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ORIGINAL ARTICLE

Knee, low back and disabling pain and their associated factors in instructors of gym clubs: a census study

Fatores associados às dores no joelho, na lombar e incapacitante em instrutores de academias de ginástica: um estudo censitário

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Abstract

Background: Although gym club instructors are closely linked to health and well-being, this group of workers shows specific characteristics that may favor the involvement in musculoskeletal disorders in their occupational routines. **Objective:** To identify the prevalence of knee, low back, and disabling pain and their association with sociodemographic, nutritional, and occupational variables in instructors from gym clubs in the city of Pelotas, southern Brazil. **Method:** A census-type study was carried out with all professionals working at gym clubs (n=497). Crude and multivariable analyses were performed considering "sex", "age", "income", "occupational physical activity", "time working at the gym clubs" and "modality performed" as exposures. Outcomes were disabling pain, and knee and low back pain. **Results:** The disabling pain affected 20.9% of the workers and was associated with the gym clubs modality performed and with the working longest time in the gym clubs. Half of the professionals related to low back pain in the previous year. This outcome was associated with the age (inversely), of females and Pilates instructors. The knee pains affected, in the last year, 41.5% of the professionals; there was a significant association between age (inversely) and time of work in the gym clubs. **Conclusion:** The instructors had a high prevalence of the three outcomes analyzed. Those who have been working longer time at gym clubs, women, youngers, Pilates, or gymnastic instructors were at an increased risk of presenting the outcomes.

Keywords: occupational health; physical education and training; musculoskeletal pain; back pain.

Resumo

Introdução: Embora os instrutores de academias de ginástica estejam ligados à saúde e ao bem-estar, esse grupo de trabalhadores apresenta características específicas que podem favorecer o surgimento de distúrbios osteomusculares em suas rotinas ocupacionais. **Objetivo:** Verificar a prevalência de dor no joelho, dor lombar e dor incapacitante e sua associação com variáveis sociodemográficas, nutricional e ocupacionais em instrutores de academias de ginástica da cidade de Pelotas, Brasil. **Método:** Censo realizado com todos os profissionais atuantes nas academias da cidade (n=497). Foi realizada análise bruta e ajustada (regressão de Poisson), considerando as variáveis de exposição "sexo", "idade", "renda", "atividade física ocupacional", "anos de trabalho como profissional de academia" e "modalidade ministrada". As

Study carried out at some gyms from Pelotas (RS), Brasil.
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variáveis desfecho foram dor no joelho, dor lombar e dor incapacitante. **Resultados:** A dor incapacitante acometeu 20,9% dos profissionais e esteve associada com a função de ministrar aulas de ginástica e com o maior tempo de trabalho em academia. Metade dos entrevistados referiu sentir dor lombar no último ano, sendo associado à idade (inversamente), ao sexo feminino e ministrar aulas de Pilates. A dor no joelho acometeu, no último ano, 41,5% dos profissionais, havendo associação significativa com a idade (inversamente) e o tempo de trabalho em academia. **Conclusão:** Conclui-se que os instrutores das academias de ginástica tiveram uma alta prevalência dos três desfechos analisados. O tempo de trabalho em academia, o sexo feminino, idade, profissionais de Pilates e de ginástica estiveram associados com maiores prevalências das dores investigadas.

Palavras-chave: saúde do trabalhador; educação física e treinamento; dor musculoesquelética; dor nas costas.

INTRODUCTION

The modernization of society over the years has led to changes in the structure and work routines, generating specificities that are directly affecting the health of the worker. Repetitive tasks, inadequate positions, lack of adequate intervals, and performance requirements are among the changes in the structure of work[1]. In this context, Brazil has been suffering from an increase in work-related musculoskeletal disorders (WMSDs), reaching around 100,000 health leaves per year[2,3]. Musculoskeletal disorders can be defined as a health problem of the locomotor system, which encompasses skeletal muscles, bones, tendons, cartilage, nerves, and spinal discs[4].

Studies have identified that gym club instructors are susceptible to health issues, possibly related to the specific burden of their occupation[5-7]. In this sense, workers showed complaints regarding pains in several anatomical regions, especially the low back, the part of the body with the highest complaint prevalence, and knees, also presenting relevant percentages of complaints related to pain[6,8,9]. In addition, former studies reported that 53% of the aquatic modality instructors and 54% of the gym club instructors complained about pains resulting from occupational activities[7,10].

The literature on this matter is scarce and only one study reporting the prevalence of musculoskeletal pain in gym club instructors was found[6]. That study[6] showed a high prevalence of musculoskeletal disorders in these workers. Our literature review did not indicate any study describing the risk factors associated with musculoskeletal pain in this population. Thus, the present study aimed to identify the prevalence of knee, low back and disabling pain and its association with sociodemographic, nutritional, and occupational variables in instructors from gym clubs in the city of Pelotas, southern Brazil.

METHODS

This is an observational cross-sectional census-type study carried out between October 2011 and May 2012 including instructors working in gym clubs in the city of Pelotas, southern Brazil. All instructors were eligible to participate in the study, regardless of their academic background. Among the instructors, there were graduated professionals in Physical Education (Licenciate and Bachelor degrees), undergraduate students in Physical Education and undergraduate students or Bachelor degree holders in other areas (Physiotherapy, among others), trainees in Physical Education and people authorized to work by the Regional Council of Physical Education (CREF-RS).

In order to search for gym clubs in the city, the CREF-RS website was first consulted. However, researchers were aware that there was a large number of non-registered establishments in the council. Thus, the urban area of the city was divided into 19 sectors made up of similar geographical areas, and trained interviewers were sent to these sectors to search for existing gym clubs. Using this strategy, 170 gym clubs were found.

Twenty interviewers, Physical Education undergraduate students, were trained in a specific 20-hour course to ensure standardization and quality of data collection. A pilot study was conducted in a gym club from a neighboring city to test the data collection instruments.

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The interviewees were previously contacted and those who were accepted to participate signed the informed consent form. All participants were guaranteed the confidentiality of the information and the right of refusal. A quality control was performed by reapplying key questions of the original instrument to a random sample of 10% of the sample. This quality control was carried out by the supervisors of the fieldwork. Further details of the methodology used in the study are described in Hartwig et al.[5].

The following exposure variables were considered in the present study: sociodemographic (sex, age, income), nutritional (body mass index - BMI), and work-related variables (occupational physical activity [minutes/week]; working time in the gym clubs [years]; modalities offered at the gym clubs [bodybuilding, personal trainer, gymnastic, fights, dance, Pilates, Yoga, and aquatic activities]). The income information was obtained using the salaries derived from the activity of the gym club instructors and it was then divided into quartiles. BMI was determined from body mass and height measurements, classifying the individuals as normal (≤ 24.9 kg/m^2), overweight (25.0-29.9 kg/m^2), or obese (≥ 30 kg/m^2). Occupational physical activity was measured using the long version of the International Physical Activity Questionnaire (IPAQ)[11]. A continuous score of weekly physical activity in minutes was obtained in the occupational domain, which by operational decision was divided into quartiles. Only data from the occupational physical activity domain was used in this study.

The variables knee pains (pain either in just one knee or in both knees) and low back pain in the previous year, as well as musculoskeletal pain disabling the performance of the instructors at some point in their careers, were included as outcomes. The latter was investigated by the following question: "Did you have to stop performing any modality due to musculoskeletal pain?" The remaining pains were collected using the Nordic Musculoskeletal Symptoms Questionnaire[12], which measured the occurrence of pain in the previous year. For this study, we chose to use only the information on low back pain and knee pains as they are the most prevalent in the study population. Chart 1 presented the definition and characterization of each variable used in this study.

The EpiData 3.1 software was used to structure the database. Each questionnaire was double-typed, which allowed the comparison of the data to be verified and corrected any typing errors. Data analysis was performed using the statistical software STATA 13.1. Firstly, descriptive analyzes were performed including absolute and relative frequencies and their respective 95% confidence intervals. In the crude analysis, Chi-square for heterogeneity and linear trend tests was performed. For the adjusted analysis, Poisson regression was used. All the exposure variables were imputed at the same time in the regression model and were withdrawn one by one (the highest "p" value) until, in the model, only variables with $p \leq 0.2$ value remained. The significance level was $p < 0.05$.

The study protocol was submitted to the Ethics and Research Committee of the Faculty of Physical Education at the Federal University of Pelotas and approved under number 27-021/2011.

RESULTS

We found 546 instructors working in the 170 gym clubs mapped in Pelotas; from these, 497 were accepted to participate in the study, totaling 9% of losses and refusals. Table 1 describes the sociodemographic (sex, age, and income), nutritional (BMI), and work-related exposures (occupational physical activity, time of work in the gym clubs [years], and modality performed in the gym clubs), as well as disabling pain, low back pain and knee pains outcomes.

Most subjects were male (57.9%), aged 17-29 years (61.0%), and presented normal BMI (57.1%). The income was considered similar between categories. Regarding the time of work in the gym clubs, most participants worked for more than four years (51.7%) and 74.8% of the instructors reached the recommendations of occupational physical activity, that is, they performed 150 minutes or more of physical activity per week. Considering the modalities performed by the subjects, bodybuilder instructors (48.5%), personal trainers (38.8%), and gymnastic instructors (16.7%) were the most frequent ones. Concerning the study outcomes, low back pain was the most prevalent (50.1%), followed by knee pains (41.5%) and disabling pain (20.9%).

Chart 1. Variables, operational definition, and categories of the variables used in this study

Variable	Operational definition	Categories
Exposures		
Sociodemographic variables		
Sex	Male or female	Categorical Dichotomous
Age	Full years	Categorical ordinal (17-29; 30-39; 40-49; 50 or more)
Monthly income	Wages derived from the job at the gym club	Quartiles
Nutritional variable		
Body mass index	Determined from body mass (kg) divided by the square of body height (m^2)	Categorical ordinal, classified as normal, overweight, or obese
Work-related variables		
Occupational physical activity	Minutes per week of occupational physical activity estimated by the occupational session of the long version of the International Physical Activity Questionnaire	Quartiles
Time working at the gym clubs	Years working as a gym club instructor	Categorical ordinal (<1 year; 1-2; 2-4; >4 years)
Modalities offered by the gym clubs	Bodybuilding, personal training, gymnastics, fights, dance, Pilates, yoga, and aquatic activities	Dichotomous categorical (yes or no for each activity
Outcomes		
Knee pain	Pain either in just one knee or in both knees in the previous year, verified by Nordic Musculoskeletal Symptoms Questionnaire	Dichotomous categorical (yes or no)
Low back pain	Pain in the low back region in the previous year, verified by Nordic Musculoskeletal Symptoms Questionnaire	Dichotomous categorical (yes or no)
Pain disabling	Need to stop performing any modality due to musculoskeletal pain	Dichotomous categorical (yes or no)

Table 2 shows the crude association between the outcomes and exposure variables. The disabling pain was associated with female sex (PR 1.43 95%CI 1.02-2.01), higher income (PR 1.77 95%CI 1.08-2.88), more years working at the gym (PR 2.47 95%CI 1.26-4.83; PR 2.17 95%CI 1.17-4.04, to 2-4 and more than 4 years of work, respectively), more occupational physical activity time (PR 2.40 95%CI 1.41-4.10, to more than 1500 minutes), being a gymnastic instructor (PR 2.22 95%CI 1.57-3.13) and a personal trainer (PR 1.57 95%CI 1.12-2.21). Low back pain was more prevalent among the female sex (PR 1.50 95%CI 1.26-1.79) and Pilates instructor (PR 1.32 95%CI 1.08-1.61) and less prevalent according to the increase of aging (PR 0.84 95%CI 0.68-1.03; PR 0.71 95%CI 0.47-1.08; PR 0.48 95%CI 0.22-1.03, to 30-39, 40-49 and more than 50 years, respectively), an increase of body mass index (PR 0.78 95%CI 0.64-0.95; PR 0.66 95%CI 0.43-1.63,

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Table 1. Description of the sociodemographic, nutritional, and work-related variables from gym club instructors in the city of Pelotas, southern Brazil, 2011 - 2012 (n=497)

Characteristics	N	%	(95% CI)
Sex			
Male	288	57.9	(53.6-62.3)
Female	209	42.1	(37.7-46.4)
Age (years)			
17-29	303	61.0	(56.7-65.3)
30-39	139	28.0	(24.0-31.9)
40-49	36	7.3	(5.0-9.5)
≥ 50	19	3.7	(2.1-5.5)
Income (quartiles)			
1 (Poorest)	129	26.6	(22.7-30.5)
2	114	23.5	(19.7-27.3)
3	149	30.7	(26.6-34.8)
4 (Richest)	93	19.2	(15.7-22.7)
Body mass index (kg/m²)			
Normal	282	57.1	(52.7-61.5)
Overweight	177	35.8	(31.6-40.1)
Obesity	35	7.1	(4.8-9.4)
Time of work in the gym clubs (years)			
< 1	86	17.3	(14.0-20.6)
1-2	67	13.5	(10.5-16.5)
2-4	87	17.5	(14.2-20.9)
> 4	257	51.7	(47.3-56.1)
Occupational physical activity (quartiles)			
< 150 minutes	125	25.2	(21.3-29.0)
151 600 minutes	126	25.4	(21.5-29.2)
601-1500 minutes	129	26.0	(22.1-29.8)
> 1500 minutes	117	23.4	(19.8-27.3)
Disabling pain			
No	393	79.1	(75.5-82.7)
Yes	104	20.9	(17.3-24.5)
Low back pain			
No	248	49.9	(45.4-54.3)
Yes	249	50.1	(45.6-54.5)
Knee pain			
No	291	58.6	(54.2-62.9)
Yes	206	41.5	(37.1-45.8)
Bodybuilding instructor			
No	256	51.5	(47.1-55.9)
Yes	241	48.5	(44.1-52.9)
Personal trainer			
No	304	61.2	(56.8-65.4)
Yes	193	38.8	(34.6-43.2)
Fight instructor			
No	421	84.7	(81.3-87.6)
Yes	76	15.3	(12.4-18.7)
Gymnastic instructor			
No	414	83.3	(79.7-86.3)
Yes	83	16.7	(13.7-20.3)
Pilates instructor			
No	424	85.3	(81.9-88.2)
Yes	73	14.7	(11.8-18.1)
Aquatic activities instructor			
No	466	93.8	(91.3-95.6)
Yes	31	6.2	(4.4-8.7)
Dance instructor			
No	464	93.4	(90.8-95.2)
Yes	33	6.6	(4.8-9.2)
Yoga Instructor			
No	488	98.2	(96.5-99.1)
Yes	9	1.8	(0.9-3.5)

95% CI: Confidence interval of 95%

Table 2. Prevalence and crude analysis of disabling pain, low back pain, and knee pain outcomes according to the exposure variables from gym club instructors working in the city of Pelotas, southern Brazil, 2011-2012 (n=497)

Characteristics	Disabling pain				Low back pain				Knee pain			
	%	PR	(95%CI)	*p*	%	PR	(95%CI)	*p*	%	PR	(95%CI)	*p*
Sex				*0.039*				*<0.001*				*0.320*
Male	17.7	1.0	1.0		41.3	1.0	1.0		39.6	1.0	1.0	
Female	25.4	1.43	(1.02-2.01)		62.2	1.50	(1.26-1.79)		44.0	1.11	(0.90-1.37)	
Age (years)				*0.467**				*0.004**				*0.079**
17-29	18.8	1.0	1.0		54.8	1.0	1.0		41.9	1.0	1.0	
30-39	26.6	1.41	(0.99-2.03)		46.1	0.84	(0.68-1.03)		46.8	1.12	(0.89-1.39)	
40-49	16.7	0.85	(0.41-1.91)		38.9	0.71	(0.47-1.08)		30.6	0.73	(0.44-1.21)	
≥ 50	21.1	1.12	(0.45-2.76)		26.3	0.48	(0.22-1.03)		15.8	0.38	(0.13-1.07)	
Income (quartiles)				*0.025**				*0.497**				*0.919**
1 (Poorest)	17.1	1.0	1.0		49.6	1.0	1.0		43.4	1.0	1.0	
2	18.4	1.08	(0.63-1.86)		55.3	1.11	(0.88-1.42)		40.4	0.93	(0.69-1.25)	
3	21.5	1.26	(0.77-2.05)		51.0	1.03	(0.81-1.30)		38.3	0.88	(0.66-1.17)	
4 (Richest)	30.1	1.77	(1.08-2.88)		45.2	0.91	(0.69-1.21)		46.2	1.07	(0.79-1.43)	
Body mass index (kg/m²)				*0.429**				*0.005**				*0.463**
Normal	22.0	1.0	1.0		56.0	1.0	1.0		41.5	1.0	1.0	
Overweight	19.8	0.90	(0.62-1.30)		43.1	0.78	(0.64-0.95)		43.5	1.05	(0.84-1.30)	
Obesity	17.1	0.78	(0.36-1.67)		37.1	0.66	(0.43-1.03)		28.6	0.69	(0.40-1.18)	
Time of work in the gym clubs (years)				*0.001**				*0.271**				*0.053**
< 1	11.6	1.0	1.0		52.3	1.0	1.0		37.2	1.0	1.0	
1-2	6.0	0.51	(0.17-1.57)		50.8	0.97	(0.71-1.32)		26.9	0.72	(0.45-1.17)	
2-4	28.7	2.47	(1.26-4.83)		58.6	1.12	(0.86-1.47)		47.1	1.27	(0.89-1.80)	
> 4	25.3	2.17	(1.17-4.04)		46.3	0.88	(0.70-1.13)		44.8	1.20	(0.89-1.63)	
Occupational physical activity (quartiles)				*0.001**				*0.920**				*0.023**
< 150 minutes	12.8	1.0	1.0		51.2	1.0	1.0		30.4	1.0	1.0	
151-600 minutes	19.1	1.49	(0.83-2.67)		48.4	0.95	(0.74-1.21)		44.4	1.46	(1.05-2.03)	
601-1500 minutes	21.7	1.70	(0.97-2.98)		51.2	1.00	(0.79-1.27)		46.5	1.53	(1.10-2.11)	
> 1500 minutes	30.8	2.40	(1.41-4.10)		49.6	0.97	(0.75-1.24)		44.4	1.46	(1.05-2.04)	
Gymnastic Instructor				*<0.001*				*0.889*				*0.049*
No	17.4	1.0	1.0		50.2	1.0	1.0		39.6	1.0	1.0	
Yes	38.6	2.22	(1.57-3.13)		49.4	0.98	(0.77-1.25)		50.6	1.28	(1.00-1.63)	

PR: Prevalence ratio; 95% CI: Confidence interval of 95% *Linear trend test

Table 2. Continued...

Characteristics	Disabling pain				Low back pain				Knee pain			
	%	PR	(95%CI)	*p*	%	PR	(95%CI)	*p*	%	PR	(95%CI)	*p*
Pilates Instructor				*0.487*				*0.008*				*0.418*
No	21.5	1.0	1.0		47.9	1.0	1.0		42.2	1.0	1.0	
Yes	17.8	0.83	(0.49-1.40)		63.0	1.32	(1.08-1.61)		37.0	0.88	(0.64-1.21)	
Aquatic activities instructor				*0.232*				*0.322*				*0.392*
No	20.4	1.0	1.0		49.6	1.0	1.0		41.0	1.0	1.0	
Yes	29.0	1.42	(0.80-2.54)		58.1	1.17	(0.86-1.60)		48.4	1.18	(0.81-1.73)	
Yoga Instructor				*0498*				*0.383*				*0.850*
No	21.1	1.0	1.0		50.4	1.0	1.0		41.4	1.0	1.0	
Yes	11.1	0.53	(0.82-3.37)		33.3	0.66	(0.26-1.67)		44.4	1.07	(0.51-2.25)	
Bodybuilding Instructor				*0.593*				*0.445*				*0.871*
No	21.9	1.0	1.0		48.4	1.0	1.0		41.8	1.0	1.0	
Yes	19.9	0.91	(0.65-1.28)		51.9	1.07	(0.90-1.28)		41.1	0.98	(0.80-1.21)	
Personal trainer				*0.009*				*0.174*				*0.038*
No	17.1	1.0	1.0		47.7	1.0	1.0		37.8	1.0	1.0	
Yes	26.9	1.57	(1.12-2.21)		53.9	1.13	(0.95-1.35)		47.2	1.25	(1.01-1.53)	
Fight Instructor				*0.516*				*0.014*				*0.899*
No	20.4	1.0	1.0		52.7	1.0	1.0		41.3	1.0	1.0	
Yes	23.7	1.16	(0.74-1.81)		35.5	0.67	(0.49-0.92)		42.1	1.02	(0.76-1.36)	
Dance Instructor				*0.967*				*0.582*				*0.906*
No	20.9	1.0	1.0		49.8	1.0	1.0		41.4	1.0	1.0	
Yes	21.2	1.01	(0.51-2.01)		54.6	1.10	(0.79-1.51)		42.4	1.03	(0.68-1.55)	

PR: Prevalence ratio; 95% CI: Confidence interval of 95% *Linear trend test

to overweight and obesity, respectively), and in the fight instructor (PR 0.67 95%CI 0.49-0.92). Knee pain was more frequently reported by those with higher levels of occupational physical activity time (PR 1.46 95%CI 1.05-2.04, to more than 1500 minutes), gymnastic instructors (PR 1.28 95%CI 1.00-1.63) and personal trainers (PR 1.25 95%CI 1.01-1.53).

The results of the adjusted analysis between the exposure variables and the outcomes of disabling pain, low back pain, and knee pains are presented in Table 3. The outcome of disabling pain was directly associated with the variables gymnastic modality performed in the gym clubs (PR 1.7 95%CI 1.18-2.46) and time of work in the gym clubs (PR 2.17 95%CI 1.09-4.32, to 2-4 years of work). The independent variables age (inversely) (PR 0.89 95%CI 0.73-1.10; PR 0.73 95%CI 0.48-1.11; PR 0.52 95%CI 0.23-1.15, to 30-39, 40-49 and more than 50 years, respectively), female sex (PR 1.43 95%CI 1.20-1.71) and Pilates instructor (PR 1.28 95%CI 1.03-1.61) were associated to the outcome low back pain. Regarding knee pains outcome, age (inversely) (PR 0.34 95%CI 0.12-0.96, more than 50 years) and time of work in the gym clubs (PR 1.22 95%CI 0.86-1.73; PR 1.24 95%CI 0.89-1.72, to 2-4 and more than 4 years of work, respectively) variables were significantly associated.

DISCUSSION

The present study aimed to identify the prevalence of knee, low back, and disabling pain and its association with sociodemographic, nutritional, and occupational variables in instructors from gym clubs in the city of Pelotas, southern Brazil. Although gym club instructors are closely linked to health and well-being, this group of workers shows specific characteristics that may favor the involvement in musculoskeletal disorders in their occupational routines.

The adjusted analyzes identified that variables such as sex, age, and time of work in the gym clubs and working as Pilates or as gymnastic instructors were associated with a higher prevalence of WMSDs. In addition, our hypothesis indicating the need to consider different demographic and occupational contexts of instructors working in gyms should be observed in the assessment of musculoskeletal disorders was confirmed.

The adjusted analysis showed that the longer the time of work in the gym clubs the higher the prevalence of both knees pain and disabling pain, which interfered with the modalities performed by the instructors in the gym clubs. The repetition of the strenuous routine, determining great physiological and articular demands, high workload, and insufficient rest intervals between the efforts can help to explain the association[5,6,13]. Although there is common sense that gym club instructors are healthy people, when it comes to WMSDs, these workers show similarities with other professions, obviously respecting the ergonomic characteristics of each one[14-17].

The disabling pain outcome was associated with the instructor of the gymnastic modality performed in the gym clubs variable. In general, these professionals perform the activities together with their clients, demonstrating the correct way and motivating them to carry out the exercises until the end. In addition, these instructors suffer from a heavy load of physical work, which can lead to disabling pain in their occupational activity[17,18].

According to the literature, 60-80% of the adult population have already presented low back pain at some time in life, regardless of the occupational activity performed. In addition, most of the population already presented an episode of this pain varying in intensity, ranging from mild discomfort to disabling and long-lasting pain[19]. Moreover, low back pain can be multicausal having different occupational factors influencing its onsets, such as physical strain and repetitive tasks[20-22]. In the present study, 50.1% of gym club instructors presented low back pain in the previous year; the pain was associated with the female sex, demonstrating that women are at higher risk of developing this morbidity than men. This fact is well documented by several studies that also observed a higher risk in the female when compared to their peers[23-25]. The double burden of work observed in women and their anatomical characteristics differing from the male are factors that may explain the greater involvement of this type of pain in female individuals[25].

Table 3. Adjusted analysis of disabling pain, low back pain, and knee pain outcomes according to the exposure variables from gym club instructors working in the city of Pelotas, southern Brazil, 2011 - 2012 (n=497)

Characteristics	Disabling pain			Low back pain				Knee pain			
	PR	(95%CI)	*p*	%	PR	(95%CI)	*p*	%	PR	(95%CI)	*p*
Sex			*0.066*				*<0.0001*				-
Male	1.0	1.0		41.3	1.0	1.0		-	-	-	
Female	1.41	(0.98-2.02)		62.2	1.43	(1.20-1.71)		-	-	-	
Age (years)			-				*0.015**				*0.008**
17-29	-	-		54.8	1.0	1.0		41.9	1.0	1.0	
30-39	-	-		46.1	0.89	(0.73-1.10)		46.8	1.0	(0.78-1.28)	
40-49	-	-		38.9	0.73	(0.48-1.11)		30.6	0.62	(0.37-1.05)	
≥ 50	-	-		26.3	0.52	(0.23-1.15)		15.8	0.34	(0.12-0.96)	
Time of work in the gym clubs (years)			*0.021**				-				*0.011**
< 1	1.0	1.0		-	-	-		37.2	1.0	1.0	
1-2	0.48	(0.16-1.48)		-	-	-		26.9	0.7	(0.43-1.14)	
2-4	2.17	(1.09-4.32)		-	-	-		47.1	1.22	(0.86-1.73)	
> 4	1.68	(0.88-3.21)		-	-	-		44.8	1.24	(0.89-1.72)	
Occupational physical activity (quartiles)			*0.051**				-				*0.072**
< 150 minutes	1.0	1.0		-	-	-		30.4	1.0	1.0	
151-600 minutes	1.15	(0.65-2.05)		-	-	-		44.4	1.42	(1.02-1.97)	
601-1500 minutes	1.29	(0.74-2.25)		-	-	-		46.5	1.50	(1.09-2.06)	
> 1500 minutes	1.62	(0.94-2.80)		-	-	-		44.4	1.37	(0.98-1.91)	
Gymnastic instructor			*0.004*				-				-
No	1.0	1.0		-	-	-		-	-	-	
Yes	1.7	(1.18-2.46)		-	-	-		-	-	-	
Pilates Instructor			-				*0.029*				-
No	-	-		47.9	1.0	1.0		-	-	-	
Yes	-	-		63.0	1.28	(1.03-1.61)		-	-	-	
Bodybuilding Instructor			-				*0.108*				-
No	-	-		48.4	1.0	1.0		-	-	-	
Yes	-	-		51.9	1.16	(0.97-1.40)		-	-	-	

Income, body mass index, aquatic activities instructor, and Yoga instructor variables were taken from the adjusted analysis. However, as they lost significance (p>0.2), they are not shown in this table. PR: Prevalence ratio; 95% CI: Confidence interval of 95% *Linear trend test

Table 3. Continued...

Characteristics	Disabling pain			Low back pain				Knee pain			
	PR	(95%CI)	*p*	%	PR	(95%CI)	*p*	%	PR	(95%CI)	*p*
Personal trainer			*0.06*				*0.095*				-
No	1.0	1.0		47.7	1.0	1.0		-	-	-	
Yes	1.38	(0.97-1.93)		53.9	1.16	(0.97-1.39)		-	-	-	
Fight Instructor			*0.157*				-				-
No	1.0	1.0		-	-	-		-	-	-	
Yes	1.41	(0.88-2.27)		-	-	-		-	-	-	
Dance Instructor			-				*0.173*				-
No	-	-		49.8	1.0	1.0		-	-	-	
Yes	-	-		54.6	1.25	(0.91-1.74)		-	-	-	

Income, body mass index, aquatic activities instructor, and Yoga instructor variables were taken from the adjusted analysis. However, as they lost significance (p>0.2), they are not shown in this table. PR: Prevalence ratio; 95% CI: Confidence interval of 95% *Linear trend test

The exposure variable age was inversely associated with low back pain and knee pain outcomes, indicating that older professionals presented lower pain prevalence compared to a younger age. Silva et al.[25] when analyzing this outcome, observed a positive association between the variables in a population-based sample from a city in southern Brazil. Gonçalves[26] studying physical education teachers working in gym clubs in the city of Salvador (northeast, Brazil) also identified a positive association between age and pain variables. It should be noted that the population of the present study has different characteristics from the population in general, a possible reason that may explain the differences found in relation to the reported by Silva et al.[25]. In addition, the study conducted by Gonçalves[26] performed convenience sampling, a fact that may justify the discrepancy of results in the association of variables age and pain since the present research performed a census-type study. The main hypothesis for younger people feel more pain may be related to the fact that, possibly, young professionals use the body as an instrument to develop the necessary work routine (e.g. fight, dance, aquatic activities). In addition, the present results indicated that most instructors were young (under 30 years of age). In this sense, another hypothesis is that professionals stop being gym instructors as age advances, and this fact may be related to the physical demand that the work imposes on the body.

We found that Pilates instructors were at risk for low back pain. It should be noted that this modality is widely recommended in the literature as a means of improving the pain condition in this anatomical region[27,28]. However, no studies were found considering this issue for Pilates instructors. The hypothesis for this finding is related to the fact that these instructors have high workloads, and during the sessions, they need to demonstrate the movements to help the clients to perform the exercises. In this sense, Pilates instructors should pay attention to their posture to try avoid low back pain.

The limitations and strengths of the present study should be addressed. The cross-sectional design does not allow the verification of cause and effect relationships for variables that may change according to the presence/absence of the outcome, being this a characteristic of this type of study. Another negative point concerns the small number of subjects to conduct stratified analysis, such as for example, associations with modalities performed with few instructors. Despite these limitations, this was a census-type study that presented a low number of losses and refusals, used validated and pre-tested instruments, and carried out careful logistics, facts that strengthen the results reported.

It was concluded that instructors from gym clubs had a high prevalence of the three outcomes analyzed. Those who have been working longer time at gym clubs, women, youngers, Pilates, or gymnastic instructors were at an increased risk of presenting the outcomes here investigated. These characteristics should be taken into account in health promotion actions for this population. More research is warranted, especially using longitudinal designs, to better understand the risk factors associated with musculoskeletal disorders development.

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