ISSN 0103-5150
Fisioter. Mov., Curitiba, v. 30, n. 2, p. 255-265, Apr./June 2017

DOI: http://dx.doi.org/10.1590/1980-5918.030.002.AO06

Prevalence and factors associated to back pain in adults from the northeast of São Paulo, Brazil: a population-based study

Prevalência e fatores associados à dor na coluna vertebral em adultos do noroeste de São Paulo, Brasil: estudo de base populacional

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Abstract

Introduction: Back pain has become a serious public health problem. **Objective**: To determine the prevalence of back pain in a population-based sample of subjects over 20 years old living in the city of Bauru (São Paulo, Brazil) and to analyze the associations to variables- sociodemographic, ergonomic and lifestyle-related – and to morbidity. **Methods**: a cross-sectional study which evaluated 600 adults over 20 years old, both gender and living in the city. We used a structured protocol and the Nordic questionnaire. Also, we developed a descriptive analysis, bivariate and multivariate by binary logistic regression. **Results**: The prevalence of back pain was of 50.3% (CI 46.3 to 54.3), since 42.3% (CI 36.9 to 48.0) in men and 57.6% (CI 51.9 to 63.0) in women, with statistical significant difference (p = 0.001). Different variables remained in final models when assessed by gender. For male to be widowed and divorced and smoking habits and, for women to be widowed and divorced, to work in seated position and to perform occupational activities that demand carrying and lifting weight. **Conclusion**: We verified high prevalence in back pain in the population

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of Bauru and high association to widowed/divorced in both gender, with women performing occupational activities usually or always in seated position, those who carry or lift weight in work and men who smoke.

Keywords: Epidemiology. Spine. Back Pain. Neck Pain. Risk Factors.

Resumo

Introdução: *As dores na coluna vertebral tornaram-se um grave problema de saúde pública.* ***Objetivo****: Verificar a prevalência de dor na coluna vertebral em uma amostra de base populacional de indivíduos com idade superior a 20 anos residentes na cidade de Bauru (São Paulo, Brasil) e analisar as associações as variáveis sociodemográficas, ergonômicas, relacionadas ao estilo de vida e a morbidade referida.* ***Métodos****: Estudo transversal que avaliou 600 adultos com idade superior a 20 anos, de ambos os sexos, moradores da zona urbana do município. Utilizou-se um protocolo estruturado e o questionário Nórdico. Realizou-se uma análise descritiva, bivariada e multivariada por regressão logística binária.* ***Resultados****: A prevalência de dor nas costas foi 50,3% (IC95% 46,3 a 54,3), sendo que, 42,3% (IC95% 36,9 a 48,0) nos homens e 57,6% (IC95% 51,9 a 63,0) nas mulheres com diferença estatisticamente significativa (p = 0,001). Diferentes variáveis permaneceram nos modelos finais ao se considerarem, em separado, o sexo masculino e o feminino. Ser viúvo e separado e tabagismo para o sexo masculino e, para o feminino, ser viúva e separada, trabalho na postura sentada e exercer atividades ocupacionais que exigem transporte e carregamento de peso.* ***Conclusão****: Verificou uma prevalência alta de dor na coluna vertebral na população de Bauru e marcante associação com marcante associação com os viúvos/separados, em ambos os sexos, com as mulheres que exercem suas atividades ocupacionais, geralmente ou sempre, na postura sentada, naqueles que transportam e carregam pesos regulamente no trabalho e nos homens tabagistas.*

Palavras-chave: *Epidemiologia. Coluna Vertebral. Dor Lombar. Dor Cervical. Fatores de Risco.*

Introduction

Back pain has become a serious public health problem, since it has high incidence in economically active population, whereas seventy percent of adults experience it in some point of their lives, resulting in more than 15 million doctors' appointments in one year (1).

Population-based studies about the prevalence of back pain are relevant since it creates social and economic consequences for both State and subjects. To the subject, it means the loss of life quality and, to the State, the costs of treatment and rehabilitation, besides work absence. Also, knowing the sociodemographic and behavioral profile; the work and general health of these subjects; and the risk factors associated to musculoskeletal symptoms, is essential for public policies that aim this problem control based on preventive and/or therapeutic interventions (2).

Back pain may have specific causes (inflammatory diseases, degenerative diseases, neoplasia, congenital impairment, muscle weakness, degeneration signs of spine or intervertebral discs) and non-specific, such as sociodemographic factors (age, gender, income and education), behavioral (smoking and low physical activity level), every day and work expositions (exhaustive work, vibration, vicious posture, repetitive movements), among others (obesity and psychological factors) (3, 4, 5).

Some studies show the relation between back pain and the associated factors. In Salvador (BA, Brazil), researchers observed that being single was a protector factor, while smoking habit was a possible factor to back pain (3). However, in Pelotas (RS, Brazil) subjects between 50 and 59 years old presented about eight times more chronic back pain than those between 20 and 29. The categories of low education level, from 1 to 4 and 5 to 8 years of studying had, at least, double the risk of presenting the condition than the people who had 12 years of education or more. Also, they found significant risks higher than 2.0 for people with current smoking habit when compared to those who doesn't smoke; as well as those who usually or always practice every day activities

performing repetitive movements or carrying weight, when compared to those who perform activities in vicious position (4). In American adults, back and low back pain was related to the presence of comorbities (respiratory, cardiovascular and gastrointestinal diseases, among others) and psychological alterations (depression, insomnia or trouble falling asleep) (1). In Thailand, researchers observed that back pain was associated to incorrect posture at work (forward bending while sitting), standing more than two hours in occupational activities and previous history of working as an office worker (5).

Considering the theoretical reference, we aimed to verify the prevalence of back pain in a population-based sample of subjects over 20 years old living in the city of Bauru (São Paulo, Brazil), and to analyze the associations to sociodemographic, ergonomic and lifestyle-related variables and to morbidity.

Methods

Cross-sectional study developed in the urban zone in the city of Bauru SP, Brazil, a city with 316.064 habitants, in which 207.021 is over 20 years old.

First, we defined groups of age and gender called sample domains, for those, it will be guaranteed minimum number to allow further analysis. The sample domains were: From 20 to 35 years old for male gender; 20 to 35 for female; 36 to 59 for male; 36 to 59 for female; 60 years or more for male; 60 years or more for female.

The sample calculation was based on the estimated proportion in the population subgroups of 50% ($p = 0.50$), since it is the maximum variability that conduct to obtain sizes of conservatory samples; the confidence interval of 95% ($z = 1.96$) in the determination of it in estimative; sample error of 10% indicating the amplitude between sample evaluation and population parameter should not exceed this value ($d = 0.1$); and the design effect (deff) equal to 2. Therefore, the sample size for the group was a minimum of 200 subjects (100 male and 100 female), a total of 600 participants.

The draw of the sample was calculated by two-stage cluster. Census sectors constituted the primary sampling units (PSU), and the household sector, the secondary. We draw the PSUs with proportional probability of its size by random draw. The samples were obtained by the National Household Samples Survey from 2010, which provide a list of private homes addresses of each census sector. We drawn 50 urban census sectors of the 476 identified.

For each census sector, we determined a number of households to be drawn by calculating the ratio of subjects average by the household number in each sample domain (6). Therefore, we estimated it should be visited around 12 households by census sector. These households were draw systematically and were considered eligible to be interviewed all the subjects living in the house. In the case of refuse, a new household was drawn.

We considered being losses the subjects that were not reached after four visits, being, at least, one at night and one on the weekends; and those who were unable to answer the interview due to travelling. And, refuses were considered those who denial to answer the questionnaire by personal option.

Subjects who were institutionalized (nursing homes, hospitals, prisons, etc.) and those not having mental condition to answer were excluded from study. The aged subjects were submitted to a mini-exam of Mental State in the beginning of the questionnaire, to assess their cognitive state and verify the reliability of their answers. Participants who scored below 27 points were excluded (7).

The interviews were conducted by 10 interviewers, senior students of the Physical Therapy graduation. All of them completed 40 hours of training, which included aspects related to interviewing technique, household approach and training related to interest questions of the research tool. A pilot study was conducted as part of the interviewers training to verify question understanding. Field practice was supervised by researchers involved in the study, being each supervisor responsible for following two interviewers.

Data collection comprised the period between February and June 2012, by means of questionnaires. The code was developed right after the interviews by the interviewers themselves. The supervisors had also carried through the quality control that consisted on the application of questionnaires with reduced number of questions, to 10% of the interviewed subjects.

The data from aspects demographic (gender, age, marital status and color of the skin), socioeconomic (education and income); ergonomic (seated work, standing, crouched, lying, kneeled, vibration and/or trepidation, carrying weight, repetitive movement);

and related to the life style (physical activity, smoking), were collected by means of a pre-coded questionnaire, with closed questions. We considered to be a smoker those who affirmed to smoke daily (at least a cigarette per day) or occasionally (less than one cigarette per day); and former-smokers were considered those who had quit smoking at least six months ago.

To verify the level of physical activity, we applied the International Questionnaire of Physical Activity — Short Form (IPAQ-SF), which contains questions related to the weekly frequency and the duration in minutes of every day physical activities of vigorous, moderate and for walking. The questionnaire was properly validated for the Brazilian population, getting coefficient of validation for the short version of r = 0.75 (8). A cut-point of 150 minutes per week was used to classify subjects as active (150 min/per week or more) or insufficiently active — below of 150 min/per week (9).

The Morbidity data was collected by means of interview, in which subjects answered to the following question: amongst the alternatives below (hypertension, osteoporosis, diabetes, osteoarthrosis, skin diseases, gastrointestinal, respiratory, duodenal or liver disease, genital and urinary system), that one (s) that corresponds (m) to diagnosis (s) have received from any doctor in the last 12 months (10).

The question used for the definition of pain in the spine was: "In the last year, have you already felt any pain in your back?" In the case of positive answer, the interviewed subject would have to indicate the part in a figure of an erect human being differing, with colors, the regions of the lumbar, thoracic and cervical column (11).

The obtained data were introduced in a data base and the analysis were conducted using the statistical program SPSS, version 10.0 (SPSS, Chicago, United States). The analysis was conducted through a descriptive and inferential approach. In the descriptive approach, we conducted the distributions of absolute and relative frequency for categorical variables; and in the analytical approach we developed bivariate analysis through Pearson's chi-square test and followed by a multivariate analysis by binary logistic regression, according to the hierarchical model. We adopted the method "backward stepwise" of variables introduction. The model considered for the hierarchy previous mentioned was constituted by three levels: first, where the demographic variable are inserted (gender, age and color of the skin); second, where there are socioeconomic variables (income and education) and demographic variables (marital status); and third that encloses the ergonomic variables (seated work, standing, crouching, knelling, lying, vibration and/or trepidation and repetitive movement) and the behavioral variable (low physical activity, smoking). The effect of variables in the first level were controlled between themselves; those in the second level they were controlled between them and for the ones in the first level; variables in the third level were controlled between them and for the ones in the two previous levels. The variable that presented in the bivariate analysis value $p \leq 0.2$ came into the hierarchized model of analysis. Variables that in the multivariate analysis also presented value $p \leq 0.2$ remained in the model whenever they filled the criteria for probable factors of confusion. For the election of variables that remained in the model of logistic regression, it was used the selection process backward stepwise, remaining, in the final model, all variables that presented value $p < 0.05$.

The project was approved by the Committee of Ethics in Research of the Universidade do Sagrado Coração, under protocol number 251/97. The participants signed the Consent Form, as recommendations of Resolution 196 of the National Health Council.

Results

In the drawn households 641 subjects were found to be eligible, being effectively interviewed 600 individuals. The main reasons of losses (n = 41) were: *"it did not have anybody at home"* and *"they had an appointment with the interviewer and they did not attend"*; and the reasons of refusals: *"they do not answer the interview"* and *"too long and out of time to answer"*.

Table 1 shows the sociodemographic characteristics — level of physical activity and smoking — of the sample with individuals over 20 years old, living in the city of Bauru.

From the interviewed subjects 94.3% watch TV whereas 90.0% of them do it more than three times per week and 43.8% three or more hours per day. Regarding computer and videogame usage, 47.7% use it and 41.5% of subjects do it over than five hours per day and 26.5% up to two hours per day.

Regarding the position at work, we observed that 32.3% of the subjects always work in seated position;

43.8% standing; 24.7% standing and forward bending; 6.8% sitting and forward bending; 2.8% in kneeled position; and 2.0% sitting lifting weight. Near 36.5% of the subjects always performed repetitive movements; 13.8% always carried weight; and 7.0% were always exposed to vibration.

From total of subjects, 50.3% (CI95% 46.3 to 54.3) reported back pain at least once in the last 12 months previous to the interview, since 42.3% (CI95% 36.9 to 48.0) of men and 57.6% (CI95% 51.9 to 63.0) of women, with statistical significant difference (p=0.001). Low back pain was predominant (34.2%; CI 95% 30.4 to 38.0), followed by thoracic pain (22.5%; CI95% 19.3 to 26.0) and cervical pain (20.3%; CI95% 17.2 a 23.7).

In Table 2 we observed that back pain was significantly higher in subjects widowed or divorced for both gender; in low income women, and low education level and smokers men. We also notice, for men ever since the age increased there was a tendency of increasing the frequency of pain.

In Table 3 analysis, we observed that back pain was significantly higher in men who watch TV more than 3 times in week and women who use the computer more than 3 hours per day.

Table 1 - Frequency distribution of the sociodemographic characteristics – level of physical activity and smoking – from the sample with individuals over 20 years old, living in the city of Bauru, by gender

Factors	Gender			
	Male		Female	
	n	% (CI95%)	n	% (CI95%)
Years of Education				
0 to 4 years	52	17.3 (13.4 - 22.0)	70	23.3 (18.9 - 28.4)
5 to 8 years	65	21.7 (17.3 - 26.6)	64	21.3 (17.0 - 26.3)
9 to 11 years	126	42.0 (36.5 - 47.6)	118	39.3 (33.9 - 44.9)
12 years or higher	57	19.0 (14.9 - 23.8)	48	16.0 (12.2 - 20.5)
Race				
White	237	79.0 (74.0 - 83.2)	243	81.0 (76.1 - 85.0)
Black	17	5.7 (3.5 - 8.8)	21	7.0 (4.6 - 10.4)
Brown/mixed race	46	15.3 (11.7 - 19.8)	36	12.0 (8.8 - 16.1)
Marital Status				
Married	180	60.0 (54.3 - 65.3)	165	55.0 (49.3 - 60.5)
Never Been Married	85	28.3 (923.5 - 33.6)	65	21.7 (17.3 - 26.6)
Widower/Divorced	35	11.7 (8.5 - 15.7)	70	23.3 (18.9 - 28.4)
Income				
Low	189	63.0 (57.4 - 68.2)	200	66.7 (61.1 - 71.7)
Average	72	24.0 (19.5 - 29.1)	68	22.7 (18.2 - 27.7)
High	39	13.0 (9.6 - 17.2)	32	10.7 (7.6 - 14.6)
Smoking				
Non smoker	160	53.3 (47.6 - 58.9)	203	67.7 (62.1 - 72.7)
Former-smoker	74	24.7 (20.1 - 29.8)	54	18.0 (14.0 - 22.7)
Smoker	66	22.0 (17.6 - 27.0)	43	14.3 (10.8 - 18.7)
Level of Physical Activity				
Active	99	33.0 (27.9 - 38.5)	111	37.0 (31.7 - 42.6)
Sedentary	201	67.0 (61.4 - 72.0)	189	63.0 (57.4 - 68.2)

Table 2 - Bivariate analysis between sociodemographic characteristics – smoking and physical activity level and pain in spine – from subjects over 20 years old, living in the city of Bauru (São Paulo, Brazil), by gender

Factors	Back Pain					
	Male		χ^2 value and *p*	Female		χ^2 value and *p*
	n	% (CI95%)		n	% (CI95%)	
Age						
20 to 35 years old	33	25.7 (18.9 - 33.9)		57	32.7 (26.2 - 40.0)	
36 to 59 years old	46	35.9 (28.1 - 44.5)	$\chi^2 = 5.914$	56	32.1 (25.6 - 39.4)	$\chi^2 = 0.575$
60 or more	49	38.2 (30.3 - 46.9)	p = 0.05	61	35.0 (28.3 - 42.4)	p = 0.74

(To be continued)

(Conclusion)

Table 2 - Bivariate analysis between sociodemographic characteristics – smoking and physical activity level and pain in spine – from subjects over 20 years old, living in the city of Bauru (São Paulo, Brazil), by gender

Factors	Back Pain					
	Male		χ^2 value and *p*	Female		χ^2 value and *p*
	n	% (CI95%)		n	% (CI95%)	
Years of Education						
0 to 4 years old	29	22.6 (16.2 - 30.6)		47	27.0 (20.9 - 34.0)	
5 to 8 years old	28	21.8 (15.5 - 29.8)	$\chi^2 = 8.311$	35	20.1 (14.8 - 26.6)	$\chi^2 = 3.187$
9 to 11 years old	43	33.5 (26.0 - 42.1)	p = 0.03	66	37.9 (31.0 - 45.3)	p = 0.34
More than 12 years old	28	21.8 (15.5 - 29.8)		26	14.9 (10.4 - 20.9)	
Race						
White	94	73.4 (65.1 - 80.3)		138	79.3 (72.6 - 84.6)	
Black	7	5.4 (2.6 - 10.8)	$\chi^2 = 5.721$	13	7.4 (4.4 - 12.3)	$\chi^2 = 0.670$
Brown/mixed race	27	21.0 (14.9 - 28.9)	p = 0.05	23	13.2 (8.9 - 19.0)	p = 0.67
Marital Status						
Married	71	55.4 (46.8 - 63.7)		90	51.7 (44.3 - 59.0)	
Never Been Married	32	25.0 (18.3 - 33.1)	$\chi^2 = 13.476$	36	20.6 (15.3 - 27.3)	$\chi^2 = 4.202$
Widower/Divorced	25	19.5 (13.5 - 27.2)	p = 0.001	48	27.5 (21.4 - 34.6)	p = 0.04
Income						
Low	82	64.0 (55.4 - 71.8)		127	72.9 (65.9 - 79.0)	
Average	31	24.2 (17.6 - 32.3)	$\chi^2 = 0.326$	32	18.3 (13.4 - 24.8)	$\chi^2 = 7.451$
High	15	11.7 (7.2 - 18.4)	p = 0.84	15	8.6 (5.2 - 13.7)	p = 0.02
Smoking						
Non smoker	54	42.1 (33.9 - 50.8)		121	69.5 (62.3 - 75.9)	
Former-smoker	37	28.9 (21.7 - 37.2)	$\chi^2 = 11.667$	30	17.2 (12.3 - 23.5)	$\chi^2 = 0.707$
Smoker	37	28.9 (21.7 - 37.2)	p = 0.003	23	13.2 (8.9 - 19.0)	p = 0.70
Level of Physical Activity						
Active	46	35.9 (28.1 - 44.5)	$\chi^2 = 0.870$	63	36.2 (29.4 - 44.5)	$\chi^2 = 0.112$
Sedentary	82	64.0 (55.4 - 71.8)	p = 0.35	111	63.7 (56.4 - 70.5)	p = 0.73

Table 3 - Bivariate analysis between back pain and sedentary activities of the sample with subjects over 20 years old, living in the city of Bauru (São Paulo, Brazil), by gender

Factors	Back Pain					
	Male		χ^2 value and *p*	Female		χ^2 value and *p*
	n	% (CI95%)		n	% (CI95%)	
Watch TV						
Yes	124	96.8 (92.2 - 98.7)	$\chi^2 = 2.698$	164	94.2 (89.7 - 96.8)	$\chi^2 = 0.707$
No	4	3.1 (1.2 - 7.7)	p = 0.08	10	5.7 (3.1 - 10.2)	p = 0.005
Number of hours TV/week						
Up to 2	5	4.0 (1.7 - 9.0)	$\chi^2 = 8.060$	6	3.6 (1.6 - 7.7)	$\chi^2 = 4.951$
3 or more	119	95.9 (90.9 - 98.2)	p = 0.04	158	96.3 (92.2 - 98.3)	p = 0.17
Amount of hours TV/day						
Up to 2	62	50.0 (41.3 - 58.6)	$\chi^2 = 2.169$	93	56.7 (49.0 - 64.0)	$\chi^2 = 0.596$
More than 3	62	50.0 (41.3 - 58.6)	p = 0.20	71	43.2 (35.9 - 50.9)	p = 0.74
Computer usage						
Yes	59	46.0 (37.7 - 54.7)	$\chi^2 = 3.869$	71	40.8 (33.7 - 48.2)	$\chi^2 = 0.587$
No	69	53.9 (45.2 - 62.3)	p = 0.06	103	59.2 (51.7 - 66.2)	p = 0.44
Number of hours computer/ week						
Up to 2	10	16.6 (9.3 - 28.0)	$\chi^2 = 6.540$	17	24.2 (15.7 - 35.5)	$\chi^2 = 10.085$
3 or more	50	83.3 (71.9 - 90.6)	p = 0.08	53	75.7 (64.5 - 84.2)	p = 0.01
Amount of hours TV/day						
Up to 2	33	55.0 (42.4 - 66.9)	$\chi^2 = 3.232$	47	67.1 (55.5 - 77.0)	$\chi^2 = 4.937$
More than 3	27	45.0 (33.0 - 57.5)	p = 0.19	23	32.8 (23.0 - 44.5)	p = 0.04

To define the association between back pain and ergonomic variables, frequencies obtained in categories "never" and "rarely" were enclosed in one group, the same was done with categories "usually"and "always".

We observed that prevalence of pain is higher for those usually/always exposed to work demanding carrying and lifting weight for both gender; for women performing a work in seated position, seated position lifting weight and sitting forward bending, and with vibration when comparing to those who never do any of them (Table 4).

The prevalence of back pain disclosed that widowed and divorced women and men had, respectively, two and three times higher risk of presenting the condition than single and married. Nevertheless, we notice that women who perform daily activities, usually or always, in seated position, presented significant risks almost two times more. And those who carry and lift weight regularly have two times more chances to develop back pain when compare to those women who never performed these activities (Table 5). We also notice that men who smoke have two times more chances of developing back pain.

Table 4 - Bivariate analysis between back pain and ergonomic variables of the sample with subjects over 20 years old, living in the city of Bauru (São Paulo, Brazil), by gender

Factors	Back Pain					
	Male		χ^2 value and *p*	Female		χ^2 value and *p*
	n	% (CI95%)		n	% (CI95%)	
Repetitive Movements						
Never/ Rarely	51	39.8 (31.7 - 48.5)	$\chi^2 = 1.107$	58	33.3 (26.7 - 40.6)	$\chi^2 = 1.982$
Always/ Usually	77	60.1 (51.5 - 68.2)	p = 0.29	116	66.6 (59.3 - 73.2)	p = 0.15
Vibration/ Trepidation						
Never/ Rarely	107	83.5 (76.2 - 89.0)	$\chi^2 = 2.472$	147	84.4 (78.3 - 89.1)	$\chi^2 = 8.635$
Always/ Usually	21	16.4 (10.9 - 23.7)	p = 0.11	27	15.5 (10.8 - 21.6)	p = 0.003
Carrying and Lifting weight						
Never/ Rarely	72	56.2 (47.6 - 64.5)	$\chi^2 = 3.519$	109	62.6 (55.2 - 69.4)	$\chi^2 = 14.050$
Always/ Usually	56	43.7 (35.4 - 52.4)	p = 0.05	65	37.3 (30.5 - 44.7)	p = 0.001
Seated position						
Never/ Rarely	45	35.1 (27.4 - 43.7)	$\chi^2 = 0.219$	56	32.1 (25.6 - 39.4)	$\chi^2 = 5.304$
Always/ Usually	83	64.8 (56.2 - 72.5)	p = 0.64	118	67.8 (60.5 - 74.3)	p = 0.02
Seated and lifting weight						
Never/ Rarely	118	92.1 (86.2 - 95.7)	$\chi^2 = 0.079$	152	87.3 (81.6 - 91.5)	$\chi^2 = 12.138$
Always/ Usually	10	7.8 (4.3 - 13.7)	p = 0.77	22	12.6 (8.5 - 18.4)	p = 0.001
Sitting forward bending						
Never/ Rarely	92	71.8 (63.5 - 78.9)	$\chi^2 = 0.524$	115	66.0 (58.7 - 72.7)	$\chi^2 = 13.466$
Always/ Usually	36	28.1 (26.6 - 57.3)	p = 0.46	59	33.9 (27.2 - 41.2)	p = 0.001
Standing position						
Never/ Rarely	27	21.0 (14.9 - 28.9)	$\chi^2 = 0.818$	46	26.4 (20.4 - 33.4)	$\chi^2 = 0.760$
Always/ Usually	101	78.9 (71.0 - 85.0)	p = 0.36	128	73.5 (66.5 - 79.5)	p = 0.18
Standing forward bending						
Never/ Rarely	66	51.5 (42.9 - 60.0)	$\chi^2 = 0.868$	89	51.5 (43.7 - 58.4)	$\chi^2 = 1.316$
Always/ Usually	62	48.4 (39.9 - 57.0)	p = 0.35	85	48.8 (41.5 - 56.2)	p = 0.25

Table 5 - Final model of multivariate analysis of logistic regression for variables associations with back pain of the sample with subjects over 20 years old, living in the city of Bauru (São Paulo, Brazil), by gender

Factors	p value	Adjusted OR* / CI 95%
	Female	
Marital Status		
Married		1.00
Never Been Married	0.52	0.81 (0.43 - 1.53)
Widowed/divorced	0.0009	2.26 (1.22 - 4.19)
Sitting position forward bending		
Never/ Rarely	0.0001	1.00
Usually/Always		3.01 (1.62 - 5.59)
Carry and lift weight		
Never/ Rarely	0.0001	
Usually/Always		
	Male	
Marital Status		
Married		
Never Been Married	0.49	0.81 (0.68 - 2.18)
Widowed/divorced	0.002	3.78 (1.66 - 8.63)
Smoking		
Non smoker		
Former-smoker	0.47	1.28 (0.65 - 2.20)
Smoker	0.002	2.56 (1.40 - 4.54)

Note: * adjusted by age, education and income.

Discussion

In this study the prevalence of back pain was of 50.3% similar to reports from a city in the south of Brazil (12), in which the prevalence was of 63.1% and in Spain (13) of 50.9%, contrasting with findings from England (14) of prevalence in only 23.0%. Considering regions of the back, 34% of subjects reported to feel pain in lumbar region as the higher prevalence among body parts that were asked. Epidemiologic data of other studies points to the prevalence of lumbar region lower than those observed in Bauru. In the northeast of Brazil (3) the prevalence was in 14.2%; 28.5% in adults from Thailand (15); 19.9% in subjects from Spain (16); and 21.9% in the autonomous region of Madrid-SP (17).

When these variation are related to prevalence indexes, it is inferred that cultural aspects, socioeconomic characteristics (income and education), the people perception of health and the quality of health systems, may have influence in the assessment of pain, positive or negatively.

The prevalence of back pain is an important indicator when it is the most common cause of invalidity related to musculoskeletal system, being the first cause of Statutory Sick Pay and the third of ill-health retirement in Brazil. Moreover, it is essential to consider the limitation on domestic and professional activities and leisure, and also the demand for health service that this problem creates (18).

Women presented a higher prevalence of back pain than men, with statistical significant difference ($p = 0.001$), similar to studies conducted in England (14) and Spain (16). However, such results are not consistent. In Vitória da Conquista (Bahia, Brazil) it was not observed association between gender and back pain (19).

Differences between genders can be explained through some assumptions. The first one is related to the physical strength that is smaller in women than men, causing more energy expenditure for them when they are exposed to the demand of similar work, increasing the risk of musculoskeletal overload. An additional assumption is psychosocial order, since it is believed that women complain more often than men; that is, according to this thought, the contrasts result from the differences in the predisposition of men and women in report information.

Possibly women have more social permission to talk on about their symptoms and feelings or have a more developed observation capacity, both factors associated to social and educational factors (20).

Regarding the condition association to the independent variables, investigated in this study, remained associated to back pain in the final model the marital status, for both gender; for women to perform activities that demand carrying and lifting weight and to work in seated position; and for men to be a smoker.

In this study, for both gender, widower/divorced subjects presented more risks of back pain than single and married ones. In the population of Salvador (4) we observed that to be single it appeared as protective factor (RP = 0.60; 95%: 0.43 0.84), whereas, in dentists, the widower/divorced subjects presented greater risk of pain (21). In the population of Cambridge (14) and Madrid (17), relation between these variables was not verified. Literature reports that the influence of the marital status on the condition is not completely clear. Probably, marital situation is not a risk factor for pain, but a risk flag could be related, for example, to the more ergonomic expositions in work/domicile or to behavioral characteristics (4). Another reasonable explanation would be more social supports for those who live in a stable union, therefore, married people present a smaller risk of developing depression (22).

Women, who worked in the seated position forward bending the body, presented three times more possibilities to report back pain. In white collars in Canada (23), researchers verified those who worked in seated position with postural risks (body flexion and rotation, absence of forearm and feet support) presented 5.04 more possibility of back pain risk than those who did not do it. In Malaysia, there is no association between seated position and back pain (24).

The seated position for a long time can cause changes in intervertebral discs, ligaments, articulate capsules and muscle. Associated to body flexion, diminishes the lordosis curve, promoting anterior annulus and pulpous nucleus compression of the intervertebral disc, stretching of posterior annulus, articular capsule and posterior ligaments. The lack of movement during this position reduces the disc fluid and diminishes blood supplement to the muscles. Evidences suggest that the extended lumbar flexion reduces the ability of the spine to resist to the forces that act on it. Also, this position in work contributes to a shortening of some muscles (ischiotibial, abdominal and adductor, amongst others) resulting in biomechanical alterations in spine. All these modifications, caused by seated position associated to improper habits, extended time and other factors, promote the development of inflammatory processes in musculoskeletal structures with associated painful simptomatology (2).

In this study, women who carried through occupational activities that demanded carry and lift weight presented 2.78 chances to report back pain. A study in India (25) revealed that diligent women who carried through this movement during working hours presented 1.56 more possibility of back pain risk than the ones who did not and, in Malaysia (24), was noticed that women amongst the subjects that carried through occupational activities demanding carry and lift weight presented more possibilities of back pain. During the activities of carrying and lifting weight, three types of stress are transmitted through lumbar column tissues: compression force, shear and torsion force. It has been suggested that disc compression is responsible for terminal plate fracture, herniated disc and causing nervous root irritation; and the shear compression modifies the viscoelastic properties of tissues, making them more vulnerable to injuries. In biomechanical evaluations, these movements created increase of body and intra-abdominal muscular activity, resulting in lost of compression forces on spine (26).

Biomechanical studies state that the mechanisms of feedback can influence the overload and its response. For example, pain can take an individual to modify the pattern of movement, modifying the way as they carry and lift a specific weight. This adaptation enables the individual to be exposed to more loads than their capacity supports (27).

Smoking men had two times more possibilities to develop back pain. In Vitória da Conquista, smokers had 15% more chance of back pain; and in the South of Brazil, significant risks of pain in the lumbar column, more than 2.0, were found for people who smoke currently when comparing to those who do not smoke. This fact can be explained by the following theories: the first one refers to the effect of the nicotine that produces a reduction on blood circulation and some substances as sulfate and oxygen in the vertebral body what probably reduces the nutrition of vertebral discs. To conclude, the use of the tobacco could be related

the psychosocial risk factors for the outcome as low socioeconomic status that would imply in more physical demands of work and stress (28).

Physical therapy has as study object, human movement in all its forms of expression and potentialities, in the pathological alterations, kinetic-functional, or its psychic and organic repercussions, objectifying to preserve, develop, restore the integrity of organs, systems and functions. Therefore, data of the present study on prevalence and factors associated to back pain not only contribute for the development of actions directed to cure and individual rehabilitation, but also it contributes for the proposal of interventions on health promotion and prevention. For example, as in analysis and changes of risk factors on occupational and domestic environments, in the elaboration and application of functional physical activities programs and of postural education (29, 30).

A limitation of the present study was the fact of all the assessments were based on self-report. In some cases, it could have occurred, mainly on the symptoms, subjects' difficulty in remembering the presence or absence of the symptoms after twelve months. However, the study outcomes are comparable to those of specific literature. A high point of this study was the number of subjects interviewed.

Conclusion

We verified high prevalence in back pain in the population of Bauru, and high association to widowed/divorced in both gender, with women performing occupational activities usually or always in seated position, who carry or lift weight in work and men who smoke.

Acknowledgements

We would like to special thank the participants, the FAPESP (Foundation of Support to Education and Research of the State of São Paulo) and to CNPq (National Advice of Research) for financing this project.

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Received in 07/23/2014
Recebido em 23/07/2014

Approved in 06/15/2016
Aprovado em 15/06/2016