

# Work-Related Shoulder Lesions and Labor Lawsuits in Brazil: Cross-Sectional Study on Worker Health Actions Developed by Employers

Reinaldo Biscaro, Luciano R. Ferreira, Leonardo C. Biscaro, Raphael C. Biscaro, Isabela S. Vasconcelos, Laura C. R. Ferreira, Cristiano M. Galhardi, Erica P. Baciuk

**Abstract**—Introduction: The present study had the objective to present the profile of workers with shoulder disorders related to labor lawsuits in Brazil. The study analyzed the association between the worker's health and the actions performed by the companies related to injured professional. The research method performed a retrospective, cross-sectional and quantitative database analysis. The documents of labor lawsuits with shoulder injury registered at the Regional Labor Court in the 15<sup>th</sup> region (Campinas - São Paulo) were submitted to the medical examination and evaluated during the period from 2012 until 2015. The data collected were age, gender, onset of symptoms, length of service, current occupation, type of shoulder injury, referred complaints, type of acromion, associated or related diseases, company actions as CAT (workplace accident communication), compliance of NR7 by the organization (Environmental Risk Prevention Program - PPRA and Medical Coordination Program in Occupational Health - PCMSO). Results: From the 93 workers evaluated, there was a prevalence of men (58.1%), with a mean age of 42.6 y-o, and 54.8% were included in the age group 35-49 years. Regarding the length of work time in the company, 66.7% have worked for more than 5 years. There was an association between gender and current occupational status ( $p < 0.005$ ), with predominance of women in household occupation (13 vs. 2) and predominance of unemployed men in job search situation (24 vs. 10) and reintegrated to work by judicial decision (8 vs. 2). There was also a correlation between pain and functional limitation ( $p < 0.01$ ). There was a positive association of PPRA with the complaint of functional limitation and negative association with pain ( $p < 0.04$ ). There was also a correlation between the sedentary lifestyle and the presence of PCMSO and PPRA ( $p < 0.04$ ), and the absence of CAT in the companies ( $p < 0.001$ ). It was concluded that

the appearance or aggravation of osseous and articular shoulder pathologies in workers who have undertaken labor law suits seem to be associated with individual habits or inadequate labor practices. These data can help preventing the occurrence of these lesions by implementing local health promotion policies at work.

**Keywords**—Work-related accidents, cross-sectional study, shoulder lesions, labor lawsuits.

## I. INTRODUCTION

IN spite of all the existing legislation, which involves the environmental and working conditions, the incapacity for work is now becoming an important social problem, increasing the number of labor lawsuits [1].

According to some authors [2], Brazil is one of the leaders in the number of individual labor lawsuits that occurred between 2001 and 2016, with 2 million cases per year. Among the health-related labor lawsuits, shoulder injuries occupy the 9<sup>th</sup> place in the granting of disability benefits nationwide, and the first in the State of São Paulo [3].

Health promotion can be considered the most relevant strategy of the health sector at work, to avoid the high prevalence of shoulder lesions related to work, and to carry out an interdisciplinary dialogue in order to prevent the occurrence of these diseases. The promotion of workers' health consists of actions aimed at employees for the adoption of healthy, individual and collective practices in the work environment. These actions should interfere in the environment and work organization and require the involvement and the commitment of several people, including the administration personal, the local manager, the staff, the workers and their representatives [4].

The workplace is considered a strategic space to stimulate changes to healthy habits including adequate ergonomic layout, health promotion and, consequently, generate a better quality of life for workers. There are currently discussions on many ways to promote the improvement of health and safety in a work environment. In this scenario, the present study aimed to identify the profile of workers with shoulder disorders, who had undertaken judicial labor action against their employees, and analyze the relationship between their health and the actions of the companies with the injured professional.

R. Biscaro is with the School of Medicine and Interdisciplinary Masters Program of the Centro Universitário das Faculdades Associadas de Ensino (UNIFAE), São João da Boa Vista-SP Brazil (phone: 55353713-8697; fax: 55353713-8697, e-mail: vascularbiscaro@uol.com.br).

L. R. Ferreira is with the School of Medicine and Interdisciplinary Masters Program of UNIFAE, São João da Boa Vista- SP Brazil (e-mail: lresendeferreira@hotmail.com).

L. C. Biscaro is with the Masters Program in International Sports Law of the University of Lleida, Spain (e-mail: leonardobiscaro@gmail.com).

R. C. Biscaro, I. S. Vasconcelos are with the School of Medicine of Jundiaí, Jundiaí-Brazil (e-mail: raphaelbiscaro@yahoo.com.br; isa.svasc@gmail.com).

L. C. R. Ferreira is with the Faculty of Medical Sciences of Sao Jose dos Campos - Humanitas, Sao Jose dos Campos-SP, Brazil (e-mail: lauracrferreira11@hotmail.com).

C. M. Galhardi is with the School of Medicine of the Centro Universitário das Faculdades Associadas de Ensino (UNIFAE), São João da Boa Vista-SP Brazil (e-mails: medcmg@gmail.com).

E. P. Baciuk is with the School of Physical Therapy, Research Group on Health and Quality of Life, and the Interdisciplinary Masters Program of the Centro Universitário das Faculdades Associadas de Ensino (UNIFAE), São João da Boa Vista-SP Brazil (e-mail: erica@fae.br).

## II. METHODS

We have selected active labor lawsuits registered in the labor courts that were submitted to an occupational medical evaluation between the years of 2012 and 2015, with the description of shoulder injury, at the Regional Labor Court in the 15<sup>th</sup> region (Campinas - São Paulo - Brazil). Processes that were under the secrecy of justice and processes that did not contain the information necessary for the minimum development of the present study were excluded.

The variables studied were the characteristics of the workers in the legal proceedings, the complaints referred to in the proceedings, the main results of the physical examination of the workers when the expert medical examination attached to the process, and the actions of the Department of Health and Safety of the organization (compliance with NR7) identified in the processes.

The characteristics of the workers identified in the judicial processes were gender; age in full years; occupational function or profession; time of performance in the company categorized from zero to one year, from one to five years, and more than five years; current occupation, categorized as at home (household), retired due to disability, retired by length of work, professional work rehabilitation, reintegrated (reinstated) by judicial decision (law order), unemployment insurance, unfit to work, other disability benefit, looking for a job, and retirement benefit; type of shoulder injury categorized as infraspinatus and supraspinatus tendinopathies, bursitis, synovitis, arthritis, and arthroplasty; time of function at the beginning of the complaints, categorized by up to one year, from one to five years, from five to 10 years, and more than 10 years. The reported clinical complaints were identified and classified as pain, functional limitation and/or low self-esteem.

Regarding the physical examination of the workers based on the expert medical examination attached files, the results of specific shoulder tests performed were shown which identified the relationship between the alleged clinical complaint and the presence or not of functional limitation, the acromion type, and associated diseases. The presence of a positive result was identified and recorded in the number of tests described as positive, categorized as none, one to two, and three or more. Specific shoulder tests that were considered include Neer Impact Test, Hawkins-Kennedy Impact Test, Yokum Impact Test, Supraspinatus Test, Jobe's Test, Speed or Palm Up Test, Spinal Examination, Patter's Test, Gerber Test, Abdominal Press test, Seizure Test, Fukuda Test, Drawer Test, Acromion Groove Test, Gerber Test, and Neer Impact Test. The type of worker's acromion was classified as type I, type II and type III. And, the associated diseases considered were diabetes, hypertension and dyslipidemias. In addition, the presence of a sedentary life or the absence of regular physical activity of the workers, in this context, is considered as risk factors for the aggravation of osseous and articular pathologies.

The study involved the revision of the actions performed by the companies in compliance with the regulatory legislation (NR 7) which included: risk exposure assessment and removal from risks; registration of Communication of Work-related Accidents (CAT); Ergonomic assessment of all working posts;

Worksite physical activity; Medical Coordination Program in Occupational Health (PCMSO); and Environmental Risk Prevention Program (PPRA).

The data contained in the selected labor lawsuits were collected and recorded in a form, previously prepared by the researchers. For data analysis, all completed paper questionnaires were compiled through the Centers for Disease Control and Prevention (CDC) program, EPI Info<sup>TM</sup> version 7.2.0.1, for Windows.

The descriptive statistical analyzes were used to describe and summarize the data sets. Descriptive statistics provide simple summaries of the sample and of the observations that were made [5].

For the analysis of the results obtained among the several variables, the chi-square test was used through the Centers for Disease Control and Prevention (CDC) program, EPI Info<sup>TM</sup> version 7.2.0.1, for Windows [6].

For all analyzes,  $\alpha$  of 5% was determined, and significant differences were considered when  $p < 0.05$  [7]. This study was approved after analysis through UNIFAE Ethical Committee no. 01163018.2.0000.5382.

## III. RESULTS

From the 93 workers with shoulder lesions who had labor lawsuits included in the present study, there was a predominance of men (58.1%). The mean age of the sample was  $42.6 \pm 9.4$  years, and 54.8% ( $n = 51$ ) were in the age range of 35-49 years. With regard to the time of operation in the company, 66.7% ( $n = 62$ ) presented more than five years. Regarding the time of exercise in the function at the beginning of the complaints, 40.9% ( $n = 38$ ) presented between one and five years in the function. Regarding the complaints, 49.5% ( $n = 46$ ) reported pain and 47.3% ( $n = 44$ ) functional limitation. The characterization of workers with pathology of shoulder lesions included in the present study that were in labor lawsuits is presented in Table I.

There was a significant relationship between gender and current occupational status ( $p < 0.005$ ), with predominance of women in household occupation (13 vs. 2) and predominance of men in the job search situation (24 vs. 10) and reinstated by law determination (8 vs. 2) (Table I).

There was also a significant difference ( $p < 0.01$ ) in the reported complaints and the current occupation situation, with the pain associated with the home situation (9 vs. 6), job seeking (27 vs. 5) or retired due to length of service (4 vs. 3). Furthermore, the functional limitation associated with the disability retirement (1 vs. 0), retired receiving social security (6 vs. 0), unfit for work (1 vs. 0), social security does not release to return (1 vs. 0), in professional rehabilitation (8 vs. 4), reinstated by Law Order (10 vs. 0) and receiving unemployment insurance (3 vs. 2) (Table I).

Regarding the results of the workers' medical examination, 41.9% ( $n = 39$ ) did not present positive tests in the shoulder evaluation, 29% ( $n = 27$ ) had one to two positive tests and 29% ( $n = 27$ ) of three positive tests or more. In relation to the type of acromion, 67.8% ( $n = 63$ ) presented type I acromion, 19.4% ( $n = 18$ ) acromion type II, 2.2% ( $n = 2$ ) 8% ( $n = 10$ ) did

not present a diagnosis with the type of acromion in magnetic resonance imaging. With regard to associated diseases, 21.5% (n = 21) had hypertension, 2.2% (n = 2) presented diabetes and 1.1% (n = 1) dyslipidemia, and 68.8% (n = 64) were sedentary or not practicing regular physical activity.

Regarding the actions of the company's Department of Health and Safety, in compliance with NR7, 62.4% (n = 58) had an indication of workers' removal from work or risk. Only 36.6% (n = 34) of the companies presented an ergonomic report, 46.2% (n = 43) presented worksite physical activities, although 95.7% (n = 89) presented the Medical Coordination Program in Occupational Health (PCMSO) and 93.6% (n = 87) presented the Environmental Risk Prevention Program (PPRA).

When checking the relation of the clinical complaint referred to the actions of the Department of Health and Safety of the company, there was a positive association of PPRA to the complaint of functional limitation and negative association with pain (p <0.04).

There was an association between the presence of sedentary lifestyle or absence of regular exercise practice among workers with upper limb pathology who are in labor court proceedings and the presence of PCMSO and PPRA in companies, both with p <0.04. However, there was an association between the presence of sedentary lifestyle or absence of regular exercise among workers with upper limb pathology who are in labor court proceedings and the absence of CAT (p <0.001); that is, of the 64 sedentary workers which are in labor court proceedings, only 29 had the issue of CAT by the company, against 35 that did not.

When comparing the exercise time in the function from when the complaints began and the time of performance in the company, there was a positive association (p <0.0001) between the time of one to five years in the company with complaints beginning with up to one year in the company. Of the 29 employees with one to five years of service in the company, 15 filed a complaint within a year of their duties; and from the 62 employees with more than five years of employment with the company, 27 employees with one to five years of working experience and 23 with five to 10 years on the job had complaints related to shoulder pain.

#### IV. DISCUSSION

The present study shows a predominance of men among workers with pathology of shoulder lesions who were involved in labor judicial lawsuits, with the majority in the 35-49 year age group and with more than five years of working in the company. These data may be a cause of great social concern, since they are people who should be at the peak of their productive capacity, many of whom are likely to be responsible for family support.

Some authors [8] have studied the influence of gender on professionals working with meat packing, and concluded that women have approximately 30% less strength in their hands, both dominant and non-dominant, than men, and a higher percentage of pain when exposed to repetitive jobs, with identical tasks.

Other researchers [9], [10] studying music teachers, have presented in their works that when it comes to the physical demands of the upper limbs, it seems that women have a higher frequency of complaints. However, other studies have not demonstrated differences between gender [11].

TABLE I  
 CHARACTERIZATION OF WORKERS WITH SHOULDER LESIONS WHO ARE IN LABOR LAW SUITS

Variables (Items)	Variables (Subtype)	Number of Workers	(%)
Gender	Female	39	41.9
	Male	54	58.1
Age (mean ± SD)		42.6 ± 9.4	
Age group (years-old)	20  --  34	20	21.5
	35  --  49	51	54.8
	50  --  65	22	23.7
Time in the company	Up to 1 year	2	2.2
	1 to 5 years	29	31.2
	More than 5 years	62	66.7
Time in function at the beginning of complaints	Up to 1 year	22	23.7
	1 to 5 years	38	40.9
	5 to 10 years	26	28.0
	More than 10 years	7	7.5
Referred complaints	Low self esteem	1	1.1
	Pain	46	49.5
	Functional limitation	44	47.3
	Other	2	2.2
	Retirement for Disability	1	1.1
	Retired by Length of Work	7	7.5
	Sick Leave Benefit	6	6.5
Current Occupation/Status	At home (Household)	15	16.1
	Unfit for Work	1	1.1
	Other Disability Benefit	1	1.1
	Looking for a job	34	36.6
	Work Rehabilitation	13	14.0
	Reinstated by Law Order	10	10.8
	Unemployment insurance	5	5.4

Data presented by number and frequency (percentage). Statistical analyses performed by  $\chi^2$  (Chi-Squared). Significant differences were made at p<0.05.

In regard to the referred complaints, there was a balance between pain and functional limitation. However, when compared to the current occupational situation, pain is associated with the home situation, looking for a job or retired due to length of service, and the functional limitation associated with disability retirement, receiving social security benefits, not being able to work, pension does not release to return, in professional work rehabilitation, reinstated by law order and receiving unemployment insurance. This suggests that the pain reported by the worker does not seem to receive a welcome within the policies of health and care, and reintegration of the worker.

The subjectivity of pain still generates a lot of discomfort to professionals who have the need to issue a functional or expert report. Among the most commonly used methods for assessing pain and functional limitation are the Nordic Musculoskeletal Questionnaire, the Karasek Demand-Control Questionnaire [12]-[14], and the Work Capability Index (ICT) [14], [15]. For the physical examination, the most commonly used methods are inclinometer, electromyography, goniometer, dynamometer and analog pain scale (VAS) [8], [16], [17].

Regarding the results of the medical examination of the workers, it was observed that the number of workers with negative tests in the evaluation of the shoulder, the majority of

the workers presenting acromion type I, considered of lower incidence for clinical complaint of shoulder discomfort, added to the presence the lack of regular physical activity, in addition to being associated with the absence of CAT, it can be inferred that factors related to individual habits or inappropriate work practices can be considered as risk factors for the onset or aggravation of bone and joint pathologies. These results strengthen the idea of the need for a more effective preventive practice in the work environment, both in relation to conducting periodic medical examinations, medical monitoring, ergonomic study in the workplace and the practice of work gymnastics, even if the vast majority attend the Occupational Health Medical Coordination Program (PCMSO) and the Environmental Risk Prevention Program (PPRA).

Since the 1980s, with the advent of work-related musculoskeletal disorders, symptoms of pain and functional limitation were related to the overload of structures, whether by repetitive movements or by vibratory movements, among others. In turn, it can be perceived more markedly when associated with sedentary lifestyle [18]. With the introduction of adequate work-related ergonomics, with the aim of exercising mainly the most demanding structures in the work environment, a reduction of painful symptoms and a better quality of life among the workers was observed [18], [19].

With respect to the actions of the Department of Health and Safety of the company, in compliance with NR7, it is observed that they comply with the legislation; however, few seem to assume the real commitment to promote worker's health. There is a deficiency in the number of companies presenting the ergonomic report and worksite physical activities among their preventive actions, despite the existence of the Medical Coordination Program in Occupational Health (PCMSO) and the Program of Prevention of Environmental Risk (PPRA) in most of them.

The positive association between the time of exercise in the function at the beginning of the complaints and the time of performance in the company seems to demonstrate that the labor practices and the strategies developed to follow the health of the workers do not present themselves effectively, of the legislation in force.

The study of the work environment and the elaboration of an ergonomic report as predicted by NR 17, contributes to this establishment of a cause-and-effect relationship regarding the lesion of the upper limb studied.

The positive association of PPRA to the complaint of functional limitation and negative association with pain may suggest that the companies act when in the presence of functional limitation. Pain seems to be neglected within programs that should care for workers' health. This attitude demonstrates that the disease-centered culture still remains, and that despite the 30 years of the Unified Health System, the National Health Promotion Policy is very new, with only 10 years of existence [3], even more recent within the context of worker health.

The results of the present study demonstrated the need for an educational posture that aims to promote healthy habits

such as regular physical activity, to prevent complaints of pain or functional limitation related to conditions attributed exclusively to the work environment, which are often presented in the wrong way.

Despite the specific regulations issued by the Ministry of Labor and Employment, many companies do not comply with those regulations and contribute to the increase of injured workers and unfolding public health policies. There is a need for improved monitoring and implementation of better working conditions and environments, both by the Ministry of Labor (auditors-fiscals) and by the Unified Health System (SUS), and by its state or municipal health surveillance units [20], [21].

It is well known that disease prevention is more effective when working to promote healthy attitudes, through health education and the promotion of habits, these practices should be increasingly incorporated into the work environment in order to prevent shoulder lesions resulting on the job.

## V. CONCLUSION

It can be concluded that workers with upper limb pathologies, especially shoulder lesions, who are in labor judicial lawsuits, are young adults who should be at the peak of their productive capacity, which may represent a relevant social problem.

A balance was observed between the complaints reported by the workers. The functional limitation is associated with the unfolding and objective actions of reintegration of the worker, whereas the referred pain does not seem to receive a reception within the policies of health and the care of the worker by the companies.

It is concluded that the appearance or aggravation of shoulder pathologies of workers who have undertaken labor lawsuits, seem to be associated with individual habits or inadequate labor practices. These can be avoided by implementing local health promotion policies.

## ACKNOWLEDGMENT

We thank the Regional Labor Court in the 15<sup>th</sup> region (Campinas - São Paulo - Brazil). for assistance in accessing the database information used in this study. We would also like to show our gratitude to the members of the CNPq Research Group (Grupo de Pesquisa do CNPq) in Health and Quality of Life in Complex Societies (Saúde e Qualidade de Vida nas Sociedades Complexas) of the Centro Universitário das Faculdades Associadas de Ensino - FAE.

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