MUSCULOSKELETAL DISORDERS SELF-REPORTED BY SUPERMARKET EMPLOYEES

Distúrbios osteomusculares autorreferidos em funcionários de supermercado

Distúrbios osteomusculares auto reportados por empleados de centro comercial

Original Article

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ABSTRACT

Objective: To determine the prevalence of self-reported pains in employees of a supermarket chain. **Methods:** A descriptive cross-sectional observational study conducted in a supermarket chain in the city of São Paulo from January 2011 to February 2012, with a sample of 300 employees. Information on sociodemographics, physical activity and characterization of the labor process were collected. It was assumed as the outcome the reports of symptoms of musculoskeletal pain obtained through The Nordic Musculoskeletal Questionnaire. For statistical analysis, frequencies and percentages were calculated. **Results:** The population was mostly composed of young, single women who attended up to the 2nd year of high school. Only 25 % of employees performed physical activities. All employees had presented some type of musculoskeletal symptoms in the last 12 months, and half of them (50%) had three or more symptoms. The pain predominantly occurred in the lower limbs, followed by the thoracic and lumbar spine. Age may be associated with the onset of neck pain. In addition, the job is associated with pain in elbows, lumbar spine and legs. Finally, the lumbar spine is the region with the highest association among the independent variables. **Conclusion:** It was verified that the employees investigated in the supermarket chain presented a prevalence of pains or some type of musculoskeletal symptom in the past 12 months in the lower limb, regions that make up the spine, wrists, fingers and hands.

Descriptors: Cumulative Trauma Disorders; Occupational Health; Occupational Diseases.

RESUMO

Objetivo: *Verificar a prevalência das algias autorreferidas em funcionários de uma rede de supermercados.* **Métodos:** *Estudo observacional, transversal, descritivo, realizado em uma rede de supermercados da capital paulista, no período de janeiro de 2011 a fevereiro de 2012, em uma amostra de 300 funcionários. Foram coletadas informações sociodemográficas, de atividade física e caracterização do processo de trabalho. Assumiu-se como desfecho o relato de sintomas de dores osteomusculares, por meio do Questionário Nórdico de Sintomas Osteomusculares. Para análise estatística, foram calculadas frequências e porcentagens.* **Resultados:** *A população, em sua maioria, era do sexo feminino, jovem, solteira e possuía escolaridade até o 2º grau. Apenas 25% dos funcionários realizavam atividades físicas. Todos haviam apresentado algum tipo de sintomatologia musculoesquelética nos últimos 12 meses e metade (50%) apresentou três ou mais sintomas. A dor apareceu predominante nos membros inferiores, seguida pela coluna torácica e lombar. A idade pode estar associada ao aparecimento de dores no pescoço. Além disso, a função associa-se a dores no cotovelo, coluna lombar e membros inferiores. Por fim, a coluna lombar é a região com maior associação dentre as variáveis independentes.* **Conclusão:** *Identificou-se que os funcionários investigados da referida rede de supermercado apresentavam prevalência de algias ou algum sintoma musculoesquelético nos últimos 12 meses, que englobaram o membro inferior, regiões que compõem a coluna vertebral, região dos punhos, dedos e mãos.*

Descritores: *Transtornos Traumáticos Cumulativos; Saúde do Trabalhador; Doenças Profissionais.*

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RESUMEN

Objetivo: *Verificar la prevalencia de dolores auto reportadas por empleados de una red de centros comerciales.* **Métodos:** *Estudio observacional, transversal y descriptivo, realizado en una red de centros comerciales en una capital entre enero de 2011 y febrero de 2012 con una muestra de 300 empleados. Fueron recogidas informaciones sociodemográficas, de actividad física y caracterización del proceso de trabajo. Se asumió como desenlace el relato de síntomas de dolores osteomusculares a través del Cuestionario Nórdico de Síntomas Osteomusculares. En el análisis estadístico fueron calculados frecuencias y porcentajes.* **Resultados:** *La población era en su mayoría del sexo femenino, joven, soltera y de educación secundaria como máxima escolaridad. Solamente el 25% de los empleados realizaban actividades físicas. Todos habían presentado algún tipo de sintomatología en la musculatura esquelética de los últimos 12 meses y la mitad (50%) presentó tres o más síntomas. El dolor fue predominante en los miembros inferiores, seguido de la columna torácica y lumbar. La edad puede estar asociada a la aparición de dolores del cuello. Además, la función se asocia a Dolores del codo, columna lumbar y miembros inferiores. Por fin, la columna lumbar es la región con más asociación de las variables independientes.* **Conclusión:** *Se identificó que los empleados investigados de la referida red de centro comercial presentaron prevalencia de dolores o algún síntoma musculoesquelético en los últimos 12 meses que incluyeron el miembro inferior, regiones que constituyen la columna vertebral, puños, dedos y manos.*

Descriptores: *Trastornos de Trauma Acumulados; Salud Laboral; Enfermedades Profesionales.*

INTRODUCTION

Work-related musculoskeletal symptoms affect workers of different professions and can receive several names like repetitive strain injury (RSI) and work-related musculoskeletal disorders (WMSD), which have been adopted by Brazil's Ministry of Health and Ministry of Social Security[1]. They are a group of work-related disorders that affect muscles, fascia, tendons, ligaments, joints, nerves, blood vessels and integument[2]. The various clinical forms of RSI/WMSD present pain and temporary or permanent functional disabilities as their common aspect[3].

It has multiple and complex causes that originate from one single factor or a joint contribution of factors that exert their effects in a simultaneous and interconnected way[4]. Factors like the inappropriate transportation and handling of weights; critical postures, like trunk rotation and flexion, and static postures (maintained and prolonged); and the frequency (repetition of the same movements) during occupational activities have been pointed as the main causes of RSI/WMSD[5]. These ergonomic factors are caused by the occurrence of musculoskeletal symptoms[6].

Known as the disease of modern times, it has caused countless work leaves that evolve to partial disability and, in many cases, to permanent disability, leading to disability retirement[7]. In 2011, Brazil spent R$ 356,038,000.00 with 381,810 sick pays provided to workers with musculoskeletal disorders, standing as the second biggest provision of sick pays. It is also the second major cause of disability retirement, with 23,485 retirements in 2011, which corresponds to the cost of R$ 24,073,000.00[8].

Musculoskeletal disorders appear when the physical, physiological and psychological limits of employees are exceeded[9]. People with RSI/WMSD complain about pain, paresthesia, sensation of weight and fatigue in the upper limb and cervical region, usually with an insidious onset. Quite often, they also feel pain the lower limb and thoracic and lumbar regions. Other symptoms include numbness, neurovegetative and trophic disorders and other regional sensory and motor abnormalities[3], and also psychological disorders and physical isolation. At this moment, the social support from family, healthcare professionals, friends, colleagues and neighbors becomes important for the recovery and coping with the disease[4,10].

The main actions for the prevention and control of occupational diseases take into account the possibility of health promotion within the work environment, determining risk conditions, the characterization and the quantification of risk factors in companies, public institutions and informal market[11]. The current prevention interventions comprise a set of person-centered activities like labor gymnastics, pause exercises, *in loco* posture correction and weight handling training. Thus, the need for body care outside the workplace of great importance[12].

Among the several job categories affected by musculoskeletal disorders are the employees of many supermarket sectors. For instance, the incidence of RSI/WMSD is very common among supermarket cashiers (checkout). For this job, RSI/WMSD is usually associated with the introduction of new technologies like informatics and optical readers without the adaptation of the workstation and the work rhythm to the new situation[13]. According to the Bureau of Labor and Statistics, there were over 20 thousand musculoskeletal disorders in US supermarket employees in the year 2000. More than 50% of these musculoskeletal lesions were associated with the lifting of items at the stores (shelf stockers)[14].

It is known that cross-sectional studies describing what happens to a certain group at a certain moment are important and constitute important guides for decision-making in the health care planning, influencing clinical reasoning and decision-making in clinical practices[15]. Therefore, the study aimed to assess the prevalence of self-reported pains in employees of supermarket chain.

METHODS

This current investigation is an observational, descriptive, cross-sectional study conducted in a supermarket chain (4 stores) of the city of São Paulo in the period from January 2011 to February 2012.

Employees were invited to participate in the research according to their availability. The decision to participate or not was made after a brief explanation about the study. They were informed that the participation was not compulsory and that information would be safeguarded.

The convenience sample assessed 300 employees of several sectors of the supermarket and included those who had been working there for more than one year without the previous diagnosis of musculoskeletal problems. Employees who were on a health leave or any other type of work leave during the period of data collection were excluded from the study.

Besides the sociodemographic information (sex, age and education) and the characterization of the work process in the supermarket (job, working hours and length of time at the job), hereby considered as independent variables, questions regarding physical activities, like type and frequency, were also included.

It assumed as the outcome the reports of symptoms of musculoskeletal pains assessed by the validated Portuguese language version of the Nordic Musculoskeletal Questionnaire (NMQ)[16]. This instrument assesses symptoms of pain in the neck, shoulder, elbow, forearm, wrist/hand/finger, thoracic back, low back, hip/thigh, knee, ankle/foot, approaching personal, professional and musculoskeletal symptomatology data related to work in the past twelve months and their consequences. The instrument for data collection was applied using a self-applied interview conducted in a private room of the workplace. Not time was set out for the filling of the questionnaire, and researchers remained in the room for any clarifications.

The statistical analysis used frequencies and percentages for the regions affected, tasks performed, sociodemographic data and physical activities. Cramer's V test and x^2 test were used to check for possible associations of categorical variables between the affected regions and sex, age, job, working hours and length of time at the job. Significance level was set at 5%. Data were tabulated and treated using the statistical program SPSS 19.0.

The study was approved by the *Comitê de Ética em Pesquisa da Universidade Nove de Julho - CoEP-UNINOVE* (Research Ethics Committee of the Nove de Julho University) under Opinion No. 432376/2011, and all the participants signed a Free Informed Consent Form according to Resolution 196/96.

RESULTS

This study comprised 300 employees of four shops of the assessed supermarket chain. The study population was mostly female (n=195/56%), aged 23-27 years (n=105/35%) and single (n=177/59%), with an education level up to secondary school (n=272/90.7%) (Table I).

It was also verified the distribution of reports of physical activity and its duration frequency performed by employees outside the workplace. Only 25% (n=75) of the employees reported performing regular physical activity with a minimum 30-minute duration. Among those who reported the practice of regular physical activity, soccer (n=28/37.4%), followed by walking (n=19/25.6%) were the most prevalent activities.

Table II shows the distribution of the employees of the various sectors of the supermarket. Most of the cases had an eight-hour work day (n=267/89%) and had been from one to three years at the job (n=156/52%) (Table II).

All the participants (n=300/100%) had presented some type of musculoskeletal symptomatology in the past 12 months, and 50.3% (n=151) had three or more symptoms. The answers "often" and "always" were considered parameters to define the prevalence of self-reported pains, with a predominance of pain in the lower limb, followed by thoracic back, low back and shoulders as the major occurrences (Table III).

The association between self-reported pains, sociodemographic data and characterization of the work process are presented in Table IV. In this current study, age was found to be associated with the onset of pain in the neck whereas the job is associated with pain the elbow, low back and lower limb. Finally, it was verified that low back pain is the region that is mostly associated with the independent variables of this current study.

Table I - Sociodemographic characterization of the employees of a supermarket chain. São Paulo-SP, 2011-2012.

Sociodemographic data	**n**	**%**
Age		
< 18 years	2	0.7
18 to 22 years	78	26.0
23 to 27 years	105	35.0
28 to 32 years	54	18.0
+ 32 years	61	20.3
Sex		
Female	195	65.0
Male	105	35.0
Marital status		
Married	123	41.0
Single	177	59.0
Education		
Up to secondary education	272	90.7
Incomplete higher education	20	6.7
Complete higher education	8	2.7

Table II - Distribution of employees according to job, working hours and length of time at the job. São Paulo-SP, 2011-2012.

Job data	**n**	**%**
Job		
Cashier	66	22.0
Promoter	40	13.3
Clerk	22	7.3
Shelf stocker	33	11.0
Salesperson	31	10.3
System analyst	1	0.3
Controller	14	4.7
Driver	4	1.3
Leader	2	0.7
Administration	22	7.3
Custodian	13	4.3
Attendant	52	17.3
Working hours		
6 hours	5	1.7
8 hours	267	89.0
+ 8 hours	28	9.3
Length of time at the job		
1 year	51	17.0
1 to 3 years	156	52.0
4 to 6 years	61	20.3
7 to 10 years	20	6.7
> 10 years	12	4.0

Table III – Frequency of self-reported symptoms per anatomic regions of employees of a supermarket chain. São Paulo-SP, 2011-2012.

Body region	Never		Seldom		Often		Always	
	n	%	n	%	n	%	n	%
Neck	157	52.3	107	35.7	19	6.3	17	5.7
Shoulder	122	40.7	75	25	51	17	52	17.3
Arm	133	44.3	64	21.3	62	20.7	41	13.7
Elbow	282	94	16	5.3	2	0.7	0	0
Forearm	201	67	54	18	21	7	24	8
W.H.F*	140	46.7	43	14.3	53	17.7	64	21.3
Thoracic back	50	16.7	86	28.7	81	27	83	27.7
Low back	67	22.3	76	25.3	76	25.3	81	27
Lower limb	58	19.3	57	19	90	30	95	31.7

W.H.F: Wrists, Hands and Fingers.

Table IV – Possible associations of categorical variables between affected regions and sex, age, job, working hours and length of time at the job. São Paulo-SP, 2011-2012.

Body regions	Sex	Age	Job	Working H.	Job Yrs.
Neck	0.55	0.03*	0.39	< 0.01 *	0.07
Shoulder	0.32	0.27	0.11	0.05*	0.16
Arm	0.47	0.81	0.62	0.01*	0.58
Elbow	0.14	0.83	0.02*	0.25	0.03*
Forearm	0.06	0.97	0.40	0.69	0.42
W.H.F*	0.58	0.58	0.18	0.04*	< 0.01*
Thoracic back	0.14	0.14	0.57	0.16	0.30
Low back	0.14	0.14	0.05*	< 0.01*	0.03*
Lower limb	0.72	0.72	0.05*	0.06	0.79

Working H: Working hours; Job Yrs: years at the job; W.H.F: Wrists, Hands and Fingers. * $p \leq 0.05$

DISCUSSION

All the employees (n=300/100%) of the supermarket chain assessed in this current study presented some self-reported musculoskeletal painful symptom. Half (n=151/50.3%) of them presented three or more symptoms. Additionally, these symptoms were associated with the following variables: age, working hours and length of time at the job. No association was found between the self-reported symptoms and non-practice of physical activities.

This current study showed the profile of these employees and found a prevalence of single individuals, young adults, and women. Most of the people working in the trading sector are between 18 and 24 years old. Many of these youngsters find in this sector their first job opportunity, mainly because they require little or none technical knowledge and previous experience[17]. These results corroborate with a study in which authors observed a prevalence of female employees, with an average age of 25 years and complete secondary education[18].

RSI/WMSD are strongly related to changes in the work organization and to technological innovations resulting from the productive restructuring. These changes in the production process are leading to a greater work intensification, causing overwork of tendons, muscles and joints in workers[19]. Traditionally, the ergonomics of the work of a supermarket cashier has been analyzed from a physiological and biomechanical point of view. The results of this current study showed that cashiers represented the largest number of supermarket employees interviewed, which may justify the large number of studies related to this group of workers[6,20-22].

With the advent of optical reading, there was an increase in the incidence of muscle fatigue complaints. Besides that, the cashier is pressed to avoid the formation of large lines, and provide a faster, more efficient and perfect service to

clients. These factors make workers speed up the rhythm of work and hence increase physical and mental overload[22]. But cashiers are not the only supermarket employees affected by musculoskeletal disorders. Researches[6,20-22] on this issue have shown that; however, there is a need for further studies in order to promote workers' health or at least soften problems related to the employees of other sectors of a supermarket.

A study has shown that nearly one-third of the employees of various sectors of a supermarket chain has reported some type of discomfort, with the low back pain standing out as one of the most reported ones[23]. In contrast, this current study showed that half of these workers presented one or more symptoms in the past 12 months. Other large studies on the prevalence of low back pain in all the employees of various sectors of a supermarket revealed a prevalence of 34%[24] and 45%[21] of the global sample. It suggests the existence of a potential relation between psychosomatic symptoms associated with stress but not with satisfaction at work[24], a point that has not been assessed in the aforementioned study, in which this percentage reached 50% of employees.

Low back pain does not only affect the worker who performs tasks that require great physical effort, like the lifting and transportation of weights, but also the worker exposed to cumulative trauma in tasks considered light[22]. This can be observed from the results of this current study, in which the low back pain did not only correlate to the job but also to the daily working hours and the length of time at the job. Among the main risk factors related to musculoskeletal disorders are the work organization, environmental factors and the probable overload of body segments in certain movements like the excessive effort to perform certain tasks, repetition of movements and inappropriate posture when performing labor activities, and physiological factors[25].

Although it is possible to obtain a detailed occupational history, the relation between the disease or health harm and the occupation/profession will only be clear through the direct observation of the patient's work[26]. Regarding working hours and length of time at the job in this current research, the majority (n=267/89%) has been working for one to three years and had an eight-hour work day. The information on the work organization (repetitive manual work, physical overload, static load, vibrating tools, increase in the intensity and duration of exposure) is considered one of the most common risk factors, mainly when it is associated with other factors like short or no pauses, time pressure, productivity demands or encouragement, rhythm and work imposed by managers or assembly line (conveyor belt), extra hours, monotonous and static work, excessive production (production peaks, absenteeism, lack of programming) and lack of training[9,27,28].

It has been tried to understand the relation between anatomic regions where symptoms prevail and the frequency of pain manifestations caused by labor activities. These results are in accordance with studies that describe RSI/WMSD as disease that have a global symptomatology, and not only in the upper limb[5,29,30]. This current study verified a prevalence of pain complaints in the lower limb, followed by the thoracic and lower back, shoulders and wrists. Although the study did not conduct a physical assessment, these findings suggest an outstanding impact of posture on the musculoskeletal symptoms. It is known that a prolonged posture can lead to a static overload of muscle fibers, causing pain and discomfort. Most of the times, these structures are associated with the workplace conditions, favoring the onset of muscular symptoms[31]. Inappropriate postures, concentrated movement and generalized overuse of computer may favor the onset of RSI/WMSD[32].

Regarding physical activity, only 25% of the interviewees reported the practice. The mechanization of several activities, together with intensive working hours, is taking the sports practice away from people's lives. The worker who saves some minutes per week to exercise will have more energy and a better performance at work[18]. It is worth saying that the American College Sports Medicine (ACSM) recommends at least 30 minutes of regular physical activity from three to five days a week[33]. Despite these data, there was no association between work-related symptoms and regular physical activity in this current research.

The results of this current research are important for the developing of more effective actions for the prevention and promotion of the health of workers. However, the origin matter is a challenge that must be overcome by the existing conflicts and controversies, and it involves researchers, healthcare professionals and workers. Thus, there is a priority need for effective preventive policies based on the several segments involving the worker and the working process and its multiple relations, being the most important measure involving this phenomenon[27]. In this sense, the biomechanical dimension should be researched together with the organizational and psychosocial dimensions. Therefore, an interdisciplinary research may be a solution to rationalize costs and improve the knowledge transaction between fields[34].

This research did not present data on household chores and other daily habits, which could contribute to the onset of musculoskeletal symptoms. The excessive use of the computer at home and household chores involving repetitive movements (washing and ironing clothes, doing the dishes

and cleaning glasses) may aggravate musculoskeletal pain; however, they cannot be considered isolated causes of these symptoms since they present flexible rhythm and time[28].

The main limitation of this current study was the convenience sampling technique, which may have affected the generalization of results. A possible clinical and functional assessment could be done in order to correlate potential clinical findings to the self-reported symptoms. The utilization of self-application instruments may become a bias since it may be influenced by cognitive functions, culture, language and education level. Another limitation concerns the possible bias due to the fact that interviewees answered about the condition that prevailed in the period of one year before the interview; therefore, they could not remember all the manifestations of RSI/WMSD. The study did not assess the inter-relation between musculoskeletal disorders and risk factors like physical load, psychosocial load and the general health status.

CONCLUSION

It was verified that the surveyed employees of the aforementioned supermarket chain had presented a prevalence of pains or some musculoskeletal symptom in the past 12 months in the lower limb, regions of the spine, wrists, fingers and hands.

REFERENCES

1. Settimi MM, Almeida IM, Toledo LF, Paparelli R, Silva JÁ, Martins M. Lesões por Esforços Repetitivos (LER)/Distúrbios Osteomusculares relacionados ao trabalho (DORT). São Paulo: CEREST; 2000.
2. Al-Eisa E, Buragadda S, Shaheen AAM, Ibrahim A, Melam GR. Work related musculoskeletal disorders: causes, prevalence and response among egyptian and saudi physical therapists. Middle-East J. Sci. Res. 2012;12(4):523-9.
3. Yeng LT, Teixeira MJ, Romano MA, Picarelli H, Settimi MM, Greve JMA. Distúrbios ósteo-musculares relacionados ao trabalho. Rev Med. 2001;80(Ed. Esp. Pt.2):422-42.
4. Torres ARA, Chagas MIO, Moreira ACA, Barreto ICHC, Rodrigues EM. O adoecimento no trabalhador: repercurssões na vida do trabalhador e de sua família. Sanare. 2011;10(1):42-8.
5. Anap DB, Iyer C, Rao K. Work related musculoskeletal disorders among hospital nurses in rural Maharashtra, India: a multi centre survey. Int J Res Med Sci. 2013;1(2):101-7.
6. Draicchio F, Trebbi M, Mari S, Forzano F, Serrao M, Sicklinger A, et al. Biomechanical evaluation of supermarket cashiers before and after a redesign of the checkout counter. Ergonomics. 2012;55(6):650-69.
7. Rosa AFG, Garcia PA, Vedoato T, Campos RG, Lopes MLS. Incidência de LER/DORT em trabalhadores de enfermagem. Acta Sci. 2008;30(1):19-25.
8. Empresa de Tecnologia e Informações da Previdência Social – DATAPREV. Anuário Estatístico da Previdência Social 2011. Brasília: Ministério da Previdência; 2011.
9. Moraes PWT, Bastos AVB. As LER/DORT e os fatores psicossociais. Arq Bras Psicol. 2013;65(1):2-20.
10. Saldanha JHS, Pereira APM, Neves RF, Lima MAG. Facilitadores e barreiras de retorno ao trabalho de trabalhadores acometidos por LER/DORT. Rev Bras Saúde Ocup. 2013;38(127):122-38.
11. Picoloto D, Silveira ED. Prevalência de sintomas osteomusculares e fatores associados em trabalhadores de uma indústria metalúrgica de Canoas-RS. Ciênc Saúde Coletiva. 2008;13(2):507-16.
12. Delani D, Evangelista RA, Pinho ST, Silva AC. Ginástica laboral: melhoria na qualidade de vida do trabalhador. Rev Cient Faema. 2013;4(1):41-61.
13. Riesco TB, Sandoval RA, Kappes V. Exercícios compensatórios laborais nos operadores de" checkout" de um supermercado de Goiânia. Lect Educación Fís Deportes. 2006;10(92):26.
14. Clarke CM. Workplace injuries and illnesses in grocery stores. Compensation and Working Conditions. Washington: Department of Labor, Bureau of Labor Statistics; 2003. p.1-12.
15. Curci KA, Oliveira MR, Souza Rangel MM, Mendes S. Promoção da saúde e prevenção de riscos e doenças na Saúde Suplementar: um breve histórico. Mundo Saúde. 2013;37(2):230-40.
16. Pinheiro FA, Tróccoli BT, Carvalho CV. Validação do questionário nórdico de sintomas osteomusculares como medida de morbidade. Rev Saúde Pública. 2002;36(3):307-12.
17. Matos LB. Jovens e adolescentes no mercado de trabalho: uma análise sobre o Programa de Aprendizagem e suas Implicações nas empresas do polo de Manaus. Rev Magistro. 2013;8(2):77-90.
18. Battisti HH, Guimarães ACA, Simas JPN. Atividade física e qualidade de vida de operadores de caixa de supermercado. Rev Bras Ciência Mov. 2005;13(1):71-

8.

19. Murofuse NT, Marziale MHP. Doenças do sistema osteomuscular em trabalhadores de enfermagem. Rev Latinoam Enferm. 2005;13(3):364-73.

20. Bonfiglioli R, Mattioli S, Fiorentini C, Graziosi F, Curti S, Violante FS. Relationship between repetitive work and the prevalence of carpal tunnel syndrome in part-time and full-time female supermarket cashiers: a quasi-experimental study. Int Arch Occup Environ Health. 2007;80(3):248-53.

21. Forcier L, Lapointe C, Lortie M, Buckle P, Kuorinka I, Lemaire J, et al. Supermarket workers: Their work and their health, particularly their self-reported musculoskeletal problems and compensable injuries. Work. 2008;30(4):493-510.

22. Trelha CS, Cunha ACV, Carregaro RL, Castro RFD, Gallo JMCL, Silva DW, et al. Prevalência de sintomatologia musculoesquelética em funcionários de supermercado em Lonsdrina-PR; Musculoskeletal symptoms in workers of supermarket of Londrina-PR. Fisioter Mov. 2004;17(4):59-64.

23. Ryan GA. The prevalence of musculo-skeletal symptoms in supermarket workers. Ergonomics. 1989;32(4):359-71.

24. Violante FS, Graziosi F, Bonfiglioli R, Curti S, Mattioli S. Relations between occupational, psychosocial and individual factors and three different categories of back disorder among supermarket workers. Int Arch Occup Environ Health. 2005;78(8):613-24.

25. Magnago TSBS, Lisboa MTL, Griep RH, Kirchhof ALC, Camponogara S, Nonnenmacher CQ, et al. Nursing workers: work conditions, social-demographic characteristics and skeletal muscle disturbances. Acta Paul Enferm. 2010;23(2):187-93.

26. Galvão JT. Saúde e qualidade de vida do operador de caixa de supermercado. Palmas. Monografia [Bacharelado em Administração] - Universidade de Brasília; 2012.

27. Karino ME, Martins JT, Bobroff MCC. Reflexão sobre as políticas de saúde do trabalhador no brasil: avanços e desafios. Ciênc Cuid Saúde. 2011;10(2):395-400.

28. Martins AC, Felli VEA. Sintomas músculo-esqueléticos em graduandos de enfermagem. Enferm Foco. 2013;4(1):58-62.

29. Etemadinezhad S, Ranjbar F, Gorji M. Posture analysis by OWAS method and prevalence of Musculoskeletal Disorders using Nordic questionnaire among workers of Sourak tobacco factory in 2013. IJEHSE. 2013;1(2):89-94.

30. Moraes PWT, Bastos AVB. As LER/DORT e os fatores psicossociais. Arq Bras Psicol. 2013;65(1):2-20.

31. Mergener CR, Kehrig RT, Traebert J. Sintomatologia músculo-esquelética relacionada ao trabalho e sua relação com qualidade de vida em bancários do Meio Oeste Catarinense. Saúde Soc. 2008;17(4):171-81.

32. Antunes ED, Araújo CR, Abage Z. Musculoskeletal sympotms in workers of a Telecom Company. Work. 2012;41(Suppl. 1):5725-7.

33. American College of Sports Medicine. ACSM's exercise management for persons with chronic diseases and disabilities. Indianapolis: Human Kinetics Publishers; 2003.

34. Silva EP, Minette LJ, Souza AP, Marçal MA, Sanches ALP. Psychosocial and organizational factors associated with risk of LER/DORT in operators of forest harvesting machines. Rev Árvore. 2013;37(5):889-95.

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