

Impact of musculoskeletal pain in functional disability

Impacto da dor musculoesquelética na incapacidade funcional

Impacto del dolor musculoesquelético en la incapacidad funcional

Paulo Henrique dos Santos Mota¹, Thais Alves de Lima², Flavia Rupolo Berach³, Ana Carolina Basso Schmitt⁴

ABSTRACT | The objective is to estimate the prevalence of incapacity to perform tasks of daily living and to identify its association with pain and sociodemographic factors. This is a cross-sectional study, with a convenience sample, composed of individuals who actively sought healthcare in a small city with complaints of musculoskeletal pain and difficulties in carrying out activities of daily living. The sample comprised 766 individuals. Questionnaires were applied to assess the degree of difficulty in performing activities of daily living and pain (Nordic Musculoskeletal Complaints Questionnaire and Numerical Pain Scale). The prevalence of disability and pain was estimated, as well as five logistic regression models for disability were constructed considering sex, age, occupation and presence and characteristics of pain. The data found showed that the prevalence of some difficulty in performing activities of daily living was 87.6%, with a lot of difficulty 66.1%; musculoskeletal pain was 67.5%. The individuals were unable to perform 3.6 activities of daily living on average. Pain was the main association factor to explain it (OR 9.9; 95% CI 5.9-16.5), followed by age. Difficulty in performing activities of daily living was associated with pain in the lower limbs, with a frequency greater than four days a week, beginning more than five years ago and severe or unbearable intensity in crisis episodes. The prevalence of disability and pain was high. Musculoskeletal pain and age impacted functional disability. This study contributes to direct the construction of care actions that aim to minimize and prevent difficulties to perform daily tasks.

Keywords | Pain; Statistics on Sequelae and Disability; Public policy.

RESUMO | O objetivo foi estimar a prevalência de incapacidade para realizar tarefas de vida diária e identificar associação com dor e fatores sociodemográficos. Trata-se de um estudo transversal, com amostra de conveniência, composta por indivíduos que buscaram ativamente assistência à saúde em um município de pequeno porte com queixas de dor musculoesquelética e dificuldades na realização de atividades de vida diária. Compuseram a amostra 766 indivíduos. Foram aplicados questionários para avaliar o grau de dificuldade de realização de atividades de vida diária e dor (Questionário Nórdico de Queixas Musculoesqueléticas e Escala Numérica de Dor). Foram estimadas as prevalências de incapacidade e dor, bem como foram construídos cinco modelos de regressão logística para incapacidade considerando sexo, idade, ocupação e presença e características da dor. Os dados encontrados mostraram que a prevalência de alguma dificuldade para realizar atividades de vida diária foi de 87,6%, de muita dificuldade 66,1%; a de dor musculoesquelética foi de 67,5%. Os indivíduos apresentaram incapacidade para realização de 3,6 atividades de vida diária em média. A dor foi o principal fator de associação para explicá-la (OR 9,9; IC_{95%} 5,9-16,5), seguida da idade. A dificuldade na execução de atividades de vida diária foi associada à dor em membros inferiores, com frequência maior que quatro dias na semana, início há mais de cinco anos e intensidade forte ou insuportável nos episódios de crise. As prevalências de incapacidade e dores foram altas. A dor musculoesquelética e a idade impactaram na incapacidade funcional. Este estudo contribui para

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¹Universidade de São Paulo (USP) - São Paulo (SP), Brazil. E-mail: paulohsmota@gmail.com. Orcid: 0000-0003-3507-3958

²Universidade de São Paulo (USP) - São Paulo (SP), Brazil. E-mail: thais.fisiousp@gmail.com. Orcid: 0000-0002-2182-9956

³Universidade de São Paulo (USP) - São Paulo (SP), Brazil. E-mail: flarberach@gmail.com. Orcid: 0000-0003-3273-4482

⁴Universidade de São Paulo (USP) - São Paulo (SP), Brazil. E-mail: carolinaschmitt@usp.br. Orcid: 0000-0003-3685-6735

Corresponding address: Paulo Henrique dos Santos Mota - Rua Cipotânea, 51, Cidade Universitária - São Paulo (SP), Brazil - Zip Code: 056360-160 - E-mail: paulohsmota@gmail.com - Financing source: nothing to declare - Conflict of interests: nothing to declare - Presentation: Jan. 5th 2019 - Accepted for publication: Nov. 28th 2019 - Approved by the Research Ethics Committee of Faculdade de Medicina of Universidade de São Paulo: CAAE No. 07241912.0.0000.0065, process No. 157.036 /12.

direcionar a construção de ações de cuidado que visem minimizar e prevenir dificuldades para realizar tarefas do dia a dia.

Descritores | Dor; Estatísticas de Sequelas e Incapacidade; Políticas Públicas.

RESUMEN | El objetivo fue estimar la prevalencia de incapacidad para realizar tareas de la vida diaria e identificar una asociación con el dolor y los factores sociodemográficos. Este es un estudio transversal, con una muestra de conveniencia compuesta de individuos que buscaron activamente asistencia médica en un municipio de pequeño porte, quejándose de dolor musculoesquelético y dificultades para llevar a cabo actividades de la vida diaria. La muestra comprendió 766 individuos. Se aplicaron cuestionarios para evaluar el grado de dificultad en la realización de actividades de la vida diaria y el dolor (Cuestionario nórdico musculoesquelético y Escala numérica del dolor). Se estimaron las prevalencias de incapacidad y dolor, así como se construyeron cinco modelos de regresión logística para la incapacidad considerando el sexo, la edad,

la ocupación y la presencia y características del dolor. Los hallazgos evidenciaron el 87,6% de prevalencia de alguna dificultad, el 66,1% de mucha dificultad en la realización de actividades de la vida diaria; y el 67,5% de prevalencia de dolor musculoesquelético. Los individuos tuvieron incapacidad en la realización de 3,6 actividades como promedio en la vida diaria. El dolor fue el principal factor asociado para explicarla (OR 9,9; IC_{95%} 5,9-16,5), seguido de la edad. La dificultad para realizar actividades de la vida diaria se asoció con el dolor en los miembros inferiores, con una frecuencia superior a cuatro días a la semana, que había comenzado hace más de cinco años, y de intensidad fuerte o insoportable en los episodios de crisis. Fueron altas las prevalencias de incapacidad y dolor. El dolor musculoesquelético y la edad influyen en la incapacidad funcional. Este estudio puede orientar la elaboración de acciones de cuidado con el fin de minimizar y prevenir dificultades en la realización de tareas diarias.

Palabras clave | Dolor; Estadísticas de Secuelas y Discapacidad; Políticas Públicas.

INTRODUCTION

The growing contingent of people with disabilities implies challenges for planning health actions, with important clinical and public health repercussions¹. It is estimated that 15% of the world's population is disabled. Of these, 110 to 190 million adults experience functional difficulties, with personal and social impact. The number of people with disabilities tends to increase due to health conditions, environmental factors and population aging². Musculoskeletal pain (MSP), especially in the spine, is the most common and costly situation for disability in activities of daily living (ADL) and at work, with high rates of sick leave and pensions³.

Mota et al.⁴ showed a high (62.5%) prevalence of chronic pain in a population in a city in the state of Amazonas; the study also pointed out that individuals with unbearable intensity and daily frequency of the symptom reported greater difficulty in performing heavy activities (91.5%). Descriptive review of the Brazilian literature conducted by Vasconcelos and Araújo⁵ describes that chronic pain was significant in all studies analyzed, with prevalence varying between 29.3% and 73.3%.

Given the above, it is important to understand the possible relationship between musculoskeletal pain and functionality. Fear and pain distress are mechanisms that compromise body movement and functionality³. MSP is

recognized as a common problem in society, with prevalence rates greater than 50%^{6,7}, and defined as an “unpleasant sensory and emotional experience”⁸. However, this condition does not have the same priority within the Unified Health System as other chronic conditions have. As its outcome is not usually a limitation and total incapacity or death, actions for the MSP are relegated to the background, being left aside even by the not so recent thematic health care networks standardized by the Ministry of Health⁹.

An understanding of MSP, its implications for physical disability and impaired performance of life activities is necessary for planning strategies, prioritizing care and promoting better functionality. Public policies aimed at this population are set aside by policy makers without the correct scientific basis. The study objective was to estimate the prevalence of incapacity to perform tasks of daily living and to identify its association with MSP and other sociodemographic factors in residents of a city in Brazil's Northeast, with the purpose of stripping an important characteristic of the population that is poorly understood.

METHODOLOGY

This is a cross-sectional epidemiological study. The city was chosen based on the number of inhabitants (35,088),

low Human Development Index (0.657) and coverage of the Family Health Strategy (87.7%). Eight locations were selected in the city – four in urban agglomerations and four in rural areas – to carry out data collection due to the larger population and easier access for residents. In the urban area are 78.1% of the population, and 21.9% live in the rural area¹⁰.

The eligibility criterion for the interviewees was the spontaneous search for healthcare. Children under 13, people without autonomy to respond independently and who did not want to participate in the study were excluded. All participants or legal guardians in this study signed an informed consent form.

The convenience sample consisted of 766 investigated individuals, enough to answer the objectives, considering the lower prevalence of functional disability in the Brazilian population (26.8%)¹¹, with a margin of error of 0.04 in 95% of the possible samples.

Dependent variable

In order to verify functional disability, the degree of difficulty was questioned using the Likert scale (it does not apply, I cannot, much difficulty, little difficulty and no difficulty)¹² to perform the daily body tasks: carrying a heavy object, carrying a light object, going up and down stairs, kneeling, walking on the plane, staying in the same position and moving (activities based on the Roland-Morris Disability Questionnaire¹³). Functional disability was considered as any difficulty in performing the tasks questioned.

Independent variables

The presence of musculoskeletal pain was investigated by the Nordic Questionnaire¹⁴, containing the interviewee's report on the pain location (spine, upper limbs, lower limbs and diffuse), and questions about the pain characteristics:

intensity at the time of the interview and the crisis period, verified by the use of the visual analog scale¹⁵ and categorized as painless, little, moderate and severe/unbearable; frequency indicated by the number of days in pain in the week; and time of onset of the complaint measured by the onset of pain in months. In addition, sociodemographic data were collected: age, sex, place of residence and profession.

Data analysis

Data analysis performed using the Stata program, version 13.0. Prevalence of disability was estimated with the respective 95% confidence interval. An analysis was performed for the disability based on having and not having difficulty in performing bodily tasks of daily living, that is, *some functional disability*. The prevalence of pain was also estimated with the respective 95% confidence interval. Measures of central tendency and dispersion were calculated for numerical variables and percentage for categorical ones. Bivariate analyses were calculated to identify possible associations of disability and independent variables, including musculoskeletal pain ($p < 0.20$). Five logistic regression models for disability were constructed, considering sex, age, occupation and presence and characteristics of pain. All variables included in the models had $p < 0.05$ in the bivariate analyses.

RESULTS

Of the 1,437 people who sought healthcare, 845 (58.8%) individuals answered the survey questionnaire, 592 (41.2%) were excluded for not meeting the inclusion criteria (Figure 1); 9.3% were inconsistent and were excluded. Thus, 766 people participated in the study. The largest number of respondents occurred in the urban region (76.3%); in the rural area it was 23.7%.

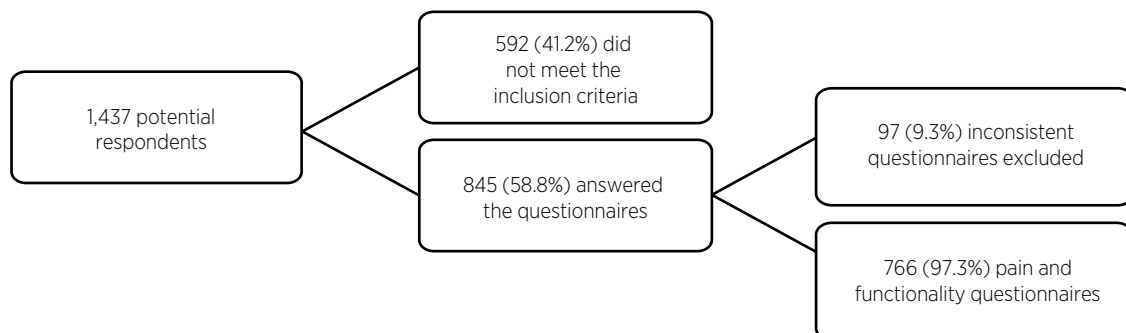


Figure 1. Sample flowchart

The prevalence of *some* difficulty in performing daily life activities was 87.6% ($_{95\%}$ CI 85.3%-89.9%), with *much* difficulty was 66.1% ($_{95\%}$ CI 62.7%-69.4%), and MSP was 67.5% ($_{95\%}$ CI 64.3%-70.7%). The sociodemographic characteristics are presented in Table 1.

Table 1. Absolute and relative distribution of musculoskeletal pain and some disability of individuals according to personal characteristics

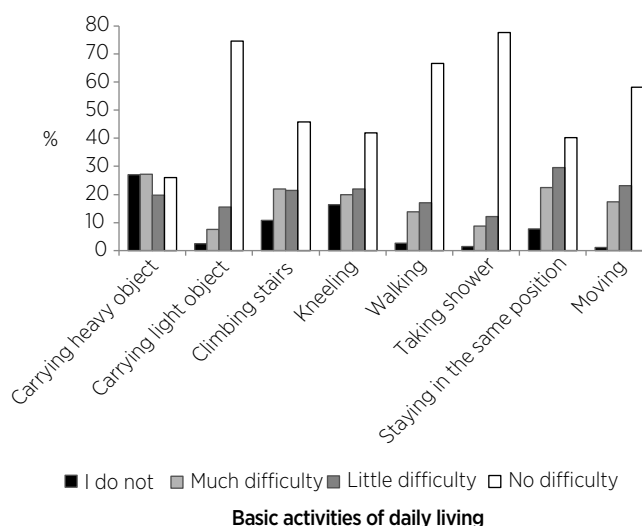
Characteristics	Pain		Some disability	
	yes	no	yes	no
	%	%	%	%
Age (years)				
13 to 59	34.9	65.1	13.9	86.1
60 or older	26.2	73.8	7.3	92.7
Sex				
Male	39.1	60.8	16.6	83.4
Female	29.2	70.8	10.7	89.4
Occupation				
No body demand	33.1	66.9	13.6	86.4
With body demand	27	73	9.5	90.5
Has pain				
No	100		34.1	66
Yes		100	4	96
Pain location				
No pain	96.7		32.7	67.3
Spine		100	3.4	96.6
Upper Limbs			6.9	93.1
Lower Limbs			1.7	98.3
Diffuse			16.7	83.3
Intensity in crisis				
No pain	96		32.6	67.4
Little		100	6.3	93.7
Moderate			7.7	93.3
Severe/unbearable			2.9	97.1
Pain frequency (days/week)				
No pain	97.5		33.2	66.8
Less than 1		100	9.1	90.1
1 to 3			3.5	96.5
More than 4			2.8	97.2
Does not know how to define			10.8	89.2
Pain onset (months)				
No pain	100		34.1	65.9
0 to 12		100	6.5	93.5
13 to 60			3.2	96.8
61 to 120			0.9	99.1
121 to 600			4.4	95.6

Of the 555 individuals who reported musculoskeletal pain, 46.6% reported pain in the spine, of severe or unbearable

intensity in crisis episodes (73.7%), more frequently than 4 days a week (68.8%), and chronic that started more than a year ago (33%). Disabilities were reported more frequently by the elderly (92.75), female (89.4%), workers with body demands (90.5%) and pain (96%) in the lower limbs, with severe/unbearable intensity, with more than four days a week and from 5 to 10 years.

On average, people had difficulty in 3.6 (SD=2.5) tasks among the eight surveyed. The tasks with the highest frequency of difficulty reported by individuals were: *carrying a heavy object* (27.3%), *staying in the same position* (22.4%) and *climbing stairs* (22%). Regarding activities that individuals were unable to perform, *carrying a heavy object* (27%), *kneeling* (16.7%) and *climbing stairs* (10.7%) were the most frequent (Graph 1).

Table 2 shows five multivariate logistic regression models of the association factors for difficulty in performing the activities questioned. In the first model, pain is the main association factor to explain it (OR 9.9; $_{95\%}$ CI 5.9-16.5), followed by age over 60 years (OR 2; $_{95\%}$ CI 1.1-3.8). Regarding the location (model 2), pain in the lower limbs has a greater association with some disability (OR 23.2; $_{95\%}$ CI 7.1-75.7), followed by the spine (OR 12.2; $_{95\%}$ CI 5.9-25.5). In model 3, performing tasks has a greater association with severe or unbearable intensity in crisis episodes (OR 14; $_{95\%}$ CI 7.3-26.9). Model 4 indicates that the association between the difficulty in performing activities and the frequency of pain is proportional. Finally, the chronicity of pain (model 5), established by the time of onset, is associated in such a way that pains between 61 and 120 months (OR 45.3; $_{95\%}$ CI 6.2-332.5) have greater influence.



Graph 1. Relative distribution of participants according to the difficulty of carrying out activities of daily living

Table 2. Logistic regression models of some disability to perform body tasks and individual characteristics and pain

		SOME DISABILITY TO PERFORM BODY FUNCTIONS									
		OR (95% CI) p									
		Model 1		Model 2		Model 3		Model 4		Model 5	
Sex	Female	1.4	0.163	1.4	0.193	1.4	0.178	1.4	0.180	1.5	0.126
		[0.8-2.5]		[0.8-2.5]		[0.8-2.5]		[0.8-2.5]		[0.9 - 2.6]	
Age	60 years or older	2	0.030	2	0.035	2.1	0.024	2	0.028	2.1	0.024
		(1.1-3.8)		(1-3.7)		(1.1-3.9)		(1.1-3.8)		(1.1-4.1)	
Occupation	With physical demand	1.4	0.177	1.4	0.161	1.4	0.231	1.4	0.201	1.4	0.223
		(0.9-2.3)		(0.9-2.4)		(0.8-2.2)		(0.8-2.3)		(0.8-2.3)	
Pain		9.9	<0.000								
		(5.9-16.5)									
Location of pain	No pain			1							
	Spine			12.2	<0.000						
				(5.9-25.5)							
	Upper Limbs			5.6	<0.000						
				(2.5-12.9)							
	Lower Limbs			23.2	<0.000						
				(7.1-75.7)							
	Diffuse			2	0.247						
				(0.63-6.1)							
Pain intensity during crisis	No pain					1					
	Little					7	0.010				
						(1.6-30.3)					
	Moderate					5	<0.000				
						(2.4-10.6)					
	Severe/unbearable					14	<0.000				
						(7.3-26.9)					
Pain frequency (day/week)	No pain							1			
	Less than 1							4.4	0.003		
								(1.7-11.8)			
	1-3							11.5	<0.000		
								(3.5-38.1)			
	More than 4							14.3	<0.000		
								(7.3-28)			
	Does not know how to define							3.4	0.028		
								(1.1-10.1)			
Pain onset (months)	No pain									1	
	0-12									6.3	<0.000
										(3.2-12.5)	
	13-60									12.8	<0.000
										(5.4-30.7)	
	61-120									45.3	<0.000
										(6.2-332.5)	
	121-600 months									9.2	<0.000
										(3.2-26.4)	

DISCUSSION

This is an innovative study as it presents the impact of pain on disability, and not only on specific diseases and complaints. Approximately 80% of the participants were disabled, and pain was the main factor associated with functional limitations. Thus, it becomes necessary to carry out strategic planning and prioritization of care

and treatment of musculoskeletal complaints, both for the individual therapeutic sphere and for the management of actions and services, enabling a better response capacity of health equipment.

Although the majority report back pain, the complaint in lower limbs had a greater influence on functionality, probably due to ADLs being related to dislocation. A study found functional limitations due to low back

pain in 20% of respondents and 29% in those who had pain in the lower limbs¹⁶. In addition to the pain location, the long onset and frequency were important indicators, with a negative effect on functionality and quality of life¹⁷.

The prevalence of functional disability varies (15.5% to 87%), depending mainly on graduation and activities to define functional disability, as well as the population studied¹⁸. This study showed a high prevalence of difficulty for three activities on average. In Brazil, 36.7% of adults reported disability, considered as difficulty to walk 100 meters¹³. In the Southeast region, 98.2% of the elderly have some degree of functional disability¹⁹. Other studies pointed out a prevalence of 17.6% of disability for basic activities of daily living and 46.3% for instrumental activities of daily living²⁰. In the South, 26.8% to 28.8% of the elderly were unable to perform basic and instrumental activities of daily living¹¹. Of 54 countries, Ireland and Norway were the least disabled, 4.3%, and South Africa was the most (35.9%)²¹. Therefore, functional disability deserves greater political attention and resources in public health.

MSP is one of the factors that can compromise habitual activities and limit recreational activities, social and family relationships²². In fact, this study found that pain impacted functional disability more than the advancing of age. For several authors^{4,23,24} the presence of pain in one or more body parts is one of the factors that can lead to disability in activities such as climbing stairs, bending, among others²⁵.

The pain itself and the individual's behavior, for fear of triggering the pain and maintaining an antalgic position, contribute to the development and maintenance of disability. The pain intensity has a positive relationship with the dysfunction, but without influence of the location, duration and type of chronic pain²⁶. Mild pain has already impaired the performance of daily tasks and severe/unbearable pain limits life even more, both in young adults and in the elderly²⁵.

There is a direct influence between age and functionality^{11,27}. There is an association of functional disability with increasing age ($p < 0.001$), reaching a prevalence 3.5 times higher in individuals aged 80 years or older, when compared to those aged 60 to 64 years¹¹. Age influenced disability, but to a lesser extent, which was the opposite of what was expected. Age interferes with functionality due to physiological issues associated with aging, such as decreased strength,

reflexes, balance, among others²⁸. The relationship between sex and functional capacity has different data in the literature^{27,29}.

In this context, as age and sex are not modifiable factors to optimize functional capacity, improving the efficiency of health services for pain control may be an adequate path for the functional implications of human beings. It is important that management is carried out by competent health professionals, in order to identify windows of opportunity with the user and their triggering factors. Early identification is essential for planning a line of care for pain.

MSP is the most frequent complaint of active demand after requests for reports and tests in primary health care services. However, the disability is under-identified, the services must incorporate forms of care based on equity in the treatment of MSP in their practice. With appropriate evaluations, care can be better structured, offering actions that move between promotion, prevention, cure and rehabilitation³⁰.

For this process to be resolvable, human resources and adequate infrastructure are needed. This should be organized among all the actors responsible for health, from policy makers, public administrators, professionals and society. Public policies must be put into practice, aiming at a line of care for users with pain and functional disabilities resulting from this.

The authors recognize the study limitations. Considering a cross-sectional design, there is no possibility of making a causal inference between pain and functionality, however there is a robust analysis to verify possibilities of association. To minimize errors, validated questionnaires were used. Despite the convenience sample, care was taken to collect it from eight locations in the city. This allowed the proportional distribution of the sample in relation to the sociodemographic variables to be close to that of the population.

CONCLUSION

The prevalence of *some* and *much* disability was high. Chronic musculoskeletal pain, severe intensity in the crisis, frequent and, predominantly in the spine also had a high prevalence. Specifically, pain in the lower limbs, with severe/unbearable intensity, frequency greater than four days a week and onset more than five years ago, was more associated with disability. This study

contributes to direct the construction of care actions that aim to minimize and prevent difficulties to perform daily tasks. It is suggested the direction of public policies aimed at the care of pain and disabilities, as well as the training of professionals and better structuring of services.

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