxication, rhinitis, pharyngitis, sinusitis, and asthma.
Digestive, metabolic and endocrine systems: Functions of ingestion; digestion; assimilation; defecation; weight maintenance; general metabolic, water, mineral and electrolyte balance; thermoregulatory; endocrine gland functions; and, other functions of the digestive, metabolic and endocrine systems as well as specified and unspecified digestive system sensations.	Flatulence, heartburn, urge to vomit, nausea associated with digestive functions, poor digestion, diarrhea, abdominal discomfort, and abdominal cramping.
Genitourinary and reproductive: Urinary excretory, micturition, sexual, menstruation-related, procreative functions as well as other specified or unspecified urinary, genital and reproductive functions and sensations.	Functions of urinary excretion and associated with the menstrual cycle and pregnancy.
Neuromusculoskeletal and movement-related: Functions of joint mobility and stability; bone mobility; muscle strength, tone, and endurance; motor reflexes; involuntary motor reactions; voluntary movement control; involuntary movements; gait pattern-related as well as joint and bone; muscle; movement; neuromusculoskeletal and movement-related functions; and, sensations pertaining to muscle and movement functions.	Mobility of the joints and bones as well as the functions of strength, tone, and muscular endurance of the segments of the spine (cervical, thoracic, and lumbar), the upper limbs (shoulder, arm, wrist, hand, and fingers), and the lower limbs (hip, thigh, knee, leg, and foot).
Skin and related structures: Protective, repairing and other functions of the skin, hair, nails and related structures as well as specified and unspecified skin sensations.	Superficial injury or inflammation of the skin, injury to mucous membranes, burns, itching and nail affliction.
Other health states: Other health states not fitting the ICF (2001).	Other health states not covered by ICF (2001) body functions or not specified in the care record.

lower risk for developing dysfunctions of the skin and related structures; the cardiovascular, haematological, immunological, and respiratory systems; neuromusculoskeletal and movement-related; and, sensory and pain (Table 4).

For the work sector the reference was the administrative one. The storage area presents a 53% higher risk for the occurrence of dysfunctions of the cardiovascular, haematological, immunological, and respiratory systems. In contrast, the rubber, cutting, assembly and finishing, and injection molding sectors

Table 4
Risk of physiological and psychological dysfunctions depending on individual, labor, and seasonal factors

Variables	Physiological and psychological functions															
	M		SP		CHIR		DME		GR		NM		SS		O	
Gender	OR (CI 95%)	*p*	OR (CI 95%)	*p*	OR (CI 95%)	*p*	OR (CI 95%)	*p*	OR (CI 95%)	*p*	OR (CI 95%)	*p*	OR (CI 95%)	*p*	OR (CI 95%)	*p*
Male	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Female	3.79 (2.20-6.80)	<0.001	0.81 (0.74-0.88)	<0.001	0.72 (0.65-0.80)	<0.001	2.20 (1.89-2.56)	<0.001	46.24 (22.16-118.47)	<0.001	0.78 (0.64-0.96)	0.017	0.56 (0.31-0.97)	0.046	-	-
Work sector																
Administrative	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Storage	-	-	0.53 (0.37-0.76)	0.001	1.53 (1.05-2.23)	0.025	-	-	-	-	-	-	-	-	-	-
Rubber	-	-	-	-	0.42 (0.23-0.74)	0.004	-	-	-	-	-	-	-	-	-	-
Cutting, assembly and finishing	-	-	-	-	0.74 (0.57-0.96)	0.023	-	-	-	-	-	-	-	-	-	-
Injection molds	-	-	-	-	0.65 (0.48-0.88)	0.005	-	-	-	-	-	-	-	-	-	-
Month of the complaint																
January	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
March	-	-	0.73 (0.57-0.94)	0.014	-	-	-	-	-	-	-	-	-	-	-	-
April	-	-	0.78 (0.61-0.98)	0.037	1.36 (1.03-1.80)	0.032	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	1.34 (1.03-1.75)	0.029	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	1.53 (1.17-2.01)	0.002	0.70 (0.49-0.99)	0.045	-	-	-	-	-	-	-	-
July	-	-	-	-	1.60 (1.24-2.09)	<0.001	-	-	-	-	0.20 (0.11-0.34)	<0.001	-	-	-	-
August	-	-	-	-	1.64 (1.26-2.15)	<0.001	0.48 (0.33-0.69)	<0.001	5.45 (2.12-18.54)	0.002	0.28 (0.16-0.49)	<0.001	-	-	-	-
September	-	-	-	-	-	-	0.46 (0.32-0.67)	<0.001	7.62 (2.99-25.77)	<0.001	0.33 (0.19-0.56)	<0.001	-	-	-	-
October	-	-	-	-	1.41 (1.09-1.83)	0.009	0.54 (0.38-0.76)	<0.001	5.10 (1.95-17.46)	0.003	0.47 (0.30-0.73)	0.001	-	-	-	-
November	6.56 (1.28-120.00)	0.072	-	-	-	-	0.53 (0.37-0.76)	0.001	7.73 (3.00-26.33)	<0.001	0.60 (0.39-0.94)	0.024	-	-	8.29 (1.55-153.7)	0.046
December	8.54 (1.64-157.08)	0.041	-	-	-	-	0.61 (0.41-0.90)	0.013	7.31 (2.69-25.63)	<0.001	0.40 (0.24-0.66)	<0.001	-	-	-	-
Year of the complaint																
2018	1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
2019	-	-	0.86 (0.78-0.95)	0.002	-	-	1.65 (1.37-1.98)	<0.001	-	-	0.52 (0.42-0.64)	<0.001	2.99 (1.58-6.01)	0.001	-	-

Note. Data presented as odds ratio (95% confidence interval) and Wald test p-value. Abbreviation: CI = confidence interval; M = mental; SP = sensory and pain; CHIR = cardiovascular, haematological, immunological and respiratory systems; DME = digestive, metabolic and endocrine systems; GR = genitourinary and reproductive; NM = neuromusculoskeletal and movement-related; SS = skin and related structures; O = other health states not fitting the ICF; "- " = $p>0.05$.

have on average a 40% lower risk for the same body dysfunction. Moreover, there is a 47% lower risk for the occurrence of sensory dysfunctions and pain in the storage sector for the occurrence of sensory dysfunctions and pain (Table 4).

For mental disorders, the risk is on average about seven times higher in the months of November and December; for disorders of the cardiovascular, haematological, immunological, and respiratory systems, it is about 48% higher considering the months of March through September (except August); and for genitourinary and reproductive disorders, six times higher for the months of August through September. Other dysfunctions not included in the ICF (2001) present a higher risk only for the month of November. The average risk for sensory dysfunctions and pain is around 14% lower considering the months of March and April; 45% lower for dysfunctions of the digestive, metabolic and endocrine systems in the months of June to December (except July), 62% lower for neuromusculoskeletal and movement-related dysfunctions in the months of July to December. In 2019 the risk was higher for dysfunction of the digestive, metabolic and endocrine systems and for skin and related structures; and, lower for sensory and pain dysfunction and for neuromusculoskeletal and movement-related dysfunction (Table 4).

Recurrence of the Health Complaint

The number of visits to the clinic ranged from 1 to 108, with an average of 25 visits/worker. Female workers present a 23% higher estimate for the recurrence of health complaints. Compared to the administrative staff, the estimate of recurrence of complaints is higher in almost all the other sectors, with an average of 31%. Similar estimates were verified for the zero, first, and second shift. With reference to neuromusculoskeletal and movement-related functions, it was found that the estimate of recurrence of complaints is higher for only two body functions. As for the use of medication, taking as reference the group of muscle relaxants, anti-inflammatories, and analgesics, the estimate of recurrence of complaints is lower for most of the other groups, ranging from 5% to 63%. There is a trend of greater recurrence of complaints in the last quarter of the year and 2019 showed an estimate twice as high compared to the previous year. The analysis of the production demands pointed out that for every thousand pairs of shoes produced in a given month, the estimate of a worker making more than one visit to the outpatient clinic with a health complaint increases by 0.09% (Table 5).

Discussion

Presenteeism is a worldwide phenomenon that tends to grow due to work intensification. Identifying the risk factors is important for developing strategies that can reduce them. This includes medicais measures, improvements in workers' health status, or modifying working conditions. It has consequences for the physical and mental health of workers and the productivity of organizations. The main perspectives of presenteeism are North American and European. This study is based on the European one, i.e., to being at work under adverse health and well-being conditions (Lohaus & Habermann, 2019).

More than 90% of the tasks present a risk for WMSD, and most of them are in the medium and high levels. The OCRA exposure index showed that this risk is highest for the right upper limb. Several factors contributed to these results. The right upper limb is more exposed to shoulder flexion, elbow flexion and extension, wrist radial and ulnar deviation, finger movements, and narrow and pincer grip movements. Only forearm pronation is required at the same frequency for both limbs. Exposure to complementary factors is also more frequent for the right upper limb. In addition, the right upper limb performs a greater number of technical actions than the left in the same time interval.

The higher the demand and the lower the social control and support, the higher the occupational stress (Alves et al., 2004; Arjona-Fuentes, Ariza-Montes, Han, & Law, 2019; Karasek, 1979) and the higher the costs with lost productivity, health care, and medicals expenses. Having control over one's work means having independence to plan and organize tasks, time, participation, communication, and forms of cooperation of one's own work. High control provides the means necessary for coping with fluctuations in unexpected demands in a satisfactory manner (Xiao et al., 2017). Studies have associated job control with job performance (Du, Zhang, & Tekleab, 2018) and worker physical and emotional distress (Waddimba, Mohr, Beckman, Mahoney, & Young, 2019), including depression and suicidal ideation (Xiao et al., 2017). For most workers, work is of the passive type with high social support. In other words, although demand is low, control of the work process is also low. The high social support provided at the horizontal and vertical levels can mitigate the distress experienced by workers.

In this study, differences between men and women were verified. Health perceptions, behavior, susceptibility to disease, prevention strategies, and use of health services vary by gender. Generally, men underestimate occupational risks to physical and mental health. However, associating gender alone with certain types of illness may be questionable given the very horizontal and vertical segregation of work between men and women creates a bias regarding different exposures in the workplace (Raulf, Brüning, Jensen-Jarolim, & van Kampen, 2017). For example, a study done in Korea found that men are predominant in the manufacturing and construction segments. Women are concentrated in human health, social service, hospitality, restaurants, and education. Trade and administrative sectors, meanwhile, employ men and women similarly (Park, Kim, & Han, 2018). This suggests that exposure to occupational risk factors may differ considerably between these groups (Raulf et al., 2017). It is worth noting that regardless of gender, workers are exposed to several risks simultaneously (Golmohammadi & Darvishi, 2019) and the same risk factor may produce different effects on more than one physiological and psychological function.

Women had a higher estimated recurrence of health complaints and greater susceptibility to genitourinary and reproductive dysfunction, mental health, and dysfunctions related to the digestive, metabolic and endocrine systems. Physical differences between genders may explain why women tend to present genitourinary and reproductive problems related mainly to complications during pregnancy and to menstrual symptoms accentuated by adverse working conditions (Kordi, Mohamadirizi, Shakeri, Salehi Fadardi, & Hafizi, 2011). Mental disorders may vary by gender, but technological, social, and organizational conditions of work are prevalent in the incidence of the disease in both low- and high-income countries. Job stress and insecurity (Bericht, 2006), double work hours (Peristera, Westerlund, & Hanson, 2018), biological factors (Savic, Perski, & Osika, 2018), work-life imbalance (Starmer et al., 2019), role differences, conservative social arrangements, and occupational stress (Vieira et al., 2015) appear to influence women's greater vulnerability to mental illness. Mental disorders and pregnancy-related illnesses have been reported as one of the leading causes of sick leave in female private sector workers in Japan (Nishiura et al., 2017). Some tasks involving welding or contact with solvent mixtures in degreasers, cleaners, primers, and adhesives

Table 5
Recurrence of health complaints according to study variables

Variables	*n* (%)	Estimate (CI 95%)	*p*-value
Gender			
Male	5418 (59.5%)	1.00	
Female	3688 (40.5%)	1.23 (1.21-1.25)	<0.001
Work sector			
Administrative	560 (6.1%)	1.00	
Storage	172 (1.9%)	0.90 (0.84-0.98)	0.012
Rubber	102 (1.1%)	1.45 (1.33-1.59)	<0.001
Distribution	235 (2.6%)	1.10 (1.03-1.18)	0.006
Quality control	141 (1.5%)	1.21 (1.12-1.31)	<0.001
Cutting, assembly and finishing	3918 (43.0%)	1.54 (1.46-1.62)	<0.001
Injection molds	817 (9.0%)	1.30 (1.23-1.38)	<0.001
Molding and maintenance	258 (2.8%)	1.11 (1.04-1.19)	0.003
Prefabricated	2031 (22.3%)	1.49 (1.41-1.56)	<0.001
Presses	542 (6.0%)	1.45 (1.37-1.54)	<0.001
Preparation and sewing	330 (3.6%)	1.15 (1.08-1.23)	<0.001
Work shift			
Third	36 (0.4%)	1.00	
Zero	679 (7.5%)	2.74 (2.26-3.36)	<0.001
First	3904 (42.9%)	2.57 (2.13-3.14)	<0.001
Second	4487 (49.3%)	3.66 (3.04-4.48)	<0.001
Afflited body function			
Neuromusculoskeletal and movement-related	495 (5.4%)	1.00	
Mental	67 (0.74%)	-	-
Sensory functions and pain	5117 (56.2%)	-	-
Cardiovascular, haematological, immunological and respiratory systems	2281 (25.1%)	-	-
Digestive, metabolic and endocrine systems	866 (9.5%)	0.90 (0.86-0.94)	<0.001
Genitourinary and reproductive	182 (2.0%)	1.07 (1.01-1.14)	0.030
Skin and related structures	64 (0.7%)	1.83 (1.71-1.96)	<0.001
Others	34 (0.37%)	0.88 (0.77-1.01)	0.081
Medication group			
Group 7	2834 (31.1)	1.00	
Group 0	23 (0.3)	0.47 (0.40-0.55)	<0.001
Group 1	2023 (22.2)	0.82 (0.79-0.85)	<0.001
Group 2	809 (8.9)	0.95 (0.92-0.99)	0.005
Group 3	89 (0.9)	1.13 (1.01-1.26)	0.027
Group 4	2348 (25.8)	0.80 (0.78-0.91)	<0.001
Group 5	9 (0.1)	0.49 (0.38-0.62)	<0.001
Group 8	244 (2.7)	1.09 (1.05-1.14)	<0.001
Group 9	17 (0.2)	0.41 (0.32-0.53)	<0.001
Month of the health complaint			
January	514 (5.6)	1.00	
February	443 (4.9)	1.22 (1.17-1.28)	<0.001
March	484 (5.3)	1.20 (1.15-1.26)	<0.001
April	627 (6.9)	1.45 (1.39-1.51)	<0.001
May	928 (10.2)	1.13 (1.08-1.18)	<0.001
June	778 (8.5)	1.58 (1.52-1.65)	<0.001
July	957 (10.5)	1.21 (1.16-1.26)	<0.001
August	791 (8.7)	1.18 (1.13-1.23)	<0.001
September	784 (8.6)	1.55 (1.49-1.61)	<0.001
October	1112 (12.2)	1.71 (1.65-1.78)	<0.001
November	967 (10.6)	1.81 (1.74-1.89)	<0.001
December	721 (8.0)	1.87 (1.79-1.95)	<0.001

Table 5 (continued)
Recurrence of health complaints according to study variables

Variables	*n* (%)	Estimate (CI 95%)	*p*-value
Year of the health complaint			
2018	3150 (34.6%)	1.00	
2019	5956 (65.4%)	2.64 (2.58-2.69)	<0.001
Production fluctuations			
Production demand at thousands of pairs of shoes/ month*	-	1.0009 (1.0004-1.0013)	0.0002

Note. Data presented as estimate (95% confidence interval) and Wald test p-value. Abbreviation: CI = confidence interval. *Numerical information of the production demands not authorized for disclosure.

can generate complications in various physiological functions, including the digestive system, of which the symptoms are like those found in this study (Usmani, 2016).

Men seem to be more affected in their sensory and pain functions; neuromusculoskeletal and work-related functions; cardiovascular, haematological, immunological, and respiratory systems; and skin and related structures. These results corroborate with studies developed in other countries. In Germany, in men working in the industrial sector, sensory dysfunctions have been related to exposure to noisy machinery and equipment while painful dysfunctions have been related to heavy lifting (Bericht, 2006). In Korea, men were observed to have a high risk for musculoskeletal disorders when assigned to manufacturing positions (Park et al., 2018). In Germany, similar results were also found for dermatological and respiratory occupational allergies, finding differences between men and women in both the number of diseases and the type of exposure at work. The authors noted, for example, that almost twice as many men are affected by allergic obstructive diseases as women (Raulf et al., 2017). In Brazil, a study showed that the profile of workers most exposed to chemicals is male, aged between 25 and 54 years and with low education (Assunção, Abreu, & Souza, 2020). In Iran, it was observed that men have been more affected by cardiovascular events both in administrative workers and in those who develop manual activities, such as assemblers (Ghahramani et al., 2020).

Almost all production-related sectors presented a higher incidence of health complaints compared to the administrative sector. Recent research has shown similar results. These studies have divided workers into two major groups: white-collar and blue-collar. The former includes managers, professionals, technicians and associate professionals, clerks, and service and trade workers. The latter include craftsmen and similar occupations, factory and machine operators, assemblers, and workers engaged in elementary occupations (Grinza & Rycx, 2020). The group to which the worker belongs and the qualification influence the risk of illness differently. Blue-collar workers are exposed to a larger cluster of health risks than white-collar workers. Among the latter, low-skilled workers seem to be exposed to similar risks as highly skilled blue-collar workers (Väisänen et al., 2020). Blue-collar workers are also more vulnerable to occupational injuries and illnesses than white-collar workers. The negative effects are greater when in the case of workers with interdependent activities and those in the capital-intensive industry (Grinza & Rycx, 2020), as is the case in the present study.

The workers responsible for cutting and assembling the shoe components and finishing the final product are the most affected. Lourinho, Negreiros, Almeida, Vieira, and Quemelo (2011) found a high risk for musculoskeletal disorders in the cutting, assembly and finishing sectors in the footwear industry. The authors found that the burden rate is three times higher for assembly and that the prevalence of pain among workers in this sector is 80%. Bernardes and Renner (2017) demonstrated that the main risk factors in the footwear assembly sector include overtime, repetitiveness, inadequate postures, insufficient recovery time, monotony, high temperatures and noise above tolerance levels. Taylorist and Fordist production systems generate negative effects on the health conditions and operational performance of workers in the footwear industry due to work fragmentation, time constraint, and pre-established goals. Organizational changes reduce not only cases of occupational diseases, but also work accidents, rework and scrap rates, absenteeism, and medicals consultations (Guimarães, Ribeiro, Renner, & Oliveira, 2014).

Workers on the second production shift seem to be more susceptible to recurrences of health complaints. Studies have pointed out differences related to workers' illness according to work shifts in various occupational groups. Trindade, Schuh, Krein, Ferraz, and Amestoy (2012) observed that afternoon and evening shifts present more health complaints compared to morning shifts in workers from the production sector of a textile industry. Martínez-Zaragoza, Fernández-Castro, Benavides-Gil and García-Sierra (2020) found that afternoon and night shifts cause more fatigue and mood swings in nurses gradually increasing as the shift ends. Gumasing and Ilagan (2019) pointed out the following risk factors related to work shifts in telemarketers: work relationships, irregular meal times, number of rest days, noise level, workplace temperature and configuration, and disruption of social and home life.

It was observed that sensory functions and pain represent the majority of health complaints, similar to previous studies on working in the footwear industry (Leite et al., 2019; Vieira et al., 2015). Higher rates of painful symptomatology have been observed in upper limbs (shoulders, elbows, wrists, hands, and fingers), spine (cervical, thoracic, and lumbar), and lower limbs (thighs, knees, and feet). Factors such as experience, length of daily work day, frequency of breaks, work pressure, inadequate postures, perceived stress, triple shifts, repetitiveness and low social support are associated with musculoskeletal symptoms in different body regions in the footwear industry workers (Bernardes & Renner, 2017; Kanniappan & Palani, 2020; Lourinho et al., 2011; Vieira et al., 2015).

Neuromusculoskeletal and movement-related functions have one of the worst effects on recurrence severity, below only genitourinary and reproductive functions and skin and related structures. However, the fact that sensory functions and pain account for the majority of complaints provides the hypothesis of an upward trend in cases involving the neuromusculoskeletal system. This is because there is a close relationship between these two bodily functions. Sensory disturbances are reported in the early phase of neuromusculoskeletal injuries, characterized by inflammation, hypersensitivity, pain, discomfort, numbness, tingling, stiffness, and muscle weakness. Pain is one of the most frequent symptoms and represents an alert system of the body (Pangarkar, Pham, & Eapen, 2020).

The group that includes muscle relaxants/anti-inflammatory/

analgesics represents the majority of the drug administration performed in the company's outpatient clinic and presents one of the worst effects in terms of severity of recidivism. It is below group 3 and group 8, for which the estimates were only 13% and 9% higher. A variety of inflammatory and non-inflammatory health conditions can cause musculoskeletal pain (Kvien & Viktil, 2003). When the pain is acute, the muscle relaxant/anti-inflammatory/analgesic group is usually prescribed in treatments. However, it should be administered with caution due to adverse effects such as drowsiness and hepatic metabolization, which can cause work accidents in the case of machine operators or health problems in workers with previous kidney or liver disease (Sullivan et al., 2007). In addition, there are reports that some drugs (e.g., carisoprodol) can cause abuse and dependence and therefore should be administered in a short term (Kvien & Viktil, 2003).

This study evaluated health complaints over the course of two years. Guimarães et al. (2014) observed that, generally, January is the month in which the production and production support sector works only at minimum capacity, i.e., it is a month of low production. Compared to January, the other months show a higher recurrence of complaints, increasing from August to December and ranging from 18% to 87%. The last quarters of the years evaluated concentrate the highest estimates of illness. In 2019 the recurrence of complaints was about twice as high as in the previous year. It is likely that these results are related to production demands, since this study observed that the number of pairs produced is associated with the recurrence of workers' health complaints.

As a large part of the company's production is of models whose market request presents stability and a certain frequency, it is possible to consider that in the period before January there may be a tendency to produce in stock (Sadeghi, Rebelo, & Ferreira, 2018) increasing the workload. Another hypothesis is based on the results of the psychological workloads found in this study. For most workers, the work is passive with high social support. Since the psychological demands in this type of work are low, increases in production demands could generate peaks of high stress levels. In fact, the footwear industry is characterized by the occurrence of seasonal patterns concerning the creation of new collections, fashion, sales, and orders, generating periods of high and low production demand. This also reflects in employment instability with periods of high layoff and hiring rates (Ulutas & Islier, 2015). Job instability and fear of dismissal have been pointed out as risk factors related to the occupational stress.

Seasonal patterns have been explored in illness studies and are important for estimating the effects of exposure to situations that can cause or exacerbate long-term health problems. These investigations also make it possible to understand why certain populations are more susceptible, how exposure to the stressor can be reduced, which control measures should be administered, and in what situations the results can be generalized (Kim, Lee, Fong, & Bell, 2021). Many of these studies seek to understand the associations between weather conditions or seasons and illness (respiratory and cardiovascular problems) without necessarily involving work-related relationships (Shashar et al., 2020). Research with industrial work has addressed the relationship between temporal patterns of disease incidence and exposure to occupational risk in workers and nearby residents, e.g., pruritus, nonspecific dermatitis, and rhinitis in the ferronickel industry (Han & Hong, 2018); musculoskeletal disorders in the meat industry (Tappin, Vitalis, & Bentley, 2011), and cancer in construction industry (McClean et al., 2007).

Although the footwear industry has evolved considerably in terms of market demands, business models, and product quality, footwear production still comprises many operations that require great manual skill. The manufacturing of a shoe is performed linearly, its tasks are simple, repetitive, cadenced, and highly fragmented (Ulutas & Islier, 2015). Usually, each worker performs only one task during the entire workday, which decreases their control over the process and understanding of their own work and generates occupational diseases (Guimarães et al., 2014). As the production of a shoe involves several types of workers (Ulutas & Islier, 2015), different health problems can occur varying in form and severity. Assessing how working conditions influence illness is fundamental to target specific interventions.

Future research should associate health complaints with ergonomic risk factors arising from the work environment. It is also suggested to collect additional information about other individual factors and organizational factors. Furthermore, it is recommended that the assessment of physical workload include other body regions not explored in this study. Although the tasks are performed almost exclusively by the upper limbs, the work involves prolonged periods in the standing position. This factor is related to the occurrence of WMSDs in the lower back and lower limbs (Anderson, Williams, & Nester, 2021). The investigation of these factors is important since presenteeism is a phenomenon with less visibility, since most workers omit health-related problems. It is possible to assume that presenteeism only becomes apparent when it also impacts work performance (Arjona-Fuentes et al., 2019). As there is a relationship between presenteeism and absenteeism (Lohaus & Habermann, 2019), such measures are critical. This need is reinforced by the high absenteeism rates in the footwear industry (Guimarães et al., 2014), evidencing that work processes must be replanned. Moreover, absenteeism rates may be higher due to deficient recording and reporting systems.

References

Alves, M. G. M., Chor, D., Faerstein, E., Lopes, C. S., & Werneck, G. L. (2004). "Short version of the job stress scale": A Portuguese-language adaptation. *Revista de Saúde Pública, 38*(2), 164-171. https://doi.org/10.1590/S0034-89102004000200003

Anderson, J., Williams, A. E., & Nester, C. (2021). Musculoskeletal disorders, foot health and footwear choice in occupations involving prolonged standing. *International Journal of Industrial Ergonomics, 81*, 103079. https://doi.org/10.1016/j.ergon.2020.103079

Arjona-Fuentes, J. M., Ariza-Montes, A., Han, H., & Law, R. (2019). Silent threat of presenteeism in the hospitality industry: Examining individual, organisational and physical/mental health factors. *International Journal of Hospitality Management, 82*, 191-198. https://doi.org/10.1016/j.ijhm.2019.05.005

Assunção, A. Á., Abreu, M. N. S., & Souza, P. S. N. (2020). Factors associated with self-reported exposure to chemical substances at work in Brazil: Results from the National Health Survey, 2013. *Revista de Saúde Pública, 54*, 92. https://doi.org/10.11606/s1518-8787.2020054001461

Bericht, E. O. (2006). *Geschlechterspezifische Aspekte der Sicherheit und des Gesundheitsschutzes bei der Arbeit-Eine zusammenfassende Darstellung*. Retrieved from https://osha.europa.eu/de/tools-and-publications/publications/reports/209 (acessed 20 January 2021).

Bernardes, J. M., & Renner, J. S. (2017). Fatores de risco para LER/DORT no setor de montagem de uma indústria de calçados. *Fisioterapia Brasil, 10*(3), 181-187. https://doi.org/10.33233/fb.v10i3.1526

Carvalho Filho, J., Nunhes, T. V., & Oliveira, O. J. (2019). Guidelines for cleaner production implementation and management in the plastic footwear industry. *Journal of Cleaner Production, 232*, 822-838. https://doi.org/10.1016/j.jclepro.2019.05.343

Dietz, C., Zacher, H., Scheel, T., Otto, K., & Rigotti, T. (2020). Leaders as role models: Effects of leader presenteeism on employee presenteeism and sick leave. *Work & Stress, 34*(3), 300-322. https://doi.org/10.1080/02678373.2020.1728420

Du, Y., Zhang, L., & Tekleab, A. G. (2018). Job strains, job control, and POS on employee performance: An interactionist perspective. *Journal of Business Research, 82*, 213-219. https://doi.org/10.1016/j.jbusres.2017.09.040

Fávero, L. P. (2015). *Análise de dados: Modelos de regressão com Excel®, Stata® e SPSS®*. Rio de Janeiro, Brasil: Elsevier Brasil.

Freeling, M., Rainbow, J. G., & Chamberlain, D. (2020). Painting a picture of nurse presenteeism: A multi-country integrative review. *International Journal of Nursing Studies, 109*, 103659. https://doi.org/10.1016/j.ijnurstu.2020.103659

Ghahramani, R., Kermani-Alghoraishi, M., Roohafza, H. R., Bahrani, S., Talaei, M., Dianatkhah, M., ... & Sadeghi, M. (2020). The Association between Occupational Categories and Incidence of Cardiovascular Events: A Cohort Study in Iranian Male Population. *The International Journal of Occupational and Environmental Medicine, 11*(4), 179. https://doi.org/10.34172%2Fijoem.2020.2053

Golmohammadi, R., & Darvishi, E. (2019). The combined effects of occupational exposure to noise and other risk factors− a systematic review. *Noise & Health, 21*(101), 125-141. https://doi.org/10.4103%2Fnah.NAH_4_18

Grinza, E., & Rycx, F. (2020). The impact of sickness absenteeism on firm productivity: New evidence from Belgian matched employer–employee panel data. *Industrial Relations: A Journal of Economy and Society, 59*(1), 150-194. https://doi.org/10.1111/irel.12252

Guérin, F., Laville, A., Daniellou, F., Duraffourg, J., & Kerguelen, A. (2001). *Compreender o trabalho para transformá-lo: A prática da ergonomia.* São Paulo: Editora Blucher.

Guimarães, L. D. M., Ribeiro, J. L. D., Renner, J. S., & Oliveira, P. A. B. (2014). Worker evaluation of a macroergonomic intervention in a Brazilian footwear company. *Applied Ergonomics, 45*(4), 923-935. https://doi.org/10.1016/j.apergo.2013.11.007

Gumasing, M. J. J., & Ilagan, J. G. (2019). A cross-sectional study on occupational risk factors of BPO agents in the Philippines. In *Proceedings of the International Conference on Industrial Engineering and Operations Management Bangkok, Thailand* (pp. 827-836).

Han, C., & Hong, Y. C. (2018). Adverse health effects of ferronickel manufacturing factory on local residents: An interrupted time series analysis. *Environment International, 114*, 288-296. https://doi.org/10.1016/j.envint.2018.02.045

Hedayat, A. S., & Sinha, B. K. (1991). *Design and inference in finite population sampling.* New York, USA: Wiley.

International Classification of Functioning, Disability and Health (ICF) (2001). Geneva: World Health Organization.

Kanniappan, V., & Palani, V. (2020). Prevalence of Musculoskeletal Disorders among Sewing Machine Workers in a Leather Industry. *Journal of Lifestyle Medicine, 10*(2), 121. https://doi.org/10.15280%2Fjlm.2020.10.2.121

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly, 24*, 285-308. https://doi.org/10.2307/2392498

Kim, H., Lee, J. T., Fong, K. C., & Bell, M. L. (2021). Alternative adjustment for seasonality and long-term time-trend in time-series analysis for long-term environmental exposures and disease counts. *BMC Medical Research Methodology, 21*(1), 1-14. https://doi.org/10.1186/s12874-020-01199-1

Kordi, M., Mohamadirizi, S., Shakeri, M. T., Salehi Fadardi, J., & Hafizi, L. (2011). The relationship between midwives' work stress and perimenstrual distress. *The Iranian Journal of Obstetrics, Gynecology and Infertility, 14*(3), 54-63. https://doi.org/10.22038/ijogi.2011.5779

Kvien, T. K., & Viktil, K. (2003). Pharmacotherapy for regional musculoskeletal pain. *Best Practice & Research Clinical Rheumatology, 17*(1), 137-150. https://doi.org/10.1016/S1521-6942(02)00102-X

Leite, W. K. S., Araújo, A. J. S., Silva, J. M. N., Gontijo, L. A., Vieira, E. M. A., Souza, E. L., ... & Silva, L. B. (2019). Risk factors for work-related musculoskeletal disorders among workers in the footwear industry: A cross-sectional study. *International Journal of Occupational Safety and Ergonomics, 27*(2), 393-409. https://doi.org/10.1080/10803548.2019.1579966

Lohaus, D., & Habermann, W. (2019). Presenteeism: A review and research directions. *Human Resource Management Review, 29*(1), 43-58. https://doi.org/10.1016/j.hrmr.2018.02.010

Lourinho, M. G., Negreiros, G. R., Almeida, L. B. D., Vieira, E. R., & Quemelo, P. R. V. (2011). Riscos de lesão musculoesquelética em diferentes setores de uma empresa calçadista. *Fisioterapia e Pesquisa, 18*(3), 252-257. https://doi.org/10.1590/S1809-29502011000300009

Martínez-Zaragoza, F., Fernández-Castro, J., Benavides-Gil, G., & García-Sierra, R. (2020). How the Lagged and Accumulated Effects of Stress, Coping, and Tasks Affect Mood and Fatigue during Nurses' Shifts. *International Journal of Environmental Research and Public Health, 17*(19), 7277. https://doi.org/10.3390/ijerph17197277

McClean, M. D., Wiencke, J. K., Kelsey, K. T., Varkonyi, A., Ngo, L., Eisen, E. A., & Herrick, R. F. (2007). DNA adducts among asphalt paving workers. *The Annals of Occupational Hygiene, 51*(1), 27-34. https://doi.org/10.1093/annhyg/mel069

Micheli, G. J., & Marzorati, L. M. (2018). Beyond OCRA: Predictive UL-WMSD risk assessment for safe assembly design. *International Journal of Industrial Ergonomics, 65*, 74-83. https://doi.org/10.1016/j.ergon.2017.07.005

Nishiura, C., Nanri, A., Kashino, I., Hori, A., Kinugawa, C., Endo, M., ... & Dohi, S. (2017). Age-, sex-, and diagnosis-specific incidence rate of medically certified long-term sick leave among private sector employees: The Japan Epidemiology Collaboration on Occupational Health (J-ECOH) study. *Journal of Epidemiology, 27*(12), 590-595. https://doi.org/10.1016/j.je.2017.01.003

Pangarkar, S., Pham, Q. G., & Eapen, B. C. (2020). *Pain Care Essentials and Innovations.* Amsterdã, Países Baixos: Elsevier Health Sciences.

Park, J., Kim, Y., & Han, B. (2018). Work sectors with high risk for work-related musculoskeletal disorders in Korean men and women. *Safety and Health at Work, 9*(1), 75-78. https://doi.org/10.1016/j.shaw.2017.06.005

Peristera, P., Westerlund, H., & Hanson, L. L. M. (2018). Paid and unpaid working hours among Swedish men and women in relation to depressive symptom trajectories: Results from four waves of the Swedish longitudinal occupational survey of health. *BMJ Open, 8*(6), e017525. https://doi.org/10.1136/bmjopen-2017-017525

Rainbow, J. G., & Steege, L. M. (2017). Presenteeism in nursing: An evolutionary concept analysis. *Nursing Outlook, 65*(5), 615-623. https://doi.org/10.1016/j.outlook.2017.03.005

Raulf, M., Brüning, T., Jensen-Jarolim, E., & van Kampen, V. (2017). Gender-related aspects in occupational allergies–Secondary publication and update. *World Allergy Organization Journal, 10*(1), 1-10. https://doi.org/10.1186%2Fs40413-017-0175-y

Sadeghi, P., Rebelo, R. D., & Ferreira, J. S. (2018). Balancing mixed-model assembly systems in the footwear industry with a variable neighbourhood descent method. *Computers & Industrial Engineering, 121*, 161-176. https://doi.org/10.1016/j.cie.2018.05.020

Savic, I., Perski, A., & Osika, W. (2018). MRI shows that exhaustion syndrome due to chronic occupational stress is associated with partially reversible cerebral changes. *Cerebral Cortex, 28*(3), 894-906. https://doi.org/10.1093/cercor/bhw413

Shashar, S., Kloog, I., Erez, O., Shtein, A., Yitshak-Sade, M., Sarov, B., & Novack, L. (2020). Temperature and preeclampsia: Epidemiological evidence that perturbation in maternal heat homeostasis affects pregnancy outcome. *PloS one, 15*(5), e0232877. https://doi.org/10.1371/journal.pone.0232877

Starmer, A. J., Frintner, M. P., Matos, K., Somberg, C., Freed, G., & Byrne, B. J. (2019). Gender discrepancies related to pediatrician work-life balance and household responsibilities. *Pediatrics, 144*(4), e20182926. https://doi.org/10.1542/peds.2018-2926

Sullivan, W. J., Panagos, A., Foye, P. M., Sable, A. W., Irwin, R. W., & Zuhosky, J. P. (2007). Industrial medicine and acute musculoskeletal rehabilitation. 2. Medications for the treatment of acute musculoskeletal pain. *Archives of Physical Medicine and Rehabilitation, 88*(3), S10-S13. https://doi.org/10.1016/j.apmr.2006.12.009

Tappin, D. C., Vitalis, A., & Bentley, T. A. (2011). *Contextual factors for musculoskeletal disorders.* Retrieved on, 5, 1-4.

Team, R.C. (2018). *R: A language and environment for statistical computing.* Vienna: R Foundation for Statistical Computing.

Trindade, L. L., Schuh, M. C. C., Krein, C., Ferraz, L., & Amestoy, S. C. (2012). Dor osteomusculares em trabalhadores da indústria têxtil e sua relação com o turno de trabalho. *Revista de Enfermagem da UFSM, 2*(1), 108-115. https://doi.org/10.5902/217976923886

Ulutas, B., & Islier, A. A. (2015). Dynamic facility layout problem in footwear industry. *Journal of Manufacturing Systems, 36*, 55-61. https://doi.org/10.1016/j.jmsy.2015.03.004

Usmani, J. A. (2016). Occupational stress among workers having exposure to lead. Clinical Epidemiology and Global Health, 4(4), 163-170. https://doi.org/10.1016/j.cegh.2015.12.004

Väisänen, D., Kallings, L. V., Andersson, G., Wallin, P., Hemmingsson, E., & Ekblom-Bak, E. (2020). Lifestyle-associated health risk indicators across a wide range of occupational groups: A cross-sectional analysis in 72,855 workers. *BMC Public Health, 20*(1), 1-13. https://doi.org/10.1186/s12889-020-09755-6

Vieira, E. R., Serra, M. V. G. B., de Almeida, L. B., Villela, W. V., Scalon, J. D., & Quemelo, P. R. V. (2015). Symptoms and risks for musculoskeletal disorders among male and female footwear industry workers. *International Journal of Industrial Ergonomics, 48*, 110-116. https://doi.org/10.1016/j.ergon.2015.05.001

Waddimba, A. C., Mohr, D. C., Beckman, H. B., Mahoney, T. L., & Young, G. J. (2019). Job satisfaction and guideline adherence among physicians: Moderating effects of perceived autonomy support and job control. *Social Science & Medicine, 233*, 208-217. https://doi.org/10.1016/j.socscimed.2019.04.045

Xiao, J., Guan, S., Ge, H., Tao, N., Zhang, Y., Jiang, Y., ... & Lian, Y. (2017). The impact of changes in work stressors and coping resources on the risk of new-onset suicide ideation among Chinese petroleum industry workers. *Journal of Psychiatric Research, 88*, 1-8. https://doi.org/10.1016/j.jpsychires.2016.12.014

Information about the authors

Wilza Karla dos Santos Leite
Universidade Federal da Paraíba, Campus I, Cidade Universitária,
Programa de Pós-Graduação em Psicologia Social
58051-900 João Pessoa, PB, Brasil
E-mail: wilzakarlas@yahoo.com.br

Anísio José da Silva Araújo
E-mail: anisiojsa@uol.com.br

Luiz Bueno da Silva
E-mail: bueno@ct.ufpb.br

Jonhatan Magno Norte da Silva
E-mail: jonhatan.silva@delmiro.ufal.br

Erivaldo Lopes de Souza
E-mail: elopesouza@gmail.com

Arielson Santos Alves da Silva
E-mail: arielson.aa@gmail.com

Robson da Fonseca Neves
E-mail: robsonfisioba@gmail.com

Elamara Marama de Araujo Vieira
E-mail: elamaravieira@gmail.com