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Evaluation of musculoskeletal symptoms and of work ability in a higher education institution

Avaliação dos sintomas osteomusculares e da capacidade para o trabalho em uma instituição de ensino superior

Denise Hollanda Iunes[a], Melissa Louyse Duarte[a], Leticia do Vale Pereira[a], Murilo César do Nascimento[a], Valdeci Carlos Dionisio[b]*

[a] Universidade Federal de Alfenas (Unifal), Alfenas, MG, Brazil
[b] Universidade Federal de Uberlândia (UFU), Uberlândia, MG, Brazil

Abstract

Introduction: Work-related musculoskeletal disorders (WMSDs) represent a significant object of study for the field of occupational health, as they can lead to absenteeism, compensation costs and different levels of functional disability. Nonetheless, there are few studies assessing WMSDs in public higher education institutions. **Objective**: The present study aimed to investigate, describe and correlate musculoskeletal symptoms and work ability of staff members of the Federal University of Alfenas (Unifal-MG), in the state of Minas Gerais, Brazil. **Materials and methods**: A descriptive and correlational study was conducted with 213 professors, 188 administrative technicians and 124 outsourced staff members using two self-administered questionnaires: the

* DHI: PhD, e-mail: denise.iunes@unifal-mg.edu.br
MLD: undergraduate student, e-mail: melissalouyseduarte@hotmail.com
LVP: undergraduate student, e-mail: letspereira@hotmail.com
MCN: PhD student, e-mail: murilo@unifal-mg.edu.br
VCD: PhD, e-mail: vcdiosnisio@gmail.com

Work Ability Index (WAI) and the Nordic Musculoskeletal Questionnaire (NMQ). **Results**: Most of the teaching staff presented good work ability 47.9% (n = 102). Among administrative technicians and outsourced staff, on the other hand, excellent work ability predominated, with 43.6% (n = 82 technicians) and 51.61% (n = 68 outsourced). The most affected region among professors and administrative staff was the neck/cervical area 36.15% (n = 77 professors); and 28.19% (n = 53 technicians). Among outsourced staff, the lower back was reported as the main source of pain, with 23.28% (n = 29). **Conclusions**: The presence of pain interfered in the work ability of workers regardless of the affected region. Having another occupation outside the institution did not influence pain of self-assessed staff members. The work ability of Unifal-MG staff was classified as good or excellent; thus, we recommend preventive work for this population, directed at the physical and mental aspects of work activities in order to maintain or improve such rates.

Keywords: Cumulative trauma disorders. Work capacity evaluation. Occupational health.

Resumo

Introdução*: Os distúrbios osteomusculares relacionados ao trabalho (Dort) representam preocupação para a saúde ocupacional, uma vez que geram absenteísmo, custos com indenizações, além de diferentes graus de incapacidade funcional. Mesmo assim, são escassos os estudos que os tenham avaliado em instituições públicas de ensino superior.* ***Objetivo****: Este trabalho buscou investigar, descrever e correlacionar os sintomas osteomusculares e a capacidade para o trabalho dos servidores da Universidade Federal de Alfenas (Unifal-MG), no estado de Minas Gerais.* ***Materiais e métodos****: Estudo descritivo-correlacional, que caracterizou 213 professores, 188 técnicos administrativos e 124 funcionários terceirizados, por meio de dois questionários autoaplicáveis: o Índice de Capacidade para o Trabalho (ICT) e o Questionário Nórdico de Sintomas Osteomusculares (QNSO).* ***Resultados****: A maioria dos professores apresentou boa capacidade para o trabalho 47,9% (n = 102). Já entre os técnicos administrativos e funcionários terceirizados, predominou ótima capacidade com 43,6% (n = 82 técnicos) e 51,61% (n = 68 terceirizados). As regiões mais acometidas por dor entre os professores e os técnicos administrativos foram o pescoço/região cervical 36,15% (n = 77 docentes); e 28,19% (n = 53 técnicos). Já a região lombar foi a que se destacou entre os terceirizados como a principal fonte de dor, 23,28% (n = 29).* ***Conclusões****: A presença de dor interfere na capacidade de trabalho do indivíduo, independente da região acometida. A ocupação externa não influenciou o estado doloroso dos servidores autoavaliados. A capacidade dos colaboradores da Unifal-MG foi classificada como boa ou ótima, por isso sugere-se um trabalho preventivo, com abordagem nos aspectos físicos e mentais da atividade laboral, visando a manutenção ou melhoria desse índice.*

Palavras-chave*: Distúrbios osteomusculares relacionados ao trabalho. Avaliação da capacidade de trabalho. Saúde do trabalhador.*

Introduction

Occupational diseases have been recognized by the Brazilian Ministry of Health (1, 2) since 2004 and when such diseases specifically affect the musculoskeletal system, they are denominated work-related musculoskeletal disorders (WMSDs) (1). WMSDs account for most leaves of work (2-6) and compensation costs (3, 4), both in Brazil and in most industrialized countries (1, 7-10). Furthermore, WMSDs can lead to different levels of functional disability, being considered a severe problem within the field of worker health (5, 11, 12, 13). A WMSD diagnosis is complicated and frequently delayed, as it is based only on patient complaints, which cannot always be verified (13, 14). This characteristic makes treatment difficult and strongly influences the conduct of workers in and out of the work environment (1, 15-18).

Work ability is the result of combined human resources in terms of physical, mental and social work demands, organizational culture and work environment (19). Reduced work ability is a process of

functional aging that should occur concomitant with chronologic aging. However, in some cases, it occurs precociously due to work conditions (2). Therefore, evaluating work ability in order to identify its premature decline is of extreme importance for the implementation of prevention measures for improving working conditions and avoiding the development of WMSDs (5, 16, 20).

Although research has found a great prevalence of WMSDs among workers in general, there are no studies investigating the work environment of public higher education institutions. Thus, the present study aimed to investigate, describe and correlate musculoskeletal symptoms and work ability of teaching and administrative staff at a Brazilian higher education institution.

Materials and methods

This was a descriptive and correlational study on the relationship between work ability and musculoskeletal symptoms, among 615 staff members of the Federal University of Alfenas (Unifal-MG), Campus I, Alfenas, in the state of Minas Gerais, Brazil. The study sample comprised 214 professors, 188 administrative technicians and 124 outsourced staff, both men and women, from all work shifts. Of the 615 participants, 90 were lost to sample attrition. Inclusion criteria were being a staff member at the referred institution and willing to participate. Exclusion criteria were having less than a primary level of education and/or being on medical leave of absence or vacation at the time of data collection.

Two self-administered questionnaires were employed: The Work Ability Index (WAI) (21) and the Nordic Musculoskeletal Questionnaire (NMQ) (22). The WAI was developed based on studies conducted in Finland and was transculturally adapted to Brazilian Portuguese by Tuomi et al. (21). The translated Portuguese version presented acceptable levels of reliability tested through internal consistency (Cronbach's alpha 0.72) (23) and test-retest with internal consistency of 0.84 ($CI_{95\%}$ 0.78 to 0.88; $p < 0.001$) (24). Cultural validation of the WAI for the Brazilian population took place by comparing it to the Medical Outcomes Study 36 – Item short form health survey (SF-36) (23).

The WAI assesses work ability based on worker self-perception (25), determined by seven items that investigate ability, health, state of mind and work impairment (13, 21). The NMQ was developed by Dickinson et al. (22) and was culturally adapted to Brazil by Barros (26). Both the original and the Brazilian version presented good levels of reliability, confirmed through test-retest, and satisfactory levels of validity (26, 27, 28). The NMQ was developed with the purpose of standardizing the measurement of reported musculoskeletal symptoms and thus facilitate comparability among studies (28).

Most of the questionnaires were given in person to each staff member in their respective departments and work shifts. In some cases, when a particular staff member was difficult to find, they were contacted via e-mail. Questionnaires were then given to the department secretaries or sent by e-mail, according to participant preference. All questionnaires were collected a week after delivery.

The data were analyzed using the SPSS version 18.0 (Statistical Package for the Social Science), and R software, version 2.14. A chi-square test was employed and significance was set at 5% to verify differences among the results of the three observed groups (professors, administrative technicians and outsourced employees). The present study was approved by the research ethics committee (protocol no. 019/2010); all participants received information on the objectives of the research and regarding data confidentiality and signed an informed consent form.

Results

The characteristics of the studied sample are described in Table 1. The results show that most of the assessed sample consisted of internal staff (professors and administrative technicians).

Work ability indexes were heterogeneous among the investigated professional categories, as displayed in Figure 1. Most staff members presented good and excellent work ability.

In order to assess the regions most affected by pain, the results were analyzed in two subgroups: absent or rare pain and, in the other subgroup, frequent or constant pain, according to each professional category. The results demonstrate that the most affected regions among professors and administrative technicians were neck/cervical region, shoulders, lower back, hips/lower limbs and upper back. Other frequently reported areas by administrative

technicians were wrists/hands/fingers. Among outsourced staff, the most reported sites were the lower back, shoulders and hips/lower limbs. Forearms and elbows were the least affected regions in all three groups (Figure 2).

Table 2 presents the NMQ data and its association with the obtained WAI scores. The results indicate that the presence of pain, regardless of the affected region, interferes with the work ability of staff members.

Table 3 displays the relationship between presence of pain, measured with the NMQ, and whether or not participants held other jobs outside the institution. In other words, having an occupation external to the institution did not influence the pain experienced by staff members.

Table 1 - Sample characteristics

Staff profile		Professor	Technician	Outsourced
		(n = 213)	(n = 188)	(n = 124)
Gender	Female	106 (49.76%)	105 (55.85%)	76 (61.29%)
	Male	107 (50.23%)	83 (44.14%)	48 (38.7%)
Age group	18-27 years	04 (1.87%)	21 (11.17%)	16 (12.9%)
	28-37 years	47 (22.06%)	30 (15.95%)	23 (18.54%)
	38-47 years	54 (25.35%)	46 (24.46%)	31 (25%)
	48-57 years	27 (12.67%)	29 (15.42%)	15 (12.09%)
	58-67 years	08 (3.75%)	09 (4.78%)	3 (2.41%)
	68-77 years	01 (0.46%)	00 (0%)	0 (0%)
Time of service at institution	Less than 5 years	67 (31.45%)	72 (38.29%)	66 (53.22%)
	5 to 15 years	75 (35.21%)	114 (75.59%)	37 (29.83%)
	More than 15 years	70 (32.86%)	0 (0%)	17 (13.7%)

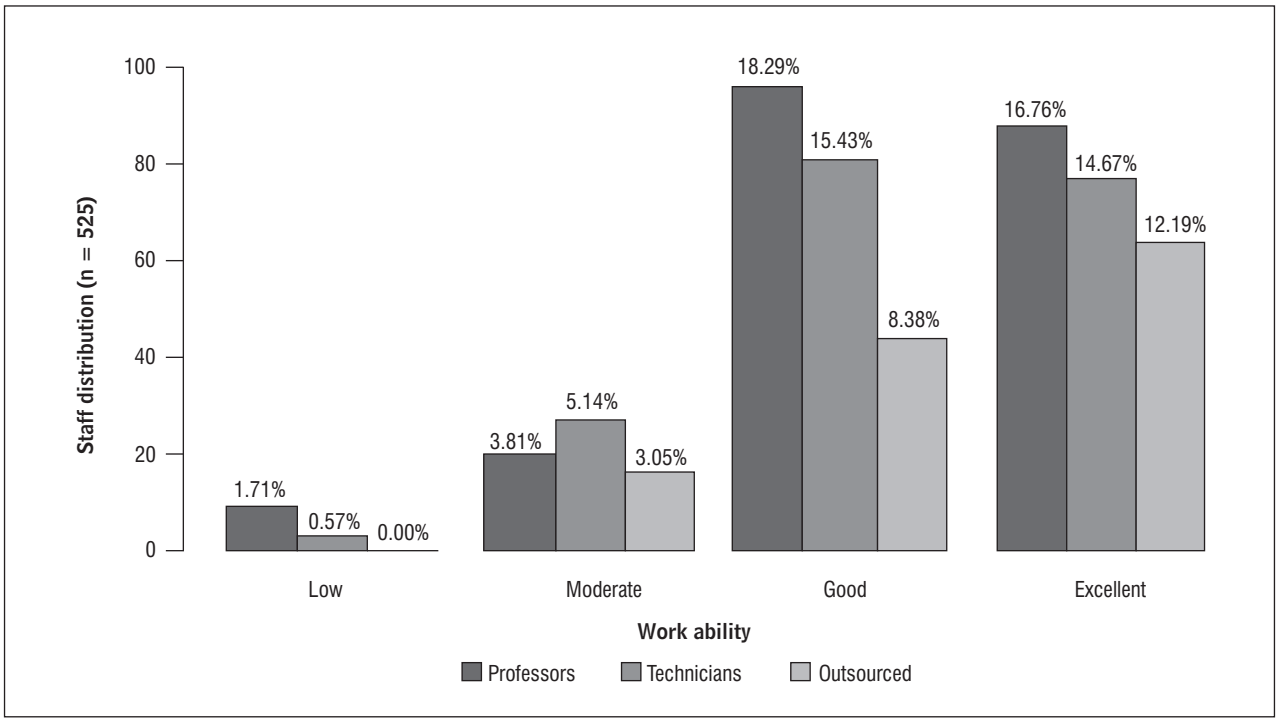

Figure 1 - Work Ability Index of Unifal-MG staff (Campus I, Alfenas, Minas Gerais, Brazil)

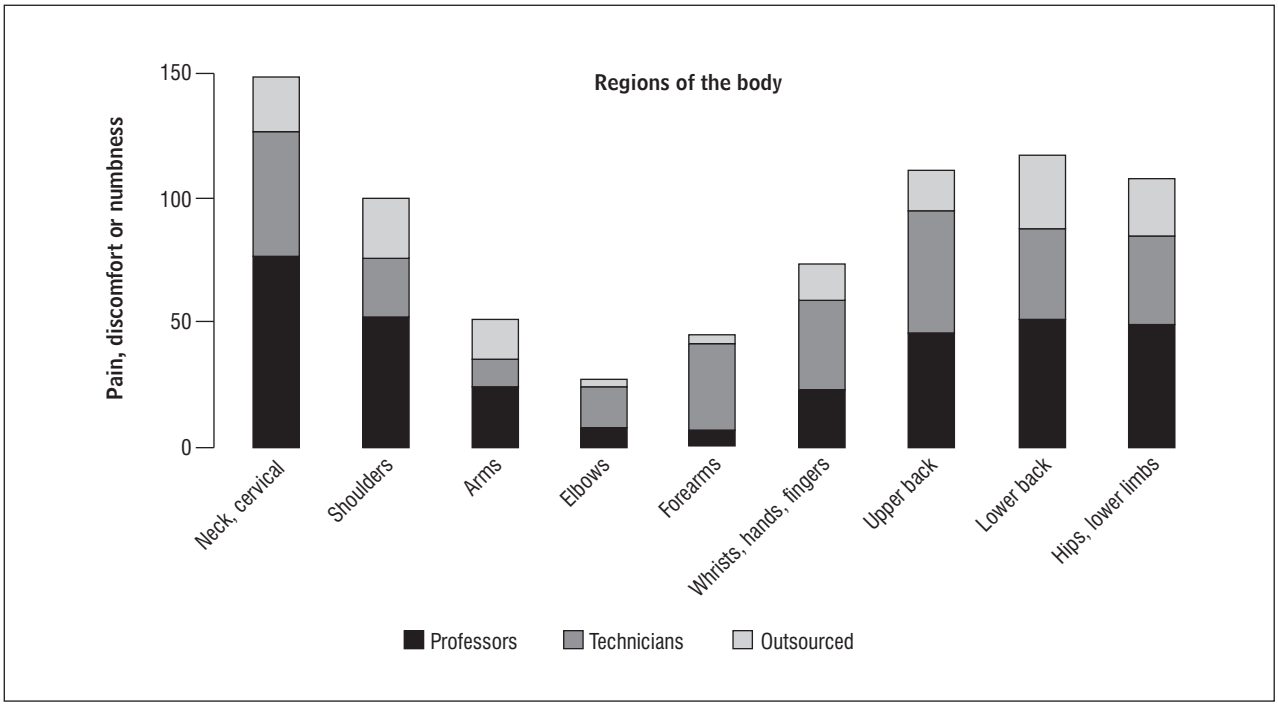

Figure 2 - Regions most affected by pain, discomfort or numbness among Unifal-MG staff (Campus I, Alfenas, Minas Gerais, Brazil)

Table 2 - WAI score and presence of pain among Unifal-MG staff (Campus I, Alfenas, Minas Gerais, Brazil)
(To be continued)

Regions	Pain	WAI Score				Total	*p* value
		1	2	3	4		
Neck/cervical region	Absent or rare pain	0	39	133	201	373	< 0.0001*
	Frequent or constant pain	4	26	85	37	152	
	Total	4	65	218	238	525	
Shoulders	Absent or rare pain	0	40	157	202	399	< 0.0001*
	Frequent or constant pain	4	25	61	36	126	
	Total	4	65	218	238	525	
Arms	Absent or rare pain	0	52	188	221	461	< 0.0001*
	Frequent or constant pain	4	13	30	17	64	
	Total	4	65	218	238	525	
Elbows	Absent or rare pain	1	59	206	236	502	< 0.0001*
	Frequent or constant pain	3	6	11	2	22	
	Total	4	65	217	238	524	
Forearms	Absent or rare pain	1	59	205	234	499	<0.0001*
	Frequent or constant pain	3	6	13	4	26	
	Total	4	65	218	238	525	

Table 2 - WAI score and presence of pain among Unifal-MG staff (Campus I, Alfenas, Minas Gerais, Brazil)

(Conclusion)

Regions	Pain	WAI Score				Total	*p* value
		1	2	3	4		
Wrists/fingers/hands	Absent or rare pain	1	49	179	223	452	< 0.0001*
	Frequent or constant pain	3	16	39	15	73	
	Total	0	65	218	238	525	
Upper back	Absent or rare pain	1	49	167	211	428	< 0.0001*
	Frequent or constant pain	3	16	51	27	97	
	Total	4	65	218	238	525	
Lower back	Absent or rare pain	1	36	156	202	395	< 0.0001*
	Frequent or constant pain	3	29	62	36	130	
	Total	4	65	218	238	525	
Hips/lower limbs	Absent or rare pain	0	38	166	212	416	< 0.0001*
	Frequent or constant pain	4	27	52	26	109	
	Total	4	65	218	238	525	

Note: *$p < 0.05$.

Table 3 - Presence of pain and performance of other professional activities of Unifal-MG staff (Campus I, Alfenas, Minas Gerais, Brazil)

(To be continued)

Regions	Pain	External Occupation		Total	*p* value
		Yes	No		
Neck/cervical region	Absent or rare pain	309	61	370	0.7493
	Frequent or constant pain	122	27	149	
	Total	431	88	519	
Shoulders	Absent or rare pain	329	68	397	0.9591
	Frequent or constant pain	102	20	122	
	Total	431	88	519	
Arms	Absent or rare pain	381	76	457	0.7217
	Frequent or constant pain	50	12	62	
	Total	431	88	519	
Elbows	Absent or rare pain	413	84	497	0.9698
	Frequent or constant pain	17	4	21	
	Total	430	88	518	

Table 3 - Presence of pain and performance of other professional activities of Unifal-MG staff (Campus I, Alfenas, Minas Gerais, Brazil)

(Conclusion)

Regions	Pain	External Occupation		Total	*p* value
		Yes	No		
Forearms	Absent or rare pain	411	83	494	0.8866
	Frequent or constant pain	20	5	25	
	Total	431	88	519	
Wrists/fingers/hands	Absent or rare pain	373	75	448	0.8752
	Frequent or constant pain	58	13	71	
	Total	431	88	519	
Upper back	Absent or rare pain	350	73	423	0.8148
	Frequent or constant pain	81	15	96	
	Total	431	88	519	
Lower back	Absent or rare pain	330	62	392	0.2805
	Frequent or constant pain	101	26	127	
	Total	431	88	519	
Hips/lower limbs	Absent or rare pain	345	68	413	0.6577
	Frequent or constant pain	86	20	106	
	Total	431	88	519	

Discussion

The relationship observed between physical and mental capacity and respective work ability points to the importance of a psychological and biological approach to enhancing adaptation to the work environment. An example of such interaction was described by Silva et al. (29), who found that the fear generated by potential loss of employment due to illness was a cause of suffering that was not shared with colleagues and, in some cases, not even with family members. In the present research, two of the three groups, that is, professors and administrative technicians, consisted of staff members who were admitted via civil service examinations, which implies professional stability. Such job security may have positively influenced the emotional component and, consequently, work ability, which was good or excellent in 86.78% of the sample population.

Comparing the work ability observed in this study, we cite the work of Freude et al. (30) who found excellent WAI scores in only 3% of secondary school teachers; most of the cases in the study (30) presented good work ability, followed by moderate and poor. It is worth emphasizing that preventive actions for such conditions should be implemented before workers begin the retirement process. Considering the population of administrative technicians, a study conducted by Martinez and Latorre (31) with workers from the same sector found a greater prevalence of excellent work ability, followed by good, consistent with the findings of the present study. Martinez and Latorre (31) also found that work ability results were associated with job satisfaction among staff members, which interfered in their physical and mental abilities.

In terms of the areas most affected by muscle pain among Unifal-MG professors, the results were similar to those of Carvalho and Alexandre (9), who studied primary school teachers and found a greater occurrence of pain in the wrists/hands, lower back, upper back, and cervical region. Fernandes et al. (11) found a

high prevalence of musculoskeletal symptoms among teaching staff, with symptoms in 93% of the teachers in the study. The affected regions also converged, namely the upper back, lower back and cervical region. Carvalho and Alexandre (9) also demonstrated that such musculoskeletal discomfort influenced these workers' quality of life, as a great portion of professionals had sought care from some health professional. The same can be said of the current study, as data crossing between NMQ and WAI results revealed that regardless of the affected region, pain exerted a negative influence on the work ability of staff members.

Regarding administrative technicians, the most affected regions were the neck/cervical, shoulder, lower back, hips/lower limbs, upper back, and wrists/fingers/hands. Other studies conducted with office workers found that workers reported the neck (20, 32) and shoulders (20) most frequently. De Vitta et al. (15) found that raising awareness among employees regarding the adoption of new postures and the organization of the work environment resulted in reduced frequency of musculoskeletal symptoms. Analysis of the outsourced staff in the present study demonstrated that the most affected sites were the lower back, shoulder and hips/lower limbs. In studies conducted by Martarello and Benatti (33) in a public municipal hospital with hospital hygiene and sanitation staff, the most prevalent pain complaints involved the shoulders, followed by the dorsal region, neck and lower back. Widanarko et al. (8) also reported that workers with high physical demands had a higher prevalence of pain in the neck, shoulders and lower back.

The present study did not corroborate the recurring argument that length of work shift in addition to other jobs can influence work ability due to muscle overload and fatigue, favoring the development of musculoskeletal symptoms. The results obtained did not show any connection between variables. Nonetheless, Fernandes et al. (11) suggested that the high prevalence of musculoskeletal symptoms among female teachers can be related to the "double burden" imposed on this population and emphasized the need for further research in this direction in order to deepen the discussion.

The present study revealed that the work ability of Unifal-MG staff was classified as good or excellent. Therefore, only preventive work is necessary with the purpose of improving or maintaining such rates. The authors recommend that extension projects be implemented (with preventive measures such as exercise in the workplace, massage therapy and postural orientation) aimed at preventing the development of musculoskeletal symptoms and maintain the levels of work ability found among staff members. Finally, we also suggest a follow-up study to verify the contribution of such preventive action, comparing work ability and musculoskeletal symptoms among the same population after the application of these techniques.

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