

MUSCULOSKELETAL SYMPTOMS IN SERVERS OF A BRAZILIAN PUBLIC UNIVERSITY: AN ERGONOMIC STUDY

Sintomas osteomusculares de servidores de uma universidade pública brasileira: um estudo ergonômico

Síntomas osteomusculares de empleados de una universidad pública brasileña: un estudio ergonómico

Original Article

ABSTRACT

Objective: To determine the prevalence of musculoskeletal symptoms and possible relations with the working conditions of teachers and administrative staff of a Brazilian public university. **Methods:** Cross-sectional analytical study conducted with 105 servers of the Universidade Estadual do Sudoeste da Bahia (UESB - Southwest Bahia State University), using a structured instrument for collecting information on the labour organization and the participants' sociodemographic profile. The Nordic Musculoskeletal Questionnaire (NMQ), a previously validated tool, was used in the musculoskeletal symptoms evaluation. The Shapiro-Wilk test was used to check normality of data, and the Pearson's chi-square test or Fisher's exact test for hypothesis testing, at 5% significance level. **Results:** Participants worked on average 5 ($\pm$ 6.04) years in UESB, their mean age was 39.01 ($\pm$ 11.03) years, and 53.3% (n=56) were female. All featured some pain in the musculoskeletal system. Consultations with health professionals were more evident among the administrative staff than in teachers (p=0.04). The working arrangements (working hours) under an exclusive contract (EC) and 40 hours per week were correlated considering the domains of the Nordic Questionnaire only in the group of teachers. In the previous seven days, there were differences between the groups of teachers (EC versus 40h) in symptoms of the shoulders (p=0.008) and upper back (p=0.004), and of the elbow (p=0.01) and wrist/hand (p=0.004) in relation to consultation with a health professional. **Conclusion:** There is a high prevalence of musculoskeletal complaints in this sample, regardless of being a teacher or an administrative server, being possibly related to the working conditions, meaning that there are workplace inadequacies.

Descriptors: Human Resources; Signs and Symptoms; Working Conditions.

RESUMO

Objetivo: Verificar a prevalência de sintomas osteomusculares e as possíveis relações com as condições de trabalho de servidores de uma universidade pública brasileira. **Métodos:** Estudo transversal e analítico com 105 servidores da Universidade Estadual do Sudoeste da Bahia (UESB), utilizando um instrumento estruturado para coleta de informações sobre organização do trabalho e perfil sociodemográfico dos participantes. Na avaliação dos sintomas musculoesqueléticos, utilizou-se o Questionário Nórdico de Sintomas Osteomusculares (QNSO), ferramenta já validada. Na análise e interpretação dos dados, utilizou-se o Teste de Shapiro-Wilk para avaliar a normalidade dos dados, e o Teste Qui-quadrado de Pearson ou Exato de Fisher para o teste de hipóteses, com nível de significância de 5%. **Resultados:** Os participantes trabalharam em média 5 ($\pm$ 6,04) anos na UESB, tinham idade média de 39,01($\pm$ 11,03) anos e 53,3% (n=56) eram do sexo feminino. Todos apresentavam alguma dor no sistema osteomuscular. As consultas com profissionais de saúde foram mais evidentes entre os servidores administrativos do que entre os professores (p=0,04). Os regimes de trabalho (horas de trabalho) de dedicação exclusiva (DE) e 40h semanais foram correlacionados considerando os domínios do Questionário Nórdico apenas no grupo dos professores. Nos sete dias precedentes, houve diferença entre os grupos de professores (DE versus 40h) nos sintomas apresentados nos ombros (p=0,008) e parte superior das costas (p=0,004), além de cotovelo (p=0,01) e punho/mão (p=0,004) em relação à consulta com algum profissional de saúde. **Conclusão:** Existe uma grande prevalência de queixas musculoesqueléticas nessa amostra, independentemente de ser professor ou servidor administrativo, podendo-se relacioná-las com as condições de trabalho; ou seja, há inadequações laborais.

Descritores: Recursos Humanos; Sinais e Sintomas; Condições de Trabalho.

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RESUMEN

Objetivo: Verificar la prevalencia de síntomas osteomusculares y las posibles relaciones con las condiciones de trabajo de empleados de una universidad pública brasileña. **Métodos:** Estudio transversal y analítico con 105 empleados de la Universidad Estadual del Sudoeste de Bahía (UESB), utilizando un instrumento estructurado para la recogida de informaciones sobre organización del trabajo y el perfil sociodemográfico de los participantes. Para la evaluación de los síntomas musculoesqueléticos se utilizó el Cuestionario Nórdico de Síntomas Osteomusculares (CNSO), herramienta ya validada. Para el análisis e interpretación de los datos, se utilizó la prueba de Shapiro-Wilk para evaluar la normalidad de los datos y la prueba del Chi-cuadrado de Pearson o Exacto de Fisher para testar las hipótesis, con nivel de significancia del 5%. **Resultados:** Los participantes trabajaron una media de 5 ($\pm 6,04$) años en la UESB, tenían edad media de 39,01 ($\pm 11,03$) años y el 53,3% ($n=56$) eran del sexo femenino. Todos presentaron algún dolor en el sistema osteomuscular. Las consultas con los profesionales de salud fueron más evidentes en los empleados administrativos que los profesores ($p=0,04$). Las horas de trabajo de dedicación exclusiva (DE) y 40h semanales estuvieron correlacionados solamente en el grupo de profesores considerando los dominios del Cuestionario Nórdico. En los siete días precedentes, hubo diferencia entre los grupos de profesores (DE versus 40h) en los síntomas presentados en los hombros ($p=0,008$) y la parte superior de la espalda ($p=0,004$), además del codo ($p=0,01$) y puño/mano ($p=0,004$) respecto la consulta con algún profesional de salud. **Conclusión:** Existe una prevalencia elevada de quejas músculo esqueléticas en la muestra independiente del hecho de ser profesor o empleado administrativo, lo que se puede relacionar a las condiciones de trabajo, o sea, existen inadecuaciones laborales.

Descritores: Recursos Humanos; Signos y Síntomas; Condiciones de trabajo.

INTRODUCTION

The working man, activity and environment are elements that constitute the work situation⁽¹⁾. However, the big problem in modern society is the inadequacy of jobs, which is reflected in the imbalance of the triad: requalification, health and productivity. In this imbalance, many people remain rejected by the productive system or at its margins as it does not always consider the work variability and the worker as a subject of the process of productive restructuring⁽²⁾.

The work can cause health risks to workers through physical and/or mental stress, causing damages to functionality and consequent loss of labor capacity, with social and personal alterations⁽¹⁾.

The individual way of performing a task, psychosocial variables (such as dissatisfaction with the work), and repetitive movements and inadequate static postures are risk factors at work that may generate high tension and muscle and joint overload^(3,4).

Currently, the structural wear of the musculoskeletal system affects professional categories and have many denominations such as repetitive strain injury (RSI) and work-related musculoskeletal disorders (WMSDs), adopted by the Ministry of Health (MH) and by the Ministry of Social Welfare (MSW). RSI and WMSDs are damages that relate and are caused by the excessive use of the musculoskeletal system and the lack of time for recovery. They are characterized by the occurrence of multiple symptoms of insidious onset, mainly in the upper body, such as pain, paresthesia, sensation of heaviness and fatigue. They accompany problems acquired by workers exposed to certain working conditions⁽⁵⁾.

Educational institutions are places that favor the development of work-related health problems. The use of computers in almost every sector, for example, can cause rapid and highly repetitive movements, prolonged static postures and musculoskeletal pains due to mechanical stress⁽⁶⁾.

The excessive workload and low pays interfere in the quality of life and emotional status of public servants as extra work interferes in leisure and favors the onset of musculoskeletal symptoms^(7,8). Among them, pain is the most common and internationally recognized symptom people complain of. Furthermore, musculoskeletal disorders represent the main cause for work leaves and high costs for the public health system⁽⁹⁾.

Until today, one of the biggest challenges of ergonomics applied to educational institutions is to conceive or adapt the furniture and educational environment to the great morphological diversity of students⁽¹⁰⁾. This problem becomes worse if we consider that this morphological diversity is also present in teachers and administrative staff.

Thus, it is important to highlight the relevance of the “Ergonomia da Atividade Aplicada à Qualidade de Vida no Trabalho – EAA_QVT” (Activity Ergonomics Applied to Quality of Life at Work), an alternative tool for the diagnosis of job burnout and promotion of wellbeing in organizations⁽¹¹⁾.

In face of the new demands of the work environment, which requires greater dynamics and flexibility, there is a need for continuous structural and administrative adaptations in this place in order to promote worker's health through the prevention of health harms, work accidents, high rates of absenteeism and early retirements. These changes can be made possible through continuous planning

and utilization of ergonomic practices at the workplace oriented by qualified professionals aiming at the promotion of the worker's health⁽¹²⁾.

In view of the great health problems confirmed by scientific literature^(1-4,6-12) and the new actions for promoting the worker's health with a focus on quality of life, this research aimed to verify the prevalence of musculoskeletal symptoms and their possible relationships to the working conditions of workers of a public Brazilian university.

METHODS

This is a quantitative cross-sectional and analytical study conducted in the *Universidade Estadual do Sudoeste da Bahia – UESB* (Southwest Bahia State University), located in the city of Jequié, Bahia, in 2010.

The intentional sample comprised 105 workers divided into two groups: administrative staff (n=56) and professors (n=49) for the comparison of occupational characteristics and work-related symptomatology.

Inclusion criteria were as follows: UESB administrative staff or professors who had been working in the university for more than one year. The study excluded individuals who were not physically and/or mentally able to answer the data collection instruments or those who were on sick leave during the period of data collection.

Data were collected through an author-developed instrument for collecting data on the organization of work and socio-demographic profile. Such information included: work type, sector, previous jobs, permission to drink water or go to the toilet, quantification of pains (very severe/severe, moderate and mild/very mild), period of work when the pain gets worse and the period when they are relieved by rest.

Musculoskeletal symptoms were assessed using the Nordic Musculoskeletal Questionnaire (NMQ) validated in Brazil and widely used in the occupational health field⁽¹³⁾ to assess musculoskeletal symptoms in order to facilitate the comparison of results between studies. The authors of this questionnaire do not recommend it for a clinical diagnosis, but it can serve as an important instrument for the diagnosis of the environment or workplace in the identification of musculoskeletal disorders⁽¹³⁻¹⁵⁾. The instrument is used through multiple or binary indications made by the interviewee regarding the occurrence of symptoms in several anatomical regions in the past 12 months and the seven days before the interview and whether they stopped performing routine activities in the past year.

The questionnaire is composed of demographic, occupational and habits/lifestyle variables. The data

collected relating to these variables were: gender, age, job, time spent on the job and weekly working hours. Regarding the degree of occupational risk: degree=0 if the individual did not perform any of the activities informed and degree=1 if the respondent reported at least one risk factor. In addition to these variables, it also assesses interviewees' perceptions of the relationship between the symptoms and their work, and the degree of severity of the symptoms for each anatomical region (ranging from 0-4: 0=no symptoms; 1=symptoms in the past 12 months *or* seven days; 2= symptoms in the past 12 months *and* seven days; 3=symptoms in the past seven days *or* in the past 12 months *and* discontinuation of activities; 4=symptoms in the past 12 months *and* past seven days *and* discontinuation of activities)⁽¹⁵⁾.

The research was conducted in the *Núcleo de Estudos em Atividade Física e Saúde – NEAFIS* (Physical Activity and Health Research Center), in the *Departamento de Ciências Humanas e Letras – DCHL* (Human Sciences and Languages Department), *Departamento de Ciências Biológicas – DCB* (Biological Sciences Department), *Departamento de Química e Exatas – DQE* (Chemistry and Exact Sciences Department), *Departamento de Saúde – DS* (Health Department) and administrative sectors of the UESB, where the workers were selected and invited to answer the questionnaires.

In the first moment, professionals were approached in the departments or administrative sectors during their work hours. Those who accepted the invitation were sent to the NEAFIS. Next, workers were individually interviewed (research formulary) and then received information about the Nordic Questionnaire. Thus, they reported the signs and symptoms they felt according to the anatomical images.

The Statistical Package for the Social Sciences for Windows, version 17.0, was used for building up the database and performing the analysis of results. Significance level was set at 5%.

Numerical variables were described as mean and standard deviation. Categorical variables were summarized using simple and relative frequencies. Shapiro-Wilk test was used for assessing normality, with data considered normal. Hypotheses relating to categorical variables were assessed using Pearson's chi-squared test or Fisher's exact test when appropriate.

The research was approved by the Research Ethics Committee of the UESB (Protocol No. 132/2008) and respected all ethical precepts according to Resolution 466/12 of the National Health Council, which establishes the principles for research with human beings⁽¹⁶⁾. Additionally, all the participants signed the Free Informed Consent Form (FICF).

RESULTS

Participants presented a mean age of 39.01($\pm$ 11.03) years; 53.3% (n=56) of them were women; they have worked in the UESB for an average of 5 ($\pm$ 6.04) years; and 53.3% (n=56) of respondents performed the same labor functions in other jobs during an average of 3 ($\pm$ 1.93) years. Of all interviewees, 71.4% (n=75) worked 40 hours per week.

Regarding working conditions, 27.6% (n=29) of the workers worked extra hours and 94% (n=99) could stop working to go to the toilet or drink water whenever they needed. Another variable assessed was the presence of varicose veins: 30.5% (n=32) reported having varicose veins (they may be a sign of labor effort); however, only 1.9% (n=2) of the individuals discontinued working because of this problem.

When questioned about the posture in which they would like to work, 2.9% (n=3) of the respondents said they would like to be standing; 11.4% (n=12), sitting; and 85.7% (n=90), alternating these postures. Concerning the body sensation at the end of a work day, 40% (n=42) of interviewees said they feel tired; 16.2% (n=17), very tired; 14.3% (n=15), little tired; 21% (n=22), relieved; and 8.6% (n=9) reported feeling normal.

All the participants presented some type of pain, and the quantification of painful sensations were as follows: 28% (n=29) very severe/severe; 62% (n=66), moderate; and 10% (n=10), mild/very mild.

When questioned about the moment when pains got worse during work, 53.4% (n=56) of the workers said it was during normal work hours; 1.8% (n=2) said it was during extra hours; 5.3% (n=5) during the night (at the end of the work day); and 39.5% (n=42) of the respondents said the pains did not get worse. Concerning pain relief by rest, 64% (n=67) of interviewees said that pains got better during the night; 14% (n=15), during the weekend; 1.8% (n=2), when they alternated activities; 3.6% (n=4), during vacation; and 16% (n=17) of the respondents said the pains did not get better.

No association was found between professions and presence of symptoms assessed by the NMQ, except the occurrence of upper back pain in administrative staff in the previous seven days ($p=0.04$) (Table I).

With regard to “absenteeism in the previous twelve months”, no difference was found between administrative staff and professors. When considering consultations with a health care professional, a difference ($p=0.04$) was observed for upper back pain. The administrative staff sought health care professionals more often when compared to professors (Table II).

Table I - Distribution of musculoskeletal symptoms by body regions according to the Nordic Musculoskeletal Questionnaire (NMQ). Jequié, Bahia, 2010.

Region	Symptoms in the previous 12 months					Symptoms in the previous 7 months				
	Professors		AS		<i>p</i>	Professors		AS		<i>p</i>
	(n=49)		(n=56)			(n=49)		(n=56)		
	%	n	%	n		%	n	%	n	
Neck	44.8	22	37.5	21	0.57	18.3	9	30.4	17	0.15
Shoulder	36.7	18	42.8	24	0.52	20.4	10	35.7	20	0.08
Upper back	28.5	14	35.7	20	0.43	10.2	5	25	14	0.04*
Elbow	4	2	1.7	1	0.48	2	1	7.1	4	0.22
Wrist/hand	28.5	14	17.1	18	0.69	14.2	7	26.8	15	0.11
Low back	44.8	22	18	19	0.25	18.3	9	26.8	15	0.30
Hip/Thighs	12.2	6	9.5	10	0.42	6.1	3	8.9	5	0.58
Knees	32.6	16	13.3	14	0.38	18.3	9	16.1	9	0.75
Ankles/Feet	30.6	15	10.4	11	0.19	12.2	6	8.9	5	0.58

AS= administrative staff

Values adjusted by the Fisher's Exact Test for the association between the presence of symptoms and type of occupation (* $p<0.05$)

Table II - Frequency of leaves and consultations due to symptoms in the previous 12 months according the Nordic Musculoskeletal Questionnaire (NMQ). Jequié, Bahia, 2010.

Region	Work leave					Consultation with a health care professional				
	Professors (n=49)		AS (n=56)		p	Professors (n=49)		AS (n=56)		p
	%	n	%	n		%	n	%	n	
Neck	8.1	4	5.4	3	0.75	8.2	4	19.6	11	0.09
Shoulders	6.1	3	7.1	4	0.83	14.2	7	26.7	15	0.11
Upper back	4	2	3.5	2	0.89	8.1	4	16	9	0.04*
Elbow	0	0	1.7	1	0.34	4	2	1.7	1	0.48
Wrist/hand	10.2	5	5.3	3	0.35	16.3	8	12.5	7	0.57
Low back	8.1	4	8.9	5	0.88	16.3	8	26.7	15	0.11
Hip/Thighs	4	2	10.7	6	0.20	8.1	4	10.7	6	0.65
Knees	4	2	7.1	4	0.50	8.1	4	17.8	10	0.14
Ankles/Feet	6.1	3	0	0	0.06	16.3	8	7.1	4	0.14

AS= administrative staff

Values adjusted by the Fisher's Exact Test for the association between work leave and consultation with type of occupation (*p<0.05)

Table III - Relation between working hours (ED and 40 hours per week) of professors (n=49) according to symptoms and body regions. Jequié, Bahia, 2010.

Region	Symptoms						Leave			Consultation		
	12 months		p	7 days		p	ED		p	ED		p
	ED	40h		ED	40h		ED	40h		ED	40h	
Neck	24.5% (n=12)	18.4% (n=9)	0.25	2% (n=1)	2% (n=1)	0.14*	4.1% (n=2)	4.1% (n=2)	0.23	10.2% (n=5)	8.2% (n=4)	0.11
Shoulders	20.4% (n=10)	16.3% (n=8)	0.38	12.2% (n=6)	2% (n=1)	0.008*	10.2% (n=5)	4.1% (n=2)	0.35	2% (n=1)	4.1% (n=2)	1.02*
Upper back	16.3% (n=8)	12.2% (n=6)	0.13	55.1% (n=27)	4.1% (n=2)	0.004*	6.1% (n=3)	2% (n=1)	0.34	4.1% (n=2)	0% (n=0)	1.30*
Elbow	2% (n=1)	2% (n=1)	0.11	2% (n=1)	0% (n=0)	0.64	2% (n=1)	2% (n=1)	0.11	61.2% (n=30)	38.8% (n=19)	0.01*
Wrist/hand	14.3% (n=7)	14.3% (n=7)	1.04*	10.2% (n=5)	4.1% (n=2)	0.35	8.2% (n=4)	8.2% (n=4)	0.50	6.1% (n=3)	4.1% (n=2)	0.004*
Low back	22.4% (n=11)	22.4% (n=11)	2.10*	10.2% (n=5)	8.2% (n=4)	0.14	10.2% (n=5)	6.1% (n=3)	0.007	6.1% (n=3)	2% (n=1)	0.34
Hip/Thighs	6.1% (n=3)	6.1% (n=3)	0.36	2% (n=1)	4.1% (n=2)	1.04*	4.1% (n=2)	4.1% (n=2)	0.23	4.1% (n=2)	0% (n=0)	1.32*
Knees	22.4% (n=11)	10.2% (n=5)	0.56	16.3% (n=8)	2% (n=1)	1.21*	6.1% (n=3)	2% (n=1)	0.34	2% (n=1)	2% (n=1)	0.11*
Ankles/Feet	20.4% (n=10)	10.2% (n=5)	1.68	8.2% (n=4)	4.1% (n=2)	0.31	10.2% (n=5)	6.1% (n=3)	2.17*	4.1% (n=2)	2% (n=1)	0.30

Exclusive Dedication- ED (n=30) x 40h weekly (n=19). * Values adjusted by the Fisher's Exact Test.

Having an exclusive dedication (ED) contract and working 40 hours per week were only correlated in the group of professors according to the domains of the Nordic Questionnaire, as members of the administrative staff worked 40 hours per week but did not have an exclusive dedication contract. In the previous seven days, there was a difference between the groups of professors (ED versus 40h) regarding shoulder symptoms ($p=0.008$) and upper back symptoms ($p=0.004$), besides elbow ($p=0.01$) and wrist/hand ($p=0.004$) symptoms in relation to a consultation with a health care professional (Table III).

DISCUSSION

The present study verified the prevalence of musculoskeletal symptoms and related them to the working conditions of the participants of a public Brazilian university.

The symptomatology of UESB administrative staff was more prevalent in the upper body, shoulders, neck and upper back during the current year and in the lower back and shoulders during the previous week. These data corroborate the localization of symptoms of office workers of other universities^(4,15). Working as a secretary on a computer generates severe static physical (posture) and cognitive stress⁽¹⁷⁾.

Other studies reveal that administrative technicians of university centers reported feeling musculoskeletal pain in the cervical spine during the previous 12 months and low back pains during the previous seven days. Such work-related symptoms, classified as RSI/WMSDs, decrease effective productivity at work and, if left untreated, they can lead to physical disability^(15,18,19).

Professors also presented musculoskeletal symptoms in the upper body in the previous year. These data are similar to the literature on higher education professors⁽²⁰⁾ and basic education teachers^(21,22) – a fact that some authors relate to movements like trunk rotation, neck inclination and suspension of the upper body during classes, which force the cervical muscles⁽²²⁾.

Considering elementary school teachers and high school teachers from other countries^(9,23), the frequencies of shoulder and neck pains were equally expressive; however, they presented different individual, ergonomic and occupational risk factors: type of school, age, weight, number of students, number of years as a teacher and class methodologies.

In the present research, the incidence of symptoms in the previous 12 months was higher than that during the previous seven days, which may represent a chronicity of the symptoms of these professors. Knee pain was remarkable (approximately 32%) and may represent the efforts in the

orthostatic posture during lecture classes. These complaints are consistent with the increased responsibilities of professors over the years, which relate to the increased number of students and courses and low investments of public Brazilian universities on infrastructure, material and human resources⁽²⁰⁾.

The significant rates of discontinuation of normal activities and consultations with a health care professional suggest an occupational risk for civil servants determined by the loss of health and quality of life⁽²⁴⁾. The absenteeism of professors due to musculoskeletal disorders has already been verified in public Brazilian universities^(7,25,26) and it could be avoided by the incorporation of therapeutic exercises and workplace exercises aiming to strengthen or decompress the mostly common affected muscle groups.

Regarding the previous week, professors complained more of low back pain, but they also complained of pains in the wrist and hands⁽²⁷⁾, which may demonstrate the labor effort of writing on whiteboards or pointing at a slideshow presentation. These results are consistent with pain complaints and sensation of “heaviness” described by professors of another higher education institution⁽⁷⁾.

Concerning the working hours, professors with exclusive dedication to the university felt shoulder and upper back symptoms during the previous seven days more often than those who work 40 hours per week; additionally, they attend consultations with health care professionals due to elbow, wrist/hand symptoms more often. Upper body pain is typical of the teaching work and maybe because of that other studies have shown an association between upper body pain and working for 40 hours or more per week^(25,26).

The comparison between the labor activities of the two professions was made possible because the symptomatology draws attention to the inadequacy of work places. Thus, it was observed in the present study a significant difference only for the symptomatology during the previous seven days and for the high frequency of consultations due to upper back pain in workers. These data may explain the secretarial nature of the administrative work and suggest the ergonomic inadequacy of work instruments that are little used by professors⁽⁴⁾.

It is important to highlight that these symptoms hinder psychosocial wellbeing and quality of life of these individuals. Thus, there is a need for further research on the assessment of ergonomic inadequacies in universities in order to analyze the workplace in detail, as this knowledge is of great importance for the ergonomic adequacy and correction of the several activities performed.

It is important to ponder some limitations of cross-sectional studies using self-report instruments, as there is a bias of simultaneous measurements and, many times, the possibility of interference from unmeasured factors⁽¹⁵⁾.

CONCLUSION

Through this work, it is possible to notice that both administrative staff and professors of a public Brazilian university reported having significant musculoskeletal complaints that directly related to their working conditions, i.e., there are inadequacies at work.

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