ORIGINAL ARTICLE

Physical activity level and self-reported musculoskeletal pain perception among older males

Nível de atividade física e percepção de dor musculoesquelética autorrelatada em homens mais velhos

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DOI 10.5935/1806-0013.20160067

ABSTRACT

BACKGROUND AND OBJECTIVES: In light of the social and economic impact caused by pain and the evidences of benefits provided by physical activity to individuals affected by this unpleasant sensation, this study aimed at evaluating the prevalence of self-reported musculoskeletal pain and at determining its association with the level of physical activity of males aged 40 years or above, dwellers of the urban zone of the city of Pelotas-RS.

METHODS: This is an observational, cross-sectional and population-based study. The level of physical activity was measured by means of leisure and commuting sections of the International Physical Activities Questionnaire, being classified as insufficiently active those with scores below 150 minutes/week. To evaluate pain self-perception, a question of the Aging Male's Symptoms Scale was used. Those reporting moderate, severe and intense pain were classified as having pain.

RESULTS: The prevalence of pain self-perception was 27.0% (CI95% 22.7 – 31.3) and was significantly associated to the level of physical activity (p<0.001). Males performing 150 minutes/week or more of physical activity had 60% protection against pain report as compared to those not reaching this cutoff point, being that this result was maintained significant even after adjustment for confounding factors (p=0.02).

CONCLUSION: This study has shown that reaching physical activity recommendations may be a protection against musculoskeletal pain perception among studied males.

Keywords: Epidemiology, Males, Musculoskeletal pain, Pain, Physical activity.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Frente ao impacto social e econômico que a dor causa e aos indícios dos benefícios proporcionados pela prática de atividade física em indivíduos acometidos por essa sensação desagradável, o objetivo deste estudo foi avaliar a prevalência de dor musculoesquelética autorrelatada e determinar a associação dessa variável com o nível de atividade física em homens de 40 anos de idade ou mais, residentes na zona urbana da cidade de Pelotas-RS.

MÉTODOS: O estudo caracteriza-se como observacional, transversal de base populacional. O nível de atividade física foi mensurado por meio das sessões de lazer e deslocamento do Questionário Internacional de Atividades Físicas, sendo classificados como insuficientemente ativos aqueles com escore inferior a 150 minutos/semana. Para avaliar a autopercepção da dor utilizou-se uma questão da escala *The Aging Male´s Symptoms Scale*. Foram classificados como tendo dores aqueles que relataram sentir dores moderadas, graves e intensas.

RESULTADOS: A prevalência de autopercepção de dor foi de 27,0% (IC95% 22,7 - 31,3) e esteve significativamente associada ao nível de atividade física (p<0,001). Os homens que realizaram 150 minutos/semana ou mais de atividade física apresentaram uma proteção de 60% contra o relato de dor quando comparados aos que não atingiam esse ponto de corte, sendo que esse resultado se manteve significativo após ajuste para os fatores de confusão (p=0,02).

CONCLUSÃO: O presente estudo demonstrou que atingir as recomendações de atividade física pode representar proteção contra a percepção da dor musculoesquelética nos homens estudados.

Descritores: Atividade física, Dor, Dor musculoesquelética, Epidemiologia, Homens.

INTRODUCTION

Pain is a major clinical, social and economic problem in communities around the world[1]. According to the International Association for the Study of Pain (IASP), it is an unpleasant sensory and emotional sensation associated to actual or potential tissue injury or described in such terms[2]. Musculoskeletal pain, especially low back pain and upper limbs (UULL) pain, occupy the first places among chronic-degenerative diseases in morbidity profiles of several coun-

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Submitted in March 26, 2016.
Accepted for publication in June 22, 2016.
Conflict of interests: none – Sponsoring sources: none.

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tries[3]. Different factors, such as socio-demographic, psychosocial, physical and organizational conditions have been related to triggering, development and maintenance of this type of pain[4].

According to Leveille et al.[5], musculoskeletal pain affects up to 60% of middle-age and older adults populations, being more prevalent among females[6]. In addition, this morbidity has many public health implications since it is one of the most common causes of deficiency and incapacity, especially in older people[7].

There are evidences that physical activity may directly influence the mechanism of endogenous opioids release and be able to induce analgesia[8], and there are also indications that this practice may act as unpleasant pain sensation modulator via dopamine[9]. In this sense, physical activity may be considered a non-pharmacological treatment for musculoskeletal pain because, when adequately performed and respecting individual characteristics, it may decrease pain and associated symptoms[10].

Some studies have shown reverse association of physical activities and improved musculoskeletal pain. Bruce, Fries and Lubeck[11] have shown 25% decrease in musculoskeletal pain in aerobic exercises practitioners as compared to sedentary individuals. Stubbs et al.[12], in turn, have observed that older painless adults were significantly more active as compared to their peers with chronic musculoskeletal pain.

In light of the economic and social impact of pain and of evidences of benefits provided by physical activity in individuals affected by this unpleasant sensation, it is clear the importance of determining the association of such variables. Added to this, epidemiological investigations with representative samples are less frequent among males, probably for being less affected by musculoskeletal pain as compared to females[6]. So, this study aimed at measuring the prevalence of self-reported musculoskeletal pain and at determining its association with the level of physical activity of males aged 40 years or above, dwellers of the urban zone of the city of Pelotas-RS.

METHODS

This is a crossover, observational, population-based study carried out in the city of Pelotas-RS, being data collected throughout one year. Pelotas is located in the extreme South of the State of Rio Grande do Sul and at data collection time population was approximately 323034 inhabitants, of whom approximately 153180 (47% of population) were males.

The city is divided in 408 urban census sectors by the Brazilian Institute of Geography and Statistics (IBGE). In our study, the selection of sectors to be part of the sample was probabilistic by conglomerate, where from 404 census sectors 45 were drawn with homes to be included in this study. In each drawn census sector, a starting point for the study was identified, as from which homes to be visited were systematically selected.

After selecting the first home to be included in the study, next homes were systematically selected, respecting the established interval of five homes until 20 homes were reached in each sector. In total 900 homes were selected where all males had ages equal to or above 40 years, who were initially considered eligible for the study. Exclusion criteria were institutionalized individuals (hospices, hospitals, prisons and barracks), individuals with severe motor incapacity (tetraplegic, brain paralysis, among others) and individuals who were unable to answer and/or understand questions of the questionnaire.

Demographic, socioeconomic and health characteristics of participants were evaluated by the application of standardized pre-tested questionnaire.

To evaluate the outcome – pain self-perception – the following question was asked: "Do you have pain in joints and/or muscles? (Do you have low back pain, joint pain, arms or legs pain, back pain in general)". This question is part of the Aging Males Symptoms Scale (AMS), used to evaluate male aging symptoms and which was validated by Heineman et al.[13]. The following possible answers were read to respondents: "I don't have severe pain"; "I have severe pain"; where respondents pointed to one alternative to indicate how they felt with regard to this sensation in the last week. Those reporting moderate, severe and intense pain were considered as having pain.

To define the level of physical activity (LPA) of respondents, the long version of the International Physical Activity Questionnaire (IPAQ)[14] was used, considering just physical activities of leisure and commuting which were jointly evaluated. Those reporting minimum of 150 min/week of physical activities according to ACSM[15] recommendations were considered as having met recommendations; this minimum score should be met by the sum of leisure and commuting activities.

Independent variables were age (in complete years), skin color (divided in white and not white, according to respondent's perception), marital status (with companion, without companion), economic level – determined according to classification of the Brazilian Association of Research Companies (A – highest; B; C; D/E)[16], education level (in complete years of study), smoking (current smoker; former smoker; never smoked) and health self-perception (excellent, very good, good, regular, poor). Nutritional status was determined by body mass index (BMI), calculated by referred weight and height and classified according to World Health Organization (WHO) criteria[17]. The variable working outside the home (any type of work, regulated or not) was collected as dichotomy (yes/no) and self-perception of strength loss was investigated by a question of the male aging symptoms scale[13]; classification was dichotomic (normal/decreased).

Tool was applied face to face by interviewers of both genders with at least complete high school, who were trained during 40h to apply the tool, without being informed of the study objectives or hypotheses. Interviews were carried out individually. Field work supervisors have redone interviews in 10% of the sample, randomly selected, with a summarized questionnaire containing key-questions selected from the

tool as quality control of the study. Questionnaire was tested in a pilot study carried out in a census sector not included in the final sample.

Statistical analysis

Epi Info 6.0 program was used to develop the database, with double-entry of each questionnaire. STATA 14.0 program was used for data analysis. A descriptive analysis of sample subjects was performed in terms of pain self-perception and socioeconomic, demographic, behavioral, nutritional and health variables. The bivariate analysis has evaluated relationship between outcome and level of physical activity in leisure and commuting through Chi-square test for heterogeneity and for linear trend. Controlled multivariate analysis for confusion factors (socioeconomic level, work, strength loss, health self-perception) was carried out with Poisson regression with robust variance, and variables maintained in this analysis were those with p<0.2 in the bivariate analysis. Significance level was 5%.

This study was approved by the Research Ethics Committee, *Escola Superior de Educação Física, Universidade Federal de Pelotas* under protocol 005/2008. All participants have signed the Free and Informed Consent Term (FICT).

RESULTS

Participated in the study 415 males with mean age of 54.5±10.5 years, varying between 40 and 86 years of age, being that 28.5% had 60 years of age or above, most (85.2%) were white, 29.9% had between zero and four years of school attendance, 41.9% belonged to socioeconomic classes A and B, 1% were overweighed or obese, 28.0% smoked at data collection time, 66.9% worked outside the home, 21.5% perceived health as regular or poor and 82.9% had not met physical activity recommendations.

With regard to studied outcome (self-reported prevalence of musculoskeletal pain), 27,0% ($CI_{95\%}$ 22.7-31.3) of respondents have reported this type of pain. Table 1 shows the association of pain report according to studied variables. As to pain intensity, 17.4% have reported moderate pain, 8.0% severe pain and 1.6% intense pain, which represent, respectively, 64.4, 29.6 and 6.0% of total prevalence among males classified as having pain.

When pain perception and level of physical activity were evaluated, it has been observed association between outcome and this variable, being that 30.5% of those not meeting physical activity recommendations for health benefits (150 min/week) have reported pain, while the percentage of those meeting recommendations was 9.9% (p<0.001). Pain perception was also associated to education, socioeconomic level, BMI, strength loss, working outside the home and health self-perception.

With regard to association between pain intensity and level of physical activity, there has been a trend (p=0.004) toward increased perception of more intense pain among those not meeting physical activity recommendations for benefits to health as compared to those who have met it (Figure 1).

Table 1. Bivariate analysis of pain self-perception with studied independent variables (n=415)

Variables	With pain		W/o pain		
	n	%	n	%	p value
Age (years)					0.43
40-49	37	23.0	124	77.0	
50-59	37	27.6	97	72.4	
60-69	25	32.5	52	67.5	
70 or above	13	30.2	30	69.8	
Skin color					0.66
White	96	27.3	256	75.4	
Not white	15	24.6	46	24.6	
Education (complete years)					0.04**
0	3	21.4	11	78.6	
1 to 4	41	36.9	70	63.1	
5 to 8	28	19.3	117	80.7	
9 to 11	20	26.7	55	73.3	
12 or more	20	28.6	50	71.4	
Socioeconomic level (ABEP)					0.04**
A (highest)	3	9.4	29	90.6	
B	45	32.9	92	67.2	
C	52	27.2	139	72.8	
D/E	10	21.3	37	78.7	
Marital status					0.86
Married or living with companion	86	26.8	235	73.2	
Without companion	26	27.7	68	72.3	
BMI (kg/m²)#					0.02**
Normal	36	27.5	95	72.5	
Overweight	40	22.4	139	77.7	
Obesity	34	38.6	54	61.4	
Smoking					0.46
Never smoked	31	24.8	94	75.2	
Former smoker	52	30.2	120	69.8	
Current smoker	29	24.6	89	75.4	
Strength self-perception					<0.001*
Normal	77	22.9	259	77.1	
Decreased	35	44.3	44	55.7	
Working outside the home					0.01*
No	48	35.0	89	65.0	
Yes	64	23.0	214	77.0	
Health self-perception					<0.001**
Excellent	5	12.5	35	87.5	
Very good	10	17.5	47	82.5	
Good	54	25.4	159	74.7	
Regular	32	38.1	52	61.9	
Poor	11	55.0	9	45.0	
Physical activity level (min/week)					<0.001*
Not meeting recommendations	105	30.5	239	69.5	
Meeting recommendations	7	9,9	64	90,1	

ABEP = Brazilian Association of Research Companies; BMI = Body mass index; # Variable with highest number of absence (17); *Chi-square for heterogeneity; **Chi-square for linear trend.

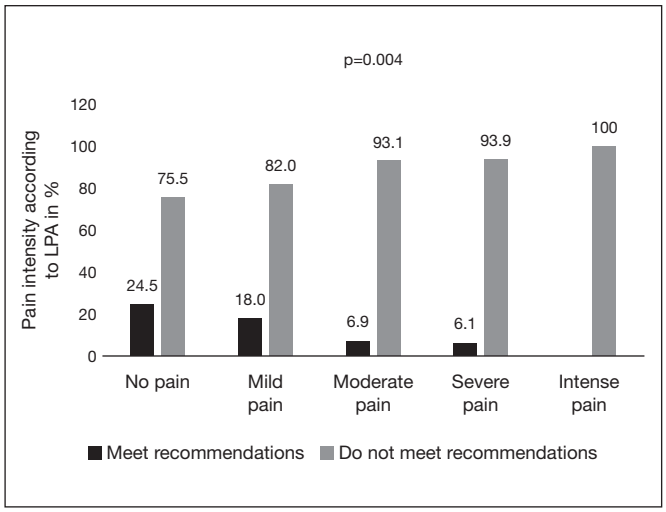

Figure 1. Reported pain intensity according to level of physical activity in leisure and commuting of studied males (n=415)

LPA = Level of physical activity.

This association was also observed when physical activity was considered by means of score categorized by for how many minutes participants would perform physical activity per week (min/week), being that less than 10% of those practicing 500 min/week or more have reported pain versus 32.4%of those not practicing any physical activity along the week (p=0.005) (Figure 2).

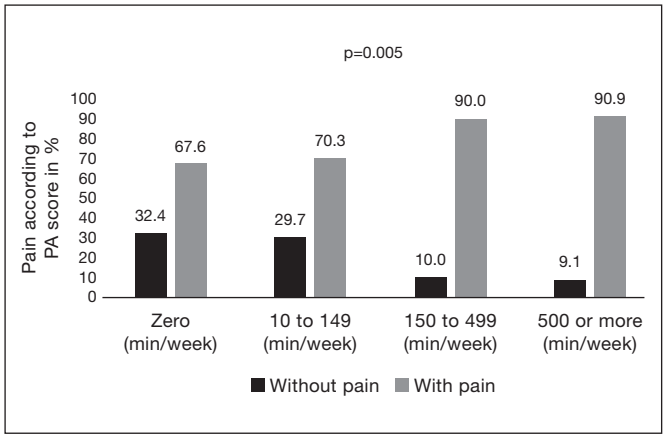

Figure 2. Pain in studied males according to time spent with physical activities of leisure and commuting (n=415)

PA = physical activity.

In multivariate analysis, when confusion factors (education, socioeconomic level, BMI, smoking, strength loss, working outside the home and health self-perception) were controlled in the same level, the association between pain perception and the level of physical activity was maintained (p=0.02) being that sufficiently active individuals had 60% protection to pain report as compared to those not meeting recommendations. Also in this analysis, subjects perceiving strength loss and poor health had higher risk of pain perception (60% and 180%, respectively) as compared to the reference group (normal strength and excellent health) (Table 2).

Table 2. Multivariate analysis of pain self-perception and studied independent variables (n=415)

	Adjusted analysis*	
Variables	RP (CI 95%)	p value
Age (years)		0.8
40-49	1.0	
50-59	2.7 (0.9 – 8.2)	
60-69	1.5 (0.5 – 4.8)	
70 or above	2.1 (0.7 – 6.6)	
Skin color	2.6 (0.8 – 8.4)	
White		0.3
Not white	1.0	
Education (complete years)	3.4 (1.1 – 10.3)	
0	2.5 (0.9 – 7.3)	
1 to 4	1.9 (0.6 – 6.2)	
5 to 8		0.3
9 to 11	1.0	
12 or more	1.0 (0.6 – 1.3)	
Socioeconomic level (ABEP)	1.4 (0.9 – 2.2)	
A (highest)		0.7
B	1.0	
C	0.9 (0.6 – 1.3)	
D/E	1.0 (0.7 – 1.5)	
Marital status		0.02**
Married or living with companion	1.0	
Without companion	1.6 (1.1 – 2.3)	
BMI (kg/m²)#		0.1
Normal	1.0	
Overweigh	0.8 (0.6 – 1.1)	
Obesity		0.01***
Smoking	1.0	
Never smoked	1.3 (0.5 – 3.6)	
Former smoker	1.6 (0.6 – 4.1)	
Current smoker	1.9 (0.7 – 5.2)	
Strength self-perception	2.8 (1.1 – 7.2)	
Normal		0.02**
Decreased	1.0	
Working outside the home	0.4 (0.2 – 0.9)	

ABEP = Brazilian Association of Research Companies; BMI = Body mass index; # Variable with highest number of absence (17); * Adjusted for education, socioeconomic level, smoking, strength loss, working outside home and self-perception of health, maintained in the analysis for presenting p≤0.2; ** Wald test for heterogeneity; *** Wald test for linear trend.

DISCUSSION

Major findings of this study point to the association of self-perception of musculoskeletal pain, strength loss and poor health with physical activities in leisure and commuting domains.

Studies carried out in the same region of Brazil have also observed factors associated to musculoskeletal disorders or to chronic back pain and have not identified any association

of these variables with the practice of physical activities, but rather with other outcomes such as BMI, age, marital status, smoking, carrying weight and repetitive effort[18,19].

Other authors have observed that the prevalence of musculoskeletal pain increases with age[20]. There is still no consensus that physical activity is a protecting factor for this type of morbidity[21,22]. However, our study has observed that those reporting decreased strength had 60% more risk of having musculoskeletal pain as compared to those not presenting such decrease.

A cohort study[23] also carried out with males, however younger, has shown that those with less muscle strength had already decreased risk of self-reporting musculoskeletal pain (OR 0.93; CI 95% 0.87 to 0.99), however the same result was not maintained for those with enough strength (OR 0.99; CI95% 0.93 to 1.05). Authors point that results do not reinforce the hypothesis that poor strength is a risk factor for future musculoskeletal pain[23]. The relationship between physical activity and musculoskeletal pain in this study has to be evaluated with caution since it is a crossover study, amenable to reverse causality bias.

With regard to the association of pain perception as major studied outcome (level of physical activity), results are different from a Japanese cohort study[22], with 4559 adults between 40 and 79 years of age (46% males), where such association was not found. It is worth stressing that our study has evaluated musculoskeletal pain in different body regions, while the Japanese study has measured pain in just two specific points: lumbar region (where prevalence of pain reported by males was 49.9%) and knees (prevalence of 39.5%)[22]. On the other hand, Stubbs et al.[12], in meta-analysis, have identified that older people with chronic pain were less active than those without this symptom. Although with minor difference, they suggest that physical activity for this population may be clinically relevant, and may be a non-pharmacological strategy.

In the same direction as Stubbs et al.[12], a cohort study carried out by Bruce, Fries and Lubeck[11] has followed for 14 years males and females of a runners association comparing them to individuals of a USA community. Results have shown that those who were always physically active had 25% less musculoskeletal pain as compared to those reporting more sedentary habits. This result[11] also confirms our results where it was observed that males meeting physical activity recommendations have reported less intense pain as compared to those not meeting recommendations, as well as those practicing 150 min/week or more have reported less intense pain as compared to those not meeting this cutoff point. Such reasons help reinforce the importance of physical activities to decrease the onset of pain as well as its intensity.

Limitations and positive points of this study should be described. Questions used to check pain and its intensity, although being part of a validated questionnaire for Brazilian male adult population, where limited to a single period of time and do not define the specific region. In addition, it should be stressed that the level of physical activity was self-reported and that design transversality has not allowed the establishment of cause-effect relationship (reverse causality). On the other hand, the application of the questionnaire by well-trained interviewers, the logistic of the research and the low percentage of losses are points to be highlighted.

CONCLUSION

In our sample, pain intensity was significantly higher among those not meeting physical activity recommendations, and performing at least 150 minutes of weekly activities was statistically associated to decreased pain report. In this sense, this study suggests that meeting physical activity recommendations may be a protecting factor against musculoskeletal pain perception. Also, strength loss perception and poorer health perception may be risk factors for pain perception.

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