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Absenteeism due to musculoskeletal disorders in Brazilian workers: thousands days missed at work

Absenteísmo por distúrbios musculoesqueléticos em trabalhadores do Brasil: milhares de dias de trabalho perdidos

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ABSTRACT: ***Objective:*** To describe and analyze the absenteeism of Brazilian workers notified with musculoskeletal disorders, from 2007 to 2012. ***Methods:*** This is a quantitative, cross-sectional and descriptive study, including retrospective and secondary data. The records came from the Information System of Notifiable Diseases, which notifies workers on a social security system, as well as informal workers. The study lasted for six years. We analyzed sociodemographic, work organization and injury variables. ***Results:*** There were approximately 5 million working days lost for 18,611 workers who were notified and removed from the position. The groups that stood out in the analysis were the illiterate people, in the age group of 50 to 59 years, with daily working hours higher than 6 hours, from the great occupational group 4, the ICD-10 M50 and M51, and workers with mental disorders. ***Conclusions:*** High absenteeism among workers with musculoskeletal disorders, illiterate, aged from 50 to 59 years, administrative service workers, ICD-10 M51 and workers with mental disorders. It is necessary to outline public policies that contemplate the absenteeism caused by the disease, in order to reduce morbidity, as well as the socioeconomic losses.

Keywords: Absenteeism. Occupational health. Cumulative trauma disorders. Occupational diseases. Epidemiology. Health information systems.

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RESUMO: ***Objetivo:*** Descrever e analisar o absenteísmo dos trabalhadores do Brasil notificados com distúrbios musculoesqueléticos, do período de 2007 a 2012. ***Métodos:*** Estudo quantitativo, transversal e descritivo, com dados retrospectivos e secundários. Os registros foram do Sistema de Informação de Agravos de Notificação, que notifica trabalhadores em regime de previdência, bem como os informais. O período do estudo foi de seis anos. As variáveis foram: sociodemográficas, organizacionais do trabalho e específicas do agravo. ***Resultados:*** Foram aproximadamente 5 milhões de dias perdidos de trabalho, de 18.611 trabalhadores afastados e notificados com o agravo. Os grupos que mais se destacaram na análise foram os analfabetos, na faixa etária dos 50 aos 59 anos, com carga horária diária de trabalho acima de 6 horas, do grande grupo ocupacional 4, os CID-10 M50 e M51 e os trabalhadores com transtornos mentais. ***Conclusões:*** Elevado absenteísmo entre os trabalhadores com distúrbios musculoesqueléticos, analfabetos, idade dos 50 aos 59 anos, trabalhadores de serviços administrativos, CID-10 M51 e trabalhadores com transtornos mentais. Há necessidade de traçar políticas públicas que contemplem o absenteísmo causado pelo agravo, a fim de reduzir a morbidade, bem como os prejuízos socioeconômicos.

Palavras-chave: Absenteísmo. Saúde do trabalhador. Transtornos traumáticos cumulativos. Doenças profissionais. Epidemiologia. Sistemas de informação em saúde.

INTRODUCTION

The musculoskeletal disorders (MSD), also known as cumulative trauma disorders, are pathologies that affect workers from several occupational groups. They can cause inflammation and degeneration, mainly affecting structures such as muscles, nerves, tendons, joints, and cartilage, leading to pain and functional limitation[1,2].

The MSDs are among the occupational losses that generate the greatest consequences to workers. Some of the main consequences are the suffering of the worker due to the symptoms, the daily limitations and absenteeism, which can be longer and more recurrent than in other diseases[1,2].

Absenteeism or leave of absence from work, due to MSDs, leads to loss of productivity and generates an important economic impact for the employer, government, society in general, besides limitations and distress to the affected workers[3,4].

The main factors associated with MSDs in workers are the repetitive aspect of the movements, the invariability of tasks, the static posture during labor activities, and the great physical demands, such as handling heavy loads. Besides the psychosocial aspects related with work, which modulate the pain of the MSDs[1,4].

Absenteeism caused by MDS can be associated with factors such as gender, age group, schooling and occupation[4]. In Spain and Greece, for instance, the occupational losses have removed workers from several occupations for thousands of days, in a one-year period[5,6].

An occupational study conducted in the Netherlands showed that the MSDs were the most recurrent for absenteeism[7]. In Brazil, a study carried out with public workers, in the city of Belo Horizonte, Minas Gerais, showed that the MSDs were among the diseases with the highest risk for absence from work[8]. The chronic diseases usually generate higher rates of absenteeism than acute conditions[9].

In the past few years, the work force has grown in the country. Currently, Brazil has approximately 96 million workers[10]. There are few studies in the literature regarding absenteeism caused by musculoskeletal disorders. It is important to carry out further and more detailed analyses on absenteeism due to MSDs, which would lead to new strategies of prevention.

This study aimed at describing and analyzing absenteeism of Brazilian workers, notified with MSD, from 2007 to 2012, regarding sociodemographic and occupational factors, besides those related to the condition.

METHODS

This is a cross-sectional, descriptive, retrospective, epidemiological quantitative study. It is part of study referring to a dissertation from the Postgraduate Nursing Program in Universidade Federal do Paraná.

Data are secondary, coming from the National Information System of Notifiable Diseases (SINAN), of the notified cases of MSD from January 1st, 2007, to December 31, 2012. The study accounted for six years of records. SINAN notifies cases of MSD in workers included or not in the social security system.

In the National Institute of Social Security (INSS), for instance, the worker who is absent due to a disease and needs the social benefit to survive, needs to forward it through social security, which does not happen in SINAN. In the latter, the search is usually spontaneous, first using the health services of the Unified Health System (SUS). Part of the workers who search for this follow-up do not have or have lost their formal work register, especially those suffering from diseases that require long-term leaves of absence. The aforementioned reasons may distinguish the coverage of notifications between SINAN and INSS.

The records were provided in a .xls file, in April 2013, by the Ministry of Health in Brazil. They included all records of workers notified with MSD. The exclusion criteria were the categories that had less than 1% of the absence records, for the low quantitative importance in relation to the total of data. The exclusions occurred in major occupational groups (GG) 0 and 1 (Chart 1). Another category excluded was that of workers aged less than 15 years.

For this study, we selected the following variables and blanks filled out in the notification file of lesions caused by repetitive strain or work-related musculoskeletal disorders (RSI/ WRMD) in SINAN:

1. general data: notification date (year of notification);
2. individual notification: sex (male, female), age group (15 – 19, 20 – 29, 30 – 39, 40 – 49, 50 – 59, more than 60); schooling (illiterate, elementary school, high school, higher education);
3. epidemiological records: occupation, mental disorder (yes, no, ignored);
4. RSI/ WRMD: more than six hours of work (yes, no); specific diagnosis according to the International Classification of Diseases (ICD);
5. conclusion: absence from work for treatment (yes, no, ignored), time of absence from work for treatment (hours, days, months, years).

Chart 1. Description of the great occupational groups according to the Brazilian Classification of Occupations.

Great occupational groups	Description of the great occupational groups	Subgroups of the great occupational groups
GG 2	Professionals of sciences and arts	Researchers and polyscience professionals; professionals of the exact, physical and engineering sciences; professionals of the biological, health and correlated sciences; education professionals; professionals of the juridical sciences; professionals of the social and human sciences; communicators, artists and religious people; professionals of gastronomy.
GG 3	Mid-level technicians	Polyvalent technicians; mid-level technicians of the physical, chemical, engineering and correlated sciences; mid-level technicians of the biological, biochemical, health and correlated sciences; lay and high school teachers; mid-level technicians in transportation services; mid-level technicians of the administrative sciences; mid-level technicians of the cultural services, communications and sports; among other mid-level technicians.
GG 4	Workers of administrative services	Book-keepers; working with customer services.
GG 5	Workers of services, sales people in the trade, stores and markets	Workers of services; sales people and trade suppliers.
GG 6	Farming, forest and fishing workers	Producers in the farming exploitation; fishermen and forest harvesters; workers of the farming and forest meccanization.
GG 7	Workers in the production of industrial goods and services I	Workers in the extractive industry and civil construction; workers of the transformation of metals and composites; workers in the electronic manufacturing and installation; assemblers of devices and precision and musical instruments; jewelers, glaziers, ceramists and correlated professions; workers in the textile, clothing and graphic arts industries; workers in the wood and furniture industry; workers in transverse functions*.
GG 8	Workers in the production of industrial goods and services II	Workers in chemical, petrochemical and correlated industries; workers in steel factories, and construction materials; workers of installations and machines to manufacture cellulose and paper; workers in the preparation of foods, drunks and smoke; operators of production, obtainment, treatment and distribution (energy, water and utilities).
GG 9	Workers in services of repair and maintenance	Workers in services of mechanical repair and maintenance; poly-maintainers; other workers of conservation, maintenance and repair.

*Transverse function: supervisors of workers of packaging and labeling, operators of robots and special equipment, drivers of vehicles and operators of lifting equipment and movement of loads, workers of maneuvers on rail, packers and production feeder.

The occupations referring to cases of RSI/WRMD registered in epidemiological records were categorized as GG, according to the Brazilian Classification of Occupations (CBO) (Chart 1). In the variable "time of absence", there were four forms of register (hours, days, months, and years). The time of absence for "days missed at work" was standardized.

For the specific ICD-10 variable, there was the categorization and the grouping according to the ICD-10. Data analysis was carried out with the software Stata, version 12 (Stata Corp., College Station, the United States).

There were contingency tables including the variable "days missed at work", with the mean and median in relation to the variables sex, age group, daily work load, GG, specific ICD-10 grouping and mental disorder. The interquartile interval (25 – 75% was described for each group, in order to compare the central 50% of the "days missed at work" between the categories of each independent variable.

After the descriptive analysis of the data, the possible outliers ere controlled to prevent the influence of divergent measures in the final results. The Mann-Whitney U test was used to analyze the dichotomous qualitative variables, and the Kruskal-Wallis for the variables with three or more categories. The tests were carried out with the dependent variable "days missed at work" in relation to the independent variables. The dependent variable did not present adherence with the normal distribution in the Kolmogorov-Smirnov test ($p < 0.05$).

The study was approved by the Research Ethics Committee of the Secretariat of Health in the State of Paraná, with the Ethics Certification n. 287,570, in May 2013, according to Resolution n. 196/96, from the National Health Council.

RESULTS

From 2007 to 2012, SINAN registered 32,438 workers with MSD. The mean age of the workers notified with the condition was 40 years. Absenteeism accounted for 4,961,478 days missed at work for 18,611 (57.4%) workers notified and absent with this condition in SINAN. Absenteeism was similar between men and women.

Regarding schooling, there was significant difference ($p = 0.0001$) of absence between the categories, and illiterate people had the highest median (183 days), and those in the second to third quartile (60.1 to 182.6). The age group that stood out was from the ages of 50 to 59 years, with median of 122 days; and from the second to the third quartile (45 to 365.2). As to daily work load, the differences of absence were significant ($p < 0.0001$), and workers with more than 6 daily hours showed the median of 90 days (Table 1).

Among the GG, the diferences were statistically significant, according to the Kruskal-Wallis test ($p = 0.0001$). GG 4 (administrative workers) was the one with the highest mean of absence (316.3 days) (Table 2).

Table 3 shows the significant difference between the groups in ICD-10 ($p = 0.0001$), M51 (other vertebral disk diseases) and M50 (cervical disk diseases) both with medians of 183 days, and from the percentile 25 to 75%, respectively, 90 to 730 and 90 to 639.2 days. The workers with mental disease were strongly associated with absence from work due to MSD ($p < 0.0001$).

DISCUSSION

This study found an absenteeism rate of approximately 5 million days missed at work in 6 years of study, among the workers notified with MSD by SINAN, from 2007 to 2012 in Brazil.

By observing the median and the central 50% (second or third quartile) of days missed at work for the groups of variables, there were longer periods of absence for illiterate people, aged rom 50 to 59 years, who worked for more than 6 daily hours, belonging to GG 4, diagnosed with ICD-10 M50 and M51, besides the workers notified with RSI/WRMD who had a mental condition.

In a study conducted in Brazil with records from INSS, about MSD in workers, absenteeism accounted for approximately 12 million days missed at work in 1 year[11]. It is possible

Table 1. Absenteeism due to musculoskeletal disorders in workers regarding gender, schooling, age group and work load in Brazil, 2007-2012.

Variable	Days missed at work			p-value
	Mean	Median	25 – 75%	
Gender				0.2872*
Male	267.7	90	30 – 213.1	
Female	256.6	91	30 – 243.5	
Schooling				0.0001**
Illiterate	419.6	183	60.1 – 182.6	
Elementary School	310.4	91	30.4 – 91.3	
High School	230.2	90	30 – 90	
Higher Education	270.9	90	30 – 90	
Age group (years)				0.0001**
15 to 19	72.6	16	10 – 60	
20 to 29	143.1	60	15 – 121.7	
30 to 39	232.5	90	30 – 182.6	
40 to 49	307.7	91	45 – 304.8	
50 to 59	336.8	122	45 – 365.2	
≥ 60	276.7	91	30.4 – 365.2	
Work Load				< 0.0001*
More than 6 hours a day	270.0	90	30 – 243.5	
Up to 6 hours a day	253.0	61	15 – 213.1	

*Mann-Whitney's test; **Kruskal-Wallis test.

Table 2. Absenteeism owed to musculoskeletal disorders in workers regarding the great occupational groups. Brazil, 2007-2012.

Variables	Days missed at work			p-value
Professionals of sciences and arts (GG2)	Mean	Median	25 – 75%	
Mid-level technicians (GG 3)	Média	91	30 – 365.2	0.0001*
Administrative workers (GG 4)	304.2	91	30.2 – 319.6	
Workers of services and trade (GG 5)	281.9	91	30 – 365.2	
Farmer, forest and fishing workers (GG 6)	316.3	91	30.4 – 243.5	
Workers in the production of industrial goods and services I (GG 7)	259.0	90	15 – 365.2	
Workers in the production of industrial goods and services II (GG 8)	276.9	90	30 – 182.6	
Workers of services of repair and maintenance (GG 9)	251.6	90	30 – 213.1	
Trabalhadores em serviços de reparação e manutenção (GG 9)	259.9	60	30 – 152.2	

*Kruskal-Wallis test.

Table 3. Absenteeism due to musculoskeletal disorders in workers regarding a specific ICD-10 and mental disorder. Brazil, 2007-2012.

Variable	Days missed at work			p-value
Specific ICD-10	Mean	Median	25 – 75%	
M75 (shoulder lesions)	224.2	90	30.4 – 365	0.0001*
M65 (synovitis and tenosynovitis)	173.5	61	30 – 121.7	
M54 (dorsalgia)	240.4	77	21 – 182.6	
M51 (other vertebral disk disorders)	458.1	183	90 – 730	
G56 (upper limb mononeuropathy)	379.3	152	60.9 – 365.2	
M77 (other enthesopathies)	171.6	61	16.5 – 121.7	
Z57 (occupational exposure to risk factors)	210.7	30	8 – 182.2	
M50 (cervical disk diseases)	471.7	183	90 – 639.2	
Others ICD-10	229.8	90	15 – 152.2	
Mental disorder				
Yes	488.5	183	60.8 – 730.5	< 0.0001**
No	254.5	90	30 – 213.1	

*Kruskal-Wallis test; *Mann-Whitney' test.

that there are differences regarding absenteeism between studies that approach the same thematic. This fact may be owed to the specificities of each information system, which may clarify such a variation.

In this study, the data extracted from SINAN were from workers with and without social security rights. We must emphasize that the worker who needs to be absent for a longer period due to MSD needs to use the social security benefit in INSS, which may increase the record of data in the system. The situation is different in SINAN, in which the search for follow-up in SUS is spontaneous for purposes of treating the condition.

As to gender, in this study the absence rate between women and men was similar. However, in Salvador, Bahia, incapacitating RSI/WRMD has removed more women (66.9%) than men[2] from their work positions. In Norway, 65.1% of the absences involved female workers[12]. In Sweden and Japan, the female gender was associated with absence from work due to occupational pathologies[13,14]. In a case control study, women have had 2.6 times more chances for long-term absence, and gender was a predictive factor for absenteeism[3]. Another study showed that female public servers had significantly 1.12 times more risk for absenteeism[8].

The increasing risk of the female gender due to MSD is understandable, once the women usually experiences the "double burden", being in charge of household chores, such as taking care of the children and the house, added to the daily work routine, which leads to mental and physical overload; besides the anatomophysiological differences in relation to men[15]. The aforementioned overload aspects may worsen the evolution of cases of women with musculoskeletal disorders, and, therefore, increase their absence from work.

The schooling level may be another relevant aspect related to the absence from work. In this study, the illiterate workers have had the highest means of days missed at work due to MSD. The work process is an important aspect regarding the occupational pathologies, and may be strongly influenced by the schooling level[16]. It is likely that workers with lower schooling levels are in positions with higher levels and diversity of exposition, so they are exposed to risk factor for longer periods which can worsen the pathological status[16].

Age can be associated with absenteeism caused by MSD[4]. In this study, the age group from 50 to 59 years had the highest median (122 days). In a multicenter study carried out in 18 countries in the world, the risk for absenteeism due to MSD was higher after the age of 30[4]. For workers in an oil company in Brazil, the risk of absence occurred in age groups of more than 50[3]. This can be explained by the fact that the highest labor productivity is concentrated in intermediate age groups. At advanced ages, the degenerative processes can be the most plausible explanation[17].

In this study, workers whose work load is higher than six daily hours had higher median of absence from work to treat MSD. In a study from Namibia, the work carried out in a partial shift was a protective factor for absenteeism[9]. In Japan, absence from work was associated with the weekly work load of more than 60 hours[14]. The higher work load of workers can be associated with morbidity, by the increasing time of exposure to work-related risk factors.

As to the field of economic activity, a study showed there was higher rates of absence due to MSD in workers in the industry of transformation, followed by trading activities[2]. In another study, the analysis of secondary data of workers in a public university in

Brazil showed that the highest median of days missed at work was addressed to operational workers (122.5 days)[18]. These studies have had similar results to this analysis. In general, the occupations that expose workers to handling heavy loads, repetitive movements and long periods of static positions lead to higher risks of RSI/WRMD and subsequent absenteeism[19].

In relation to the anatomic site, a study from Norway showed the main causes of absenteeism were shoulder and cervical injuries[12]. In Salvador, Bahia, a study about the incidence of MSD showed that the diagnoses that mostly caused absence from work were synovitis/ tenosynovitis and shoulder injuries[2]. The mentioned studies corroborate the findings in this study.

The MSDs and the mental disorders can be the main causes of absenteeism among workers, and they also occur more often in comparison to other occupational conditions[7]. Precarious mental health not only affects workers in general, but can also strengthen or modulate the symptoms of musculoskeletal disorders, especially pain, due to somatization processes[4]. In this study, the absence from work caused by MSD was associated with mental disorders.

Among this study's limitations, it is important to mention the possible under-notification of MSD cases, which makes it difficult to measure the condition in the exposed population. This does not allow the adequate follow-up of non-notified workers who suffer from this condition, besides preventing finer analyses with these records. One of the possible causes of under-notification in SINAN is the use of private health care or health insurance.

Another limitation was the incompleteness of some variables, which reduced the quality of the notification forms of RSI/WRMD and, therefore, limited the robustness of the analyses in this study.

On the other hand, this study had advantages in the use data from SINAN, such as the comprehension of the notifications, since there are records from employees ensured by the social security system or not.

One of the ways to prevent work-related diseases is the application of health public policies. There are many rules establishing work in Brazil, aiming at preventing these conditions related to and/or worsened by work. Despite not being specific for the prevention of MSD, the regulatory standard 17 (NR 17) is a set of recommendations to conduct ergonomic analyses of labor activities, aiming at providing comfort and safety to workers. NR 17 may prevent or minimize MSD in workers[20].

CONCLUSION

This study showed thousands of days missed at work in Brazil, among the cases of MSD in workers from several occupations notified by the national SINAN. Among the medians of time of absence, the groups that stood out were illiterate people, aged from 50 to 59 years, with work load higher than 6 daily hours, in the great occupational group 4, with the vertebral disk diseases (M50 and M51), and workers with mental disorders.

The morbidity profile analyzed is applicable to the population with formal work records, as well as informal workers or with precarious work relations, with long-term diseases which require longer periods of treatment and recovery.

Based on these results, it is possible to observe the importance of this condition in the health of workers in several occupations due to the limitations, suffering and absenteeism caused, besides the considerable sociodemographic and occupational damage generated. The direct and indirect expenses with MSDs were possibly significant.

It is necessary to think about the update of public policies contemplating the absence from work, considering the data in this and other studies regarding the health of the employee. This reflection will lead to new ideas regarding the workers' health, as well as the productivity it may represent to institutions; Other investigations can observe or develop other work processes that can modify this pathological morbidity profile, such as those of causal inference, which would contribute with the study phenomenon, addressed to causes and possible forms of intervention.

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