

Work-related self-reported musculoskeletal injuries in Portuguese hypermarket cashiers

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SUMMARY

Background: Work-related musculoskeletal disorders are a group of painful disorders which arise from work situations with continuous repetitive movements, carried out with speed and without time for recovery. In the performance of their job tasks, supermarket cashiers are exposed to this type of ergonomic stress. **Objectives:** This study aimed to determine the incidence of self-reported injuries in Portuguese hypermarket cashiers and to identify the related factors. **Methods:** The sample included 176 hypermarket cashiers, aged between 18 and 65 years (39.57 ± 11.11), 167 (94.9%) of them women. Symptoms and exposure of interest have been collected through an interview-based questionnaire. The presence of carpal tunnel syndrome was assessed by Phalen's test. **Results:** One hundred and seventeen (66.5%) cashiers reported an injury during employment, 100 (56.8%) of them reporting an injury in the previous 6 months. A total of 166 injuries were reported, corresponding to 1.14 injuries per 1,000 hours of work. The most common injuries were non-specific pain (30.4%), located in the shoulder (23.2%), cervical (22%) and lumbar spine (22%). Part-time workers showed a 2.25 times greater risk of injury (95% CI: 1.17-4.32; $p=0.015$) than full-time workers. Cashiers with more than 6 years of employment length had a 3.59 times higher risk of injury (95% CI: 1.84-6.99; $p \leq 0.001$) than those who had been working for a shorter period. **Conclusions:** Our data showed a high rate of reported injuries among hypermarket cashiers, especially among part-time workers and those with the highest length of employment.

RIASSUNTO

«**Disturbi muscoloscheletrici lavoro-dipendenti in cassieri di ipermercato portoghese**». **Introduzione:** I disturbi muscoloscheletrici lavoro-correlati possono manifestarsi in situazioni di lavoro caratterizzate da movimenti continui e ripetitivi, eseguiti velocemente e senza tempo di recupero/riposo. I cassieri di supermercato sono soggetti a questo tipo di stress ergonomico nell'esecuzione delle loro mansioni. **Obiettivi:** Determinare l'incidenza di disturbi in cassieri di ipermercato in Portogallo e identificare i fattori a essi correlati. **Metodi:** Il campione è composto da 176 cassieri di ipermercato, tra i 18 e i 65 anni (39.57 ± 11.11), di cui 167 (94.9%) donne. Sintomi ed esposizioni lavorative di interesse sono stati raccolti attraverso un questionario somministrato tramite intervista. La presenza della sindrome da tunnel carpale è stata accertata attraverso il test di Phalen. **Risultati:** Centodiciassette (66.5%) cassieri hanno

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riferito l'insorgenza di un disturbo durante l'impiego. Di questi, 100 (56.8%) ne hanno riportato la presenza nei sei mesi precedenti. In totale, sono stati riferiti 166 eventi (infortuni), corrispondenti a 1.14 infortuni per 1,000 ore lavorative. I disturbi più comuni sono dolore non specifico (30.4%), localizzato nella spalla (23.2%), e nella colonna cervicale (22%) e lombare (22%). Nei lavoratori part-time il rischio di infortunio è risultato 2.25 volte maggiore (95% CI: 1.17–4.32; $p=0.015$) che nei lavoratori a tempo pieno. I cassieri con oltre sei anni di anzianità nella mansione mostrano un rischio di infortunio 3.59 volte superiore (95% CI: 1.84–6.99; $p\leq 0.001$) ai lavoratori impiegati da minor tempo.

INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) consists of a group of painful disorders of the muscles, tendons, and nerves, found among a working population, that can affect both the upper and lower limbs, or the spine region, depending on the activity performed (6, 23). These disorders can be partly caused by the work itself, can be aggravated, accelerated or exacerbated by occupational exposures, and can be the cause of impaired work capacity (8, 23, 26).

WMSDs arise from work situations with continual repetition, in which movements are carried out with speed and with a lack of recovery time between movements (6, 18). WMSDs can vary from non-specific pain syndromes that cannot be attributed to any known pathology to specific disorders that are clearly defined (19).

This disorder is a widespread public health problem that not only affects the health of the worker, but also brings higher costs for companies and society at large (23, 25). It constitutes one of the most common and costly public health issues in Western societies, being an important cause of morbidity and absence due to sickness (19). The World Health Organization and World Bank attribute to WMSDs a 3% loss of life years in terms of the ability of a person to be able to work, while the International Labour Office estimates that WMSDs account for economic losses as high as 4% of the worldwide gross domestic product (9).

Supermarket cashiers perform several activities during their working day. One such activity involves picking up the products placed by customers on the conveyor belt, with the effort of this activity being influenced by the weight of the products and the

conditions of the work place. They also pass the products over the optical reader (or type the barcode numbers of the products if the scanner can't read them), place the products on the checkout counter after registering, and charge the customer by credit/debit card, check, or cash, with or without delivery of the change. In addition to these activities, supermarket cashiers also have to keep their work station clean and in order, exchange products as requested by the client, answer or make phone calls, and request changes of money with other registers or the fiscal manager (10). In Portugal, products are generally bagged by the customers, but they can be assisted by the cashier when necessary.

In order to perform their task, supermarket cashiers perform rotation, lateral inclination and flexion movements of the trunk and shoulder flexions for moving products, weighing produce, activating the control panel and withdrawing the proof of purchase, among other functions. They also use wrist extension and flexion while scanning items, and wrist extension while operating the screen. Thus, the main ergonomic stress factors of supermarket cashiers include repetitive spine and upper limbs movements and awkward postures. These factors can be due in part to check stand design and the anthropometric dimensions of each worker (1, 7, 12, 14). Regarding the performance of force movements, a study by Baron and Habes indicated that average forces were estimated to be low, and peak forces to be medium (1).

In North America, Asia, and Australia, the work stations are designed to accommodate standing postures, whereas in many European countries and in South America there is the option of a seated position (11). In Portugal, in most work stations there is the possibility for the cashier to seat, however, as

space can be limited, some workers can choose to perform their task while standing. In assuming an orthostatic position, there will be an increased load in the neck and back since the cashier has to look down and bends frequently. However, adopting a sitting posture can lead to an increase in muscular strain on the shoulders and back, since the shoulders are subjected to a greater abduction in this posture and because the cashier performs trunk rotations more frequently (8).

The study of Sansone et al. evaluated the prevalence of self-reported shoulder pain in 196 female supermarket cashiers and 302 females from the general population, and their data showed that the prevalence of shoulder pain was significantly higher in the cashier group (46.4%) than in the general population (25.5%) (19). In another study, Sansone et al. evaluated 199 supermarket cashiers by ultrasonography of the rotator cuffs, and the results revealed the presence of calcific tendinopathy in 22.6% of the sample (20).

Current international studies of injuries in supermarket cashiers are still scarce, and no national studies are known. Thus, the objective of this study was to determine the incidence of injuries over a 6-month period in Portuguese hypermarket cashiers, as well as their type, location, and to analyse the associated factors of these injuries.

METHODS

An epidemiological study was conducted to gather data on musculoskeletal injuries in hypermarket cashiers. This study was approved by the research unit Research in Education and Community Intervention (RECI).

Population

The study population consisted of hypermarket cashiers of southern Portugal, of both sexes and all ages.

Inclusion criteria specified individuals who exclusively perform the function of hypermarket cashier, have held this function for at least 6 months, freely agreed to participate and signed the informed consent form.

Cashiers working in supermarkets can perform tasks other than those of the check stand. Therefore, in this study only hypermarkets were included as cashiers do not perform other tasks in this setting.

Hypermarkets are large supermarket chains that offer all the functionalities of a supermarket, but with a much greater variety of products and services. Beyond food, hygiene, cleaning, and perfumery products, they also offer the sale of clothes, footwear, beauty accessories, home, automobiles, electronics, home appliances and various other products.

In Portugal, there are four hypermarket chains (Continente, Intermarché, Jumbo, Pingo Doce) and 86,700 supermarket and hypermarket employees (22). In the southern region of Portugal there are 76 individual hypermarket stores from these hypermarket chains. No data was found that reported the number of workers in hypermarkets specifically or in the southern region of Portugal.

In a first approach, a request to participate in study was sent by e-mail to the hypermarkets at the national level. After 5 months of waiting for an answer, we contacted the hypermarkets by phone. After the telephone intervention, only one hypermarket chain responded by email, authorizing the study if the directors responsible for the individual hypermarket stores also agreed to participate. Finally, we went in person to all the hypermarket chain stores to obtain the authorization for the collection of data. Most hypermarket directors refused to provide the number of employees, making it impossible to calculate the sample size.

Instruments

The measurement instruments consisted of a questionnaire and Phalen's test. Data were collected between March and June 2018.

Questionnaire

The questionnaire was evaluated by a group of experts with different backgrounds, and a pre-test was carried out (with ten supermarket cashiers) that consisted of two parts: socio-demographic characterization of the population, and specific questions about the injuries.

The first part of the questionnaire involved items concerning: the name of the hypermarket; age; gender; professional situation (full-time or part-time); work period (equal or greater than 6 months); work shifts (rotary or fixed); work position the majority of the time (standing or sitting); pause time (in minutes); weekly hours of work; whether there were other professional activities; and if there was physical activity at least twice a week.

The second part of the questionnaire was focused on the occurrence of injuries resulting from tasks required of hypermarket cashiers, in 4 different periods: presence of any injuries at the time of data collection, and injuries that occurred during the last 6 months, 12 months and entire career of the hypermarket cashier.

To minimize recall bias but maximize injury capture, we decided to focus on the injuries reported in the previous 6-month period by the hypermarket cashiers. Individuals who presented an injury within the last 6 months were asked to continue and fill out the questionnaire regarding the following characteristics of the injuries: number of injuries; if they prevented the carrying out of professional activities in the last 6 months; type and location; if there was any treatment and if so, what kind of treatment was applied. It was only possible for respondents to specify the characteristics of a maximum of three injuries (those considered most serious and/or needing the most time for recovery).

We included in the question regarding "type of injuries", the following options: pathologies of the upper limbs that are more common in jobs that require repetitive efforts such as arthritis/arthroses, joint capsule injury, joint bursa injury, shoulder tendinopathy, tendinitis medial and lateral epicondylitis, DeQuervain's disease and carpal tunnel syndrome; and herniated disc injury. All such injuries were recorded only if the worker reported that the injury was diagnosed by a health professional. We also included pain symptomatology without a specific injury diagnosis as a type of injury to include possible injuries that were not yet diagnosed by a health professional. These self-reported painful symptoms included low back pain, neck pain and non-specific.

An injury was defined as any condition or symptom that occurred as a result of hypermarket cashier

work and had at least one of the following effects: the worker had to stop work for at least one day; the worker did not have to stop the activity, but did have to alter it (i.e. fewer hours of activity, or impairment of certain activity gestures); or the worker sought advice or treatment from health professionals to address this condition or symptom (5).

The questionnaire was applied in the workplace by the investigator in the form of a structured interview, which allowed for clarification of any unclear aspects of the questionnaire without interfering with or introducing bias to the patient's answers.

Phalen's test

Workers may not know which disease they had, since the types of disease in the questionnaire could only be diagnosed by a health professional (except for painful symptom disorders). Therefore, soon after the application of the questionnaire, a simple test was performed by the investigator (physiotherapist) to detect the presence of carpal tunnel syndrome.

Carpal tunnel syndrome is a compressive neuropathy of the median nerve that is associated with numbness and tingling in the median nerve distribution of the hand (17). Symptoms include past and/or current nocturnal and/or diurnal numbness, tingling, burning or pain involving at least one of the first three fingers (15).

Phalen's test is performed with wrist flexion that is used to increase pressure in the carpal canal onto the median nerve, thereby eliciting symptoms consistent with carpal tunnel syndrome in affected individuals (17). The study of Wiesman et al. showed that Phalen's test had a sensitivity of 85% and specificity of 90% for diagnosis of carpal tunnel syndrome (24).

To perform Phalen's test, the individual performed maximum flexion of both wrists, placing the dorsum of one hand against the dorsum of the other hand, with shoulders in flexion and an abduction of 90°. This position was maintained for 60 seconds. The test is considered positive when there is numbness and tingling in the palmar region of the 1st, 2nd and 3rd fingers, and the radial half of the fourth finger (17).

Data analysis

Descriptive statistics were first obtained for all variables in the study, followed by calculation of incidence and prevalence.

Next, the injury proportion (IP) and injury rate (IR) were calculated. To determine the IP, the total number of participants who had at least one injury during the past 6 months was divided by the total number of workers. The IR refers to the total number of injuries, divided by total time that the hypermarket cashier was exposed to risk (normally per 1,000 hours). The calculation of the total hours of work over a 6-month period was done by multiplying the total average hours of work per week by the average number of times worked per week, the value of which was then multiplied by the 6-month period (26 weeks) (3).

The influence of the included variables on the presence of injury was assessed using binary logistic regressions, based on the Enter methods, and crude and adjusted odds ratios (by sex and age) and the respective CIs were calculated.

A final multivariate model was developed using the Forward Likelihood Method, and its validity, quality of fit and predictive capacity were assessed by the Omnibus and Hosmer-Lemeshow tests, and the Nagelkerke correlation coefficient.

For all inferential analysis, statistical significance was set at $p < 0.05$.

Statistical analysis was performed with the *Statistical Package for Social Sciences* (SPSS), version 24.0.

RESULTS

As the directors of most hypermarkets refused to participate in the study, our sample consisted of 176 hypermarket cashiers that worked in the south of Portugal, with the majority being female (167; 94.9%) and few being men (9; 5.1%). Ages ranged between 18 and 65 years old (39.57 ± 11.11).

Of the hypermarket cashiers in this study, 53 (30.1%) worked in the Albufeira region, 51 (29%) in Portimão, 31 (17.6%) in Faro, 30 (17%) in Loulé, 7 (4%) in Silves and 4 (2.3%) in Lagoa.

In the sample, 32 individuals (18.2%) had worked as cashiers for between 6 to 12 months; 11 (6.3%)

for more than 1 year and up to 2 years; 11 (6.3%) for more than 2 years and up to 3 years; 13 (7.4%) for more than 3 years and up to 6 years, and 109 individuals (61.9%) had worked as cashiers for more than 6 years. The number of hours on the job per week varied between 5 and 40 (31.89 ± 8.83).

In regards to professional status, 90 (51.1%) cashiers worked part-time, while 86 (48.9%) worked full-time. 57 (32.4%) worked in fixed shifts, while 119 (67.6%) worked in rotating shifts.

The workers were questioned about the position they adopt most frequently during the work period. 114 (64.8%) reported that they worked more in the standing position, while 62 (35.2%) assumed the seated posture with more frequency.

The majority of hypermarket cashiers did not have other employment, 151 (85.8%), while 25 (14.2%) workers did have other employment.

As regards physical activity, 46 (26.1%) answered that they exercised at least twice a week, while 130 (73.9%) did not.

The results of Phalen's test were positive in 57 (32.4%) hypermarket cashiers.

In the 6-month period of the study, 100 individuals (56.8%) reported having been injured at work. Out of these, 51 (29%) reported only one injury; 33 (18.8%) reported two; 15 (8.5%) reported three; and only 1 individual (0.6%) reported four or more injuries. The total number of injuries was 166.

Figure 1 shows the prevalence of injuries reported and analysed in this study (current; over the last 6 months; over the last 12 months; over the entire employment).

Of the individuals who presented injuries within the last 6 months, 14 (8%) said that they were unable to work because of injury.

A proportion of 0.57 (CI 95%: 0.22-1.35) injuries per hypermarket cashier per 6 months was measured. The resulting injury rate was 1.14 injuries per 1,000 hours of work.

The average number of injuries per worker (total number of injuries/total number of practitioners) was 0.94, and the average number of injuries per injured worker (total number of injuries/total number of injured practitioners) was 1.66.

Table 1 shows relative and absolute frequencies of the type and location of the injuries. Each worker

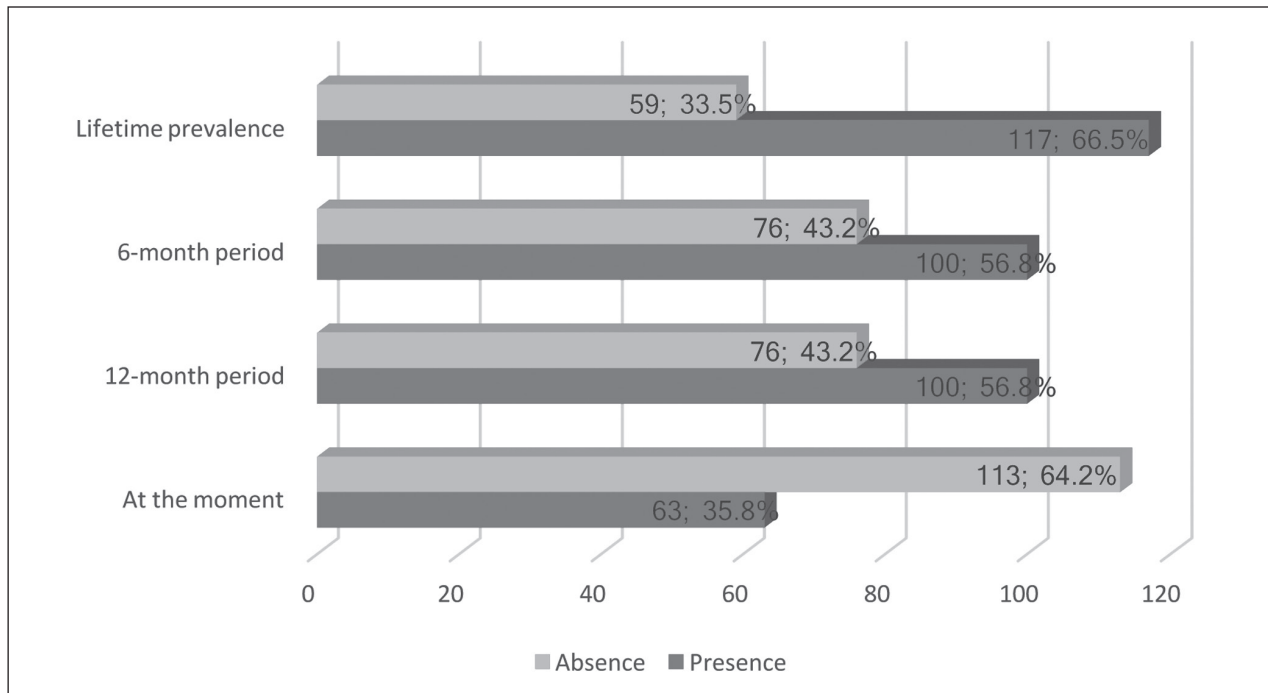


Figure 1 - Prevalence of injuries in hypermarket cashiers

was allowed to describe a maximum of three injuries. Table 1 accounts for a total of 168 injuries (only one cashier mentioned four or more injuries).

One hundred and seventeen injured cashiers (69.6%) underwent some type of treatment. Of these, 68 (58.1%) rested or took medication; 25 (21.4%) did physiotherapy; 9 (7.7%) resorted to nonconventional therapies; 4 (3.4%) had surgery; 2 (1.7%) were immobilized for a period of time; and 1 (1.8%) had another type of treatment.

Table 2 shows the relationship between the occurrence of injury over the last 6-month period and sex, age group, professional situation, years on the job, shifts and job position, obtained by application of the binary logistic regression model.

The final model was considered mathematically valid, but had a relatively weak predictive capacity (Omnibus, Hosmer-Lemeshow and Nagelkerke: $p=0.000$, $p=0.596$ and $R^2=0.089$).

It was found that, adjusted by sex and age, hypermarket cashiers who worked part-time had a 2.25 times higher probability of being injured (95% CI: 1.17-4.32; $p=0.015$) than those who worked full-time. Additionally, individuals who had worked for

more than 6 years had a 3.59 times higher probability of injury (95% CI: 1.84-6.99; $p\leq 0.001$) than those who had worked for a shorter period.

DISCUSSION

The data from this study showed a high prevalence of injuries in hypermarket cashiers. Similar prevalence values in 6- and 12-month periods were obtained. Data from the study by Sansone et al. revealed that 46.4% of 196 cashiers reported shoulder pain (19). Panzone et al. found that 74% of 100 supermarket cashiers showed disorders of the upper limbs (16). Silva et al. evaluated 66 supermarket cashiers and verified that all workers presented some self-reported symptoms of musculoskeletal pain (21).

Cashiers perform repetitive movements to execute their job. Although scanning and handling products is a light manual task, these repetitive movements without an adequate period of rest can cause musculoskeletal disorders and discomfort (11).

Musculoskeletal injuries can result from an early inflammatory response following repetitive and/or

Table 1. Type and location of injury

Type of injury	Location of injury	Number	%
Non-specific pain	Thorax	4	
	Shoulder	16	
	Arm	4	
	Elbow	1	
	Wrist	14	
	Hand-Fingers	4	
	Pelvis	1	
	Thigh	1	
	Knee	2	
	Leg	4	
	All	51	30.4
Cervical pain	Cervical spine	37	22.0
Low back pain	Lumbar spine	37	22.0
Tendinopathy	Shoulder	20	
	Arm	1	
	Elbow	1	
	Wrist	2	
	All	24	14.3
Bursitis	Shoulder	1	0.6
Capsulite	Shoulder	1	0.6
Epicondylitis	Elbow	4	2.4
Herniated disc	Thorax	1	0.6
Arthroses	Shoulder	1	
	Knee	1	
	All	2	1.2
Carpal tunnel syndrome	Wrist	10	6.0
Any type of injury	Cervical spine	37	22.0
	Thorax	5	3.0
	Lumbar spine	37	22.0
	Shoulder	39	23.2
	Arm	5	3.0
	Elbow	6	3.6
	Wrist	26	15.5
	Hand-Fingers	4	2.4
	Pelvis	1	0.6
	Thigh	1	0.6
	Knee	3	1.8
	Leg	4	2.4
	All	168	100.0

forceful tasks. If inflamed tissue continues to receive these continuous demands, a chronic inflammatory process may result (25). Wilander et al. found increased levels of IL-12, MIP-1 β and CRP in the serum of supermarket cashiers (25).

The inadequate time for rest can be due to the pressure of customers wanting increasingly faster service. Some studies have shown that psychological factors, such as time pressure and expectations from customers, may contribute to the development

Table 2. Relationship between the event, the presence of injury and variables about non-modifiable sample factors and cashiers characteristics

Variables	OddsRatio _{crude} (CI 95%); p-value	Odds Ratio _{adjusted} ^{***} (CI 95%); p-value
Sex (male)* female	1.69 (0.44-6.52); 0.446	---
Age group (until 39 years)* more than 39 years	1.51 (0.83-2.75); 0.178	---
Professional situation (full-time)* part-time	1.73 (0.95-3.15); 0.075	2.25 (1.17-4.32); 0.015
Years of job (until 6 years)*more than 6 years	3.00 (1.56-5.64); 0.001	3.59 (1.84-6.99); <0.001
Shifts (rotating)* fixed L	1.32 (0.69-2.52); 0.396	---
Job position (standing)* seated	1.64 (0.87-3.09); 0.130	---

*Class reference; **Enter model; *** Forward LR model

or worsening of musculoskeletal injuries. The study by Lundberg et al. showed that work stress was associated with muscle tension and pain symptoms, through measurements such as blood tests of catecholamine levels, heart rate, electromyography and blood pressure (12). In our study, it was not possible to measure these variables.

The data of our study showed that cashiers who have been working for a higher number of years are more likely to develop injuries compared with cashiers that have worked for less than 6 years, pointing to the trend of chronicity of repetitive strain injuries. The study by Barbieri et al. also verified that the workers who had more years on the job showed more musculoskeletal disorders (average length of service 20 years) (2).

Our study demonstrated that cashiers who worked part-time had a higher probability of being injured than those who worked full-time. The same conclusions were obtained in the study by Barbieri et al. which verified that the highest number of disorders were observed in part-time workers (2). These results may be explained by the fact that it is unknown what the worker does during the rest of the day when not working, possibly having another occupation/job or playing some sport which can lead to injury. However, results of the study by Bonfiglioli et al. showed that carpal tunnel syndrome symptoms were higher in full-time workers (31%) than in part-time ones (19.3%) (4).

Although we observed a greater probability of injuries in part-time workers, the design of our study (cross-sectional) does not allow us to affirm a causality between the presence of injuries and part-

time occupation. Longitudinal studies are needed to confirm whether part-time work status is responsible for the occurrence of injuries, or whether some workers have chosen part-time work because of his or her susceptibility to musculoskeletal pain or because they had a pre-existing injury.

The principal anatomy locations affected by injuries were the shoulder, cervical and lumbar spine and wrist. The grocery scanning task is defined as a light and repetitive manual material handling that involves exerting low force to move products repeatedly from one side of a checkout counter to the other, using the shoulder and trunk flexion. Approximately 50% of a cashier's job is spent scanning or handling products (11). This repetitive task also involves a flexo-extension and radius-ulnar deviation of the wrist while scanning items, which is associated with a static contraction of the shoulder that occurs in cases of workplace irregularities such as a high monitor or unsuitable checkout stand. This requires a greater effort to pick up the goods, weigh them, pass them over the optical reader and enter codes. The cashiers also require wrist extension while operating the keyboard and shoulder flexion and trunk rotation while reaching towards the scale to weigh produce (1).

Repetitive work has been shown to have a relationship with the risk of musculoskeletal injury, but despite the majority of injured workers being referred for shoulder injury, the aetiology and pathogenesis of these shoulder disorders remains controversial and cannot be fully associated with a particular job task (19).

The study by Lundberg et al. revealed that 70% of cashiers, when evaluated by a physiotherapist, pre-

sented neck-shoulder pain and high levels of electromyography (EMG) activity at work and reported more tension after work (12). Barbieri et al. evaluated 173 supermarket cashiers to collect information about pain and paraesthesia in the upper limbs, and the results showed 64% of individuals had disorders of the upper limbs, mainly in the shoulder (2). The study by Panzone et al. revealed that the majority of the disorders affected the shoulder and wrist (16).

Low back pain and neck pain were the most frequent types of injuries. In this study, most cashiers revealed that they assumed the standing posture more frequently. This posture reduces muscle activity and joint excursion in the shoulders and upper limbs (7) and provides a more stable condition for the lower back by preserving the natural lordosis of lumbar spine (11). However, in the standing position, the load on the neck and back is increased because the cashier looks downwards most of the time and bends frequently (7).

Working in a sitting position causes an increase in muscular strain on the shoulders and trunk because the shoulders are subjected to a greater muscle effort and the trunk torsion movement is performed more often (7). Besides that, the sitting posture is associated with greater intervertebral disc pressure, which can cause low back pain. The advantages of the sitting posture are lower energy consumption compared to the standing posture and less stress on the lower extremity joints (11). The ideal scenario is alternating between the standing and sitting postures.

Most of the cashiers who reported injury underwent some type of treatment (70%) and 8% said that they were prevented from working due to the injury. According to the World Health Organization (27), work-related health problems result in an economic loss of 4-6% of the gross domestic product (GDP) for most countries, and about 70% of workers don't have any insurance to maintain an income in the case of an occupational injury. As such, epidemiological analysis of musculoskeletal injuries in workers is urgent in order to avoid compromising the health and quality of life of the workers, protect their income and prevent an increase in the State's expenditure on health care and medicines, since the majority of cashiers require some medicine and physiotherapy services.

Despite the fact that the majority of workers seek some form of treatment, many may not see a health professional in cases where it is possible to perform self-care and medication. Indeed, Phalen's test results were positive in 32% of hypermarket cashiers but only 6% of workers had carpal tunnel syndrome diagnosis, with the majority reporting non-specific pain without a diagnosis. Although Phalen's test had a high sensitivity and specificity (24), this does not allow for a diagnosis of carpal tunnel syndrome. The diagnosis of carpal tunnel syndrome must be made by imaging and other exams such as electromyography and nerve conduction velocity (15, 17). Margolis and Kraus evaluated the prevalence of self-reported symptoms of carpal tunnel syndrome and verified these symptoms in 62.5% of workers (13).

This study presents some limitations because an interview as a data collection approach relies on the participant's memory, and thus may not be objective. Furthermore, as the reported injuries were not evaluated by health professionals, the reliability of their classification may be questionable.

Another limitation of the study was the non-random selection of the sample and calculation of the population. We had great difficulty in collecting the data, since most hypermarket establishments did not approve the study, making it necessary to widen the sample.

Although the data collection instrument that was used was evaluated by a panel of experts and submitted to a pre-test, it is not validated. However, previously validated questionnaires on injuries in cashiers were not available, thus we chose to create one. It is necessary to carry out future studies for the validation of measurement instruments that can quantify and classify the injuries in market cashiers.

No national studies have been found that evaluate musculoskeletal injuries in cashiers, and international studies are still scarce. To our knowledge, this survey is the first Portuguese study of this nature. Thus, it is necessary to carry out more studies to expand the knowledge of injuries associated with the cashier job, and on their prevention, and also to provide more detailed information on the movements that potentially cause most of these injuries using an ergonomic evaluation. Research has demonstrated that preventive programs can reduce sick

leave absenteeism by 27% and health-care costs for companies by 26% (27).

CONCLUSIONS

The data obtained in this study showed a high rate of injuries in the analysed sample of hypermarket cashiers. The most common injuries were non-specific pain, cervical pain and lumbar pain, located in the shoulder and the cervical and lumbar spine.

Regarding risk factors, it was observed that hypermarket cashiers who work part-time showed a greater probability of injury than those who work full-time, and cashiers who have more years in the profession also have a higher probability of injury than those who have worked for a shorter period.

It is necessary to carry out more studies to expand the knowledge of injuries associated with the cashier job, and on their prevention, and to provide more detailed information on the movements that potentially cause most of these injuries.

NO POTENTIAL CONFLICT OF INTEREST RELEVANT TO THIS ARTICLE WAS REPORTED BY THE AUTHORS

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INTERNATIONAL COMMISSION ON OCCUPATIONAL HEALTH
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