

Work Ability and Musculoskeletal Disorders Among Workers From a Public Health Institution

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Objective. The study investigated the associations between diagnosed musculoskeletal disorders (MSD), work ability and demographics, work and lifestyle characteristics in a public health institution with a variety of occupations. **Methods.** A cross-sectional study was carried out in a public health institution in Brazil. The subjects ($n = 168$) aged 20–69 answered a questionnaire on demographics, work, lifestyle characteristics and the work ability index. **Results.** A univariate regression analysis was carried out with the presence of MSD as a dependent variable. Association was found in relation to the age group, type of work demand, tenure at the institution, body mass index, work in the nutrition and laundry sectors, being a maid in the previous job, auxiliary service and auxiliary maintenance occupations, work ability in relation to physical and mental demands, estimated work impairment due to diseases, sick leave in the past year, own prognosis of work ability in 2 years' time and mental resources: enjoying daily activities, being active and alert, being full of hope for the future. **Conclusion.** The presence of MSD affected several aspects of work ability.

work-related musculoskeletal disorders work ability work ability index
cross-sectional studies

1. INTRODUCTION

Musculoskeletal disorders (MSD) represent a significant health problem, one of the most important causes of disability and absenteeism among workers [1, 2]. This negative impact on

work ability justifies choosing this subject to study. However, other aspects unrelated to work are very important, too, e.g., the substantial impact on health-related quality of life [3, 4, 5], because these disorders involve pain and reduce physical functioning.

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Epidemiological studies have showed that a variety of physical and psychosocial workplace factors contribute to their development [6]. Reducing risk factors is an important component of both treatment and prevention. On the other hand, the effect of leisure time and physical activities on musculoskeletal symptoms and disability in worker populations have showed inconsistent results [7]. The high rate of MSD experienced by workers in the health care sector has been a major problem. However, reports in the literature have presented studies specifically focused on nurses [8, 9].

The objective of this study was to investigate the association between diagnosed MSD with work ability, demographics, as well as work and lifestyle characteristics in a public health institution with a variety of occupations.

2. METHODOLOGY

A cross-sectional study was carried out in a public health institution in Brazil and covered all workers, with a variety of occupations: auxiliary service, auxiliary maintenance, attendant, health professional, administrative worker, technician, manual worker and manager. The response rate was 89.4% ($n = 651$). Exclusion criteria for the study included absence when data were collected due to sick leave, holidays or refusal to participate at the study.

All subjects completed a questionnaire. Information was obtained on demographics, work and lifestyle characteristics: current smoking habits, daily number of cigarettes, body mass index (BMI), housework, weekly duration of housework, physical activity and its weekly duration, type of physical activity, leisure time activity and its weekly duration.

Work ability was evaluated with the work ability index (WAI) [10, 11, 12]. It covered seven items: current work ability compared with lifetime best, work ability in relation to job demands, the number of current diseases diagnosed by a physician, estimated work impairment due to diseases, sick leave in the past 12 months, the person's own prognosis of work ability in 2 years' time and mental resources.

The presence of MSD was verified with WAI item 3 as a current disease diagnosed by a physician. The presence of MSD was defined if at least one of seven types of musculoskeletal diseases was reported: disorder of the upper back or cervical spine, disorder of the lower back, sciatica, MSD affecting the limbs, rheumatoid arthritis and other MSD.

The research project was approved by the Ethics Committee of the Federal University of São Carlos, Brazil. All subjects who participated in this study were asked to provide written consent. The characteristics of the subjects who did not participate in the research did not differ from the studied population. The subjects were 20–69 years old.

A descriptive analysis was prepared using Epi-Info version 6.04d. A univariate and multiple logistic regression analysis was carried out with MSD as a dependent variable (SAS version 8.2).

3. RESULTS

The mean (*SD*) age was 43.2 (10.6) years for women and 49.0 (10.7) for men. Women comprised 63.7% of the studied population (Table 1).

A descriptive analysis showed association ($p < 0.05$) between the presence of MSD and the demographic characteristics only by age group: the prevalence rates of MSD increased until the age of 54 and decreased in the oldest age group.

The disease was more frequent among women and married subjects. The prevalence of the disease decreased with an increase in the level of education, from 30.7% in the 4 years category and 22% in the undergraduate course category.

The work characteristics associated with MSD were the type of work (physical > physical/mental > mental), longer tenure at the institution, work sector, no previous job and current occupation. The work sectors with the highest prevalence of disease were nutrition and laundry.

There were no differences in the prevalence of MSD among the subjects that had or did not have another job, independent of the time spent weekly in another job.

TABLE 1. Musculoskeletal Diseases and Demographic, Work and Lifestyle Characteristics

Variable	Category	Musculoskeletal Diseases				P Value	
		Yes		No			Total
		N	(%)	N	(%)		
Age group (years)	20–34	20	(16.8)	99	(83.2)	119	.0026
	35–44	35	(20.3)	137	(79.7)	172	
	45–54	68	(30.0)	159	(70.0)	227	
	55–69	45	(33.8)	88	(66.2)	133	
Work demand	physical	75	(34.1)	145	(65.9)	220	.0021
	mental	24	(19.3)	100	(80.7)	124	
	physical/mental	69	(22.5)	238	(77.5)	307	
Tenure at the institution (years)	<1	7	(7.5)	86	(92.5)	93	.0000
	2–10	49	(25.6)	142	(74.4)	191	
	11–20	43	(26.7)	118	(73.3)	161	
	21–30	65	(36.1)	115	(63.9)	180	
	31–50	4	(15.4)	22	(84.6)	26	
Body mass index*	≤24.9	68	(20.7)	260	(79.3)	328	.0004
	25–29.9	64	(28.8)	158	(71.2)	222	
	≥30	30	(38.5)	48	(61.5)	78	

Notes. *—data missing for 23 subjects.

TABLE 2. Musculoskeletal Diseases and Work Ability Index Items

Variable	Category	Musculoskeletal Diseases				P Value	
		Yes		No			Total
		N	(%)	N	(%)		
Work ability in relation to the physical demands of the work	excellent	31	(15.4)	170	(84.6)	201	<.0001
	good	76	(24.4)	235	(75.6)	311	
	moderate	48	(41.0)	69	(59.0)	117	
	very poor/poor	13	(60.0)	9	(40.0)	22	
Estimated work impairment due to diseases	there is no hindrance	55	(13.6)	350	(86.4)	405	<.0001
	causes some symptoms	37	(37.4)	62	(62.6)	99	
	I must sometimes change my work methods	49	(45.4)	59	(54.6)	108	
	I often change my work methods	12	(70.6)	5	(29.4)	17	
	I can only work part time/I am entirely unable to work	15	(68.2)	7	(31.8)	22	
sick leave (days)	0	115	(22.6)	394	(77.4)	509	.0003
	<15	29	(31.2)	64	(68.8)	93	
	16–24	8	(57.1)	6	(42.9)	14	
	25–99/100–365	16	(45.7)	19	(54.3)	35	
Own prognosis of work ability in 2 years' time	relatively certain	105	(20.0)	420	(80.0)	525	<.0001
	not certain	47	(50.0)	47	(50.0)	94	
	unlikely	16	(50.0)	16	(50.0)	32	
Ability to be active and alert	always	92	(23.0)	308	(77.0)	400	.0312
	rather often	61	(28.2)	155	(71.8)	216	
	sometimes	12	(40.0)	18	(60.0)	30	
	rather seldom/never	3	(60.0)	2	(40.0)	5	
Ability to be full of hope for the future	continuously	70	(20.5)	271	(79.5)	341	.0029
	rather often	54	(30.5)	123	(69.5)	177	
	sometimes	28	(28.9)	69	(71.1)	97	
	rather seldom/never	16	(44.4)	20	(55.6)	36	

The highest prevalence of MSD occurred in maintenance auxiliary (53.3%), service auxiliary (52.0%) and nursing aides (26.0%). The most frequent type of MSD in these occupations were sciatica and neck pain among the auxiliary service; sciatica and arthritis among the maintenance auxiliary and neck pain and arthritis among nursing aides.

In relation to lifestyle characteristics, only BMI > 24.9 was associated with MSD. There were no differences in the distribution of MSD in relation to smoking habits and physical exercise.

The disease was more frequent among subjects who did housework. The proportion of disease increased together with an increase in time spent weekly doing housework (Table 2).

The work ability items associated with MSD were current work ability compared with lifetime best, work ability in relation to the physical demands of the job, estimated work impairment due to diseases, own prognosis of work ability in 2 years' time and mental resources. Current work ability compared with lifetime best varied from 0 to 10. Among the workers with MSD it was 7.9 (*SD* 1.5); among those without the disease it was 8.4 (*SD* 1.2), $p = .0003$ (Table 3).

A univariate regression analysis was carried out using MSD as a dependent variable. The results showed a relation to age >44 years old, the type of work demand (physical worse than mental), longer tenure at the institution, BMI > 24.9, current auxiliary service and maintenance auxiliary service occupation, work in the nutrition and laundry sectors, and being a maid in the previous job.

MSD were associated with the following items of WAI: low work ability in relation to physical and mental demands of work, high estimated work impairment due to diseases, high sickness absence, low own prognosis of work ability in 2 years' time and poor mental resources.

A multiple logistic regression analysis showed association between MSD and longer tenure at the institution (OR 4.7, CI 1.88–12.11), BMI > 24.9 (OR 1.6, CI 1.05–2.60) and high estimated work impairment due to diseases (OR 3.6, CI 2.11–6.24).

TABLE 3. Univariate Logistic Regression Analysis of Demographics, Work, Lifestyle and Work Ability Index Items in Relation to the Presence of Musculoskeletal Disease, Odds Ratio (OR) and Confidence Intervals (CI)

Variable	OR	CI
Age group	2.1	1.21–3.69
Work demand	2.1	1.27–3.64
Tenure at the institution	4.2	1.83–9.78
Body mass index	1.5	1.05–2.31
Work sector: nutrition	1.8	1.02–3.16
Work sector: laundry	5.1	2.82–9.33
Previous job: maid	2.3	1.26–4.25
Occupation: auxiliary service	1.9	1.20–3.31
Occupation: maintenance auxiliary	2.9	1.44–5.99
Work ability in relation to physical demands	1.7	1.11–2.81
Work ability in relation to mental demands	2.0	1.08–3.74
Estimated work impairment due to diseases	3.7	2.31–6.24
Sick leave in the past year	4.5	1.55–13.43
Own prognosis of work ability in 2 years' time	4.0	2.53–6.32
Ability to enjoy daily activities	2.9	1.57–5.36
Ability to be active and alert	2.2	1.03–4.80
Ability to be full of hope for the future	1.7	1.12–2.57

4. DISCUSSION

Because of the multifactorial nature of MSD, it is important to discuss personal factors, too. These include age, gender, smoking, BMI (obesity), socioeconomic status, physical activity, muscle strength and medical history [13, 14, 15]. Work ability is affected for some of these factors, too [16]. In this research association was found in the logistic regression analysis concerning age and BMI, only.

In the European Union a survey conducted in 15 countries in 2000 identified that ~40% of workers ≥ 45 years old reported work-related musculoskeletal symptoms [17].

Weight, height and BMI have been identified as potential risk factors for MSD, especially lumbar disc herniation [14]. However, the data are conflicting.

Other aspects of daily life, e.g., housework and sports, may present physical stresses to the musculoskeletal system [6]. However, we did not find associations between MSD and physical or leisure time activities.

In relation to time devoted to housework, the number of subjects with MSD increased together with the weekly duration of housework, but no statistical association was found.

This study showed an association between MSD and age >44 years and longer tenure at the institution. The relationship between age and some specific factors is well established. For example, the prevalence of back pain increases with age [18]. Osteoarthritis is clearly associated with advancing age. For other diseases, the findings are not clear [12].

MSD occurred more in this study in auxiliary services and maintenance auxiliary services.

There is a consensus that MSD are related to occupational ergonomic stressors such as repetitive motion patterns, forceful exertions, non-neutral body postures and vibration [3]. The risk is pronounced when a job includes a combination of those stressors.

In this study, the prevalence of MSD was higher in the nutrition and laundry sectors, both of which had a high level of physical work demands. Work ability in relation to the physical demands of work was associated with MSD, too.

There is increasing evidence that work-related psychosocial and organizational factors play a role in the development of work-related MSD [19, 20]. The factors most associated are high job demands, few rest breaks, monotonous work, lack of job control, lack of job clarity, low social support and job dissatisfaction [6, 14]. Those specific factors were not investigated in this research. The study was developed at a public institution, which is very bureaucratic, with changes occurring slowly and improvements in the work environment taking a long time. These characteristics may have affected the development of MSD in the organization.

Factors related to medical history have been thought to play a role in the development of musculoskeletal diseases [15]. However, the interpretation of this finding is difficult.

In this study we found that being a maid in the previous job was associated with MSD, maybe because of the high musculoskeletal demand that this work requires.

MSD are potentially disabling conditions. Therefore, approaches to reduce these disorders are promoted in the field of occupational health. The most common strategies include education, training, ergonomics, changes in work organization and life style, and risk management [21].

The findings of this study suggest that the presence of MSD affects several aspects of work ability. Reducing specific risk factors of MSD is an important target of any prevention plan.

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