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ARTICLE

Prevalence of chronic pain in a metropolitan area of a developing country: a population-based study

Prevalência de dor crônica em área metropolitana de um país em desenvolvimento: um estudo populacional

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ABSTRACT

Objective: To estimate the prevalence of chronic pain (CP) in the adult population living in the city of São Paulo, Brazil, and to identify factors associated with CP in developing countries. **Methods:** A cross-sectional study using a computer-assisted telephone interview in a two-stage stratified sample of adults living in households. **Results:** 2,446 subjects were interviewed. The mean age was 39.8 years old. The majority was female and 42.7% had less than 10 years of education. The prevalence of CP was 28.1%. The independent factors associated with CP were female gender (OR = 2.0; p < 0.001), age older than 65 years (OR = 1.4; p = 0.019) and less than 15 years of education (OR = 1.3-1.6; p < 0.04). **Conclusions:** The prevalence of CP was high and similar to that which has been reported in developed countries. These results raise awareness about CP and may potentially help clinicians and policy makers to design better health care programs for CP treatment in these populations.

Keywords: chronic pain; population; prevalence; developing countries.

RESUMO

Objetivo: Estimar a prevalência de dor crônica (DC) na população adulta residente na cidade de São Paulo, Brasil, e assim identificar os fatores associados com DC em países em desenvolvimento. **Método:** Estudo transversal utilizando entrevista por telefone auxiliada por computador em duas etapas numa amostra estratificada de adultos domiciliados em São Paulo. **Resultados:** 2446 indivíduos foram entrevistados. A média de idade foi 39,8 anos. A maioria foi do sexo feminino e 42,7% tinham menos de 10 anos de escolaridade. A prevalência de DC foi de 28,1%. Os fatores independentes associados à DC foram gênero feminino (OR = 2,0; p < 0,001), idade superior que 65 anos (OR = 1,4; p = 0,019) e menor que 15 anos de escolaridade (OR = 1,3-1,6; p < 0,04). **Conclusão:** A prevalência de DC foi alta e próxima à reportada em países desenvolvidos. Estes resultados irão auxiliar profissionais de saúde e gestores a realizarem programas de avaliação e tratamento de dor crônica mais ajustados à realidade local.

Palavras chave: dor crônica; população; prevalência; países em desenvolvimento.

Chronic pain (CP) is defined as pain that persists after the normal period for lesion healing and continues for at least three months[1]. It can be continuous or intermittent. It is estimated that CP prevalence varies from 7%[2,3] to 48%[4], depending on the population studied. Developing countries are defined as having a Human Development Index (HDI) bellow 0.9. While several studies have reported CP data in specific population samples from developing countries, such as the prevalence of CP in the

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elderly, and joint symptoms[5], data on CP prevalence in the general adult population in developing countries are still scarce. In fact, a systematic review in countries with a HDI bellow 0.9 published a few years ago included only a few studies reporting CP prevalence in these regions of the world[6]; most of them did not assess individuals from the general population. For instance, one of the studies included in the review was primarily aimed at mood disorders[7], and another included patients actively looking for primary care assistence[8]. Subsequently, the authors of this systematic review concluded that the low number of CP prevalence studies in low-HDI countries undermined their analyses and prevented further comparisons with the CP prevalence in high-HDI regions. Thus, while several studies have revealed the prevalence and risk factors for CP in developed countries[2,9,10], studies in developing countries are still scarce and heterogeneous[11,12] and the associated risk factors of CP are still a matter of debate. Population-based studies suggest that CP can be associated with age, gender, socio-economic level[11], among other co-morbidities[4, 9,13,14,15].

Pain is a multidimensional experience that can vary according to cultural, emotional, physical and social characteristics. Cultural differences can be identified among countries or among different regions in the same country, interfering with the assessment of the prevalence of pain. Thus, the present study reports the results of the Brazilian Study of the Prevalence of Chronic Pain (EPI-DOR), which aimed to estimate the prevalence of CP, to describe pain characteristics and to identify possible factors associated with CP among the general population in the city of São Paulo, Brazil.

METHODS

Study design and setting

The present study was approved by our Institutions' Ethics Review Board. The EPI-DOR, an observational, cross-sectional population-based survey assessed pain in adults living in households in São Paulo, Brazil. São Paulo has a population over of 10 million people; approximately 76% of its households have an active telephone line[16,17,18].

Sample size and participants

The sample size was determined by the primary aim of the study, which was to estimate the prevalence of CP. The estimated sample size was originally calculated to include 2,000 adults, based on a CP prevalence of 50%, maximum error of ± 2%, and a confidence interval of 95%. The sample size was then extended to 2,446 persons in order to cover the forecast losses of 20% of adults living in households.

A simple random, two-stage stratified sample design was used. The sampling process was as follows: (a) a systematic sample of 6,000 generated household telephone numbers was extracted, based on a telephone list obtained from the local telephone company; and (b) the telephone lines were re-sampled into 40 interpenetrating sub-samples, each including a sample of 200 telephone numbers. A random sample of the household member to be interviewed from each interpenetrating subsample was selected. Eligible subjects were required to (a) be 18 years of age or older and (b) live in a house with access to a landline telephone. Verbal informed consent was obtained from all respondents.

Data collection and measurements

Data were collected by telephone interview, using computer-assisted telephone interview software developed specifically for the present study. Some measures were adopted to prevent non-response and non-response bias. These included: (a) specific training of interviewers; (b) standardized content of the interviews, which included an introductory presentation as an initial part of the telephone contacts; and (c) standard operational procedures for contacts and callbacks in case of failed contact. Each selected telephone number was contacted up to 10 times on different days and at different time-periods of the day. In previous studies, up to six attempts were made[19]. However, some individuals were unreachable after five to six attempts. Thus, in the present study ten attempts were arbitrarily defined as the standard operational procedure in case of failed contacts. The telephone contact occurred on weekdays and weekends from 8 a.m. to 9 p.m. A respondent was randomly selected from each household by the software, after identifying the number of household members who were 18 years of age or older. If an eligible subject agreed to participate, a verbal informed consent was obtained. The refusal rate and the time spent in each interview were recorded.

Structured telephone interview questionnaire

The survey instrument used in this study included 43 questions and was based on a Brazilian Pain Questionnaire for population-based surveys developed by Moreira Júnior and Souza[20]; the Brief Pain Inventory[21]; and on the questionnaire proposed by Breivik and colleagues[2].

The questionnaire was composed of two parts. The first part assessed demographic and clinical characteristics (sex, age, level of education, religion, work/employment status, weight, height, co-morbidities, and nutritional status). The nutritional status of respondents was classified according to their body-mass index, considering the World Health Organization cut-off points. Self-reported weight and height were used to calculate body-mass index. The educational level of respondents was determined by years of education.

In the second part, regarding the presence of pain, subjects were asked, "throughout our lives, most of us have had pain from time to time (such as minor headache, sprains, and toothaches. Have you been suffering from pain in the last three months or longer?" The subjects who responded "NO" were classified as "no pain" and the interview was terminated. Responders who answered "YES" were then interviewed

regarding pain characteristics using the second part of the questionnaire which assessed: (a) frequency, duration and intensity of pain; (b) location of pain; (c) use of pharmacological and non-pharmacological interventions to treat pain in the last 12 months; (d) who ordered or suggested the pain treatments; (e) other pain characteristics and pain interference, using the Brazilian version of the Brief Pain Inventory[21].

The Brief Pain Inventory asks patients to rate their intensity of pain (highest, lowest, and average), and the pain interference (with general activities, mood, walking ability, normal work, relationships with others, sleep, and enjoyment of life) on an 11-point scale ranging from 0 (no pain/no interference) to 10 (as bad as it can be), over the past 24 hours and over the last three months[21].

Statistical analyses

Computerized weighting was used in the analyses. Data from each subject were weighted by the number of adult household members to compensate for any differences in the probabilities of selection among eligible respondents in each house. To reduce the bias due to the non-respondents and make estimations for São Paulo's general population, the distributions of the study sample according to age, sex, and level of education (12 population strata) were compared and adjusted to the distribution in the city of São Paulo, using data from the 2000 Brazilian census (the version available when the study was designed) carried out by the Brazilian Institute of Geography and Statistics.

Statistical analyses were performed using the Statistical Package for the Social Sciences, Version 15.0® (Chicago, IL). Descriptive statistics were generated on the sample characteristics. Univariate and multivariate analyses were used to identify factors associated with CP. The Chi-square test and multiple logistic regression models (adjusted odds ratio) were applied to examine the association between CP (dependent variable) and demographic characteristics (independent variables). Multiple logistic regression models were performed to measure the association between CP and presence of comorbidities, controlling for sex, age, and level of education. These demographic characteristics were included in the models because they were independently and significantly associated with the presence of CP. For all tests, a p value < 0.05 was considered statistically significant. We used a stepwise forward procedure and the Wald test.

The values left blank were treated as system-missing values. Missing data were not treated in any special manner or for any statistical method, such as imputation.

Supplementary Statistical analyses

Weighting

Prevalence estimates and statistical analyses utilized weighted data. Two steps of weights were used. One step adjusted for different probabilities of selection among respondents; and a second one was post-stratification weights adjusting for imbalances, due to non-response and non-coverage bias, between the study sample and the population of São Paulo in relation to distribution by age, sex, and educational level. The educational level of respondents was determined by years of school completed.

Data from each respondent were weighted by the number of adults living in each household. After this step, the distributions of the study sample and the São Paulo population were compared according to age, sex, and educational level. We analyzed data from the 2,000 Brazilian National Census carried out by the Brazilian Institute of Geography and Statistics (Table 1). The observed frequencies of individuals aged 40 years of age or more were higher in the sample than in the population of São Paulo, as well as the frequency of females, and individuals with 11 or more years of school completed. Thus, in order to correct for these sample imbalances, post-stratification weights were adjusted. These weights were obtained from the distribution of the sample within 12 strata, considering the population distribution according to age, sex, and educational level (Tables 2 and 3).

RESULTS

A total of 2,446 persons were interviewed to cover the forecast losses of 20% of adults living in household. There was a refusal rate of 12.4% (n = 418; 10.2% refused to schedule an interview and 2.2% refused to participate in the study after being informed of the aims and procedures of the research). The average interview lasted 7.7 minutes. The Figure

Table 1. Distribution of the study sample and the population of São Paulo according to age, sex, and level of education.

Characteristics	Population (%)	Study sample (%)
Age (years)		
18–29	32.51	25.73
30–39	23.11	20.11
40–49	18.61	18.61
50–59	11.95	17.79
60–69	7.64	10.81
≥ 70	6.17	6.96
Sex		
Male	47.66	38.1
Female	52.44	61.9
Education level*		
≤ 7	43.00	24.39
08/out	18.50	16.07
nov/14	26.92	39.88
≥ 15	11.58	19.66

*Educational level = years of school completed.

summarizes the recruitment of subjects. The mean age was 39.8 years (range = 18–91). The majority was female (53.5%), had completed up to 10 years of education (57.3%), and was currently employed (59.8%). About one-third (33.4%) of the respondents were considered overweight and 12.7% were obese (Table 4).

Prevalence of chronic pain

The presence of current CP with a duration ≥ 3 months was reported by 713 respondents, which represented a prevalence of 28.1% (95%CI: 25.0–31.4%). The prevalence of CP according to sociodemographic characteristics of the population is presented in Table 5.

Table 2. Distribution of the study sample and the population of São Paulo according to age, sex, and level of education.

Sex	Age (years)	Educational level*			
		Population (%)		Study sample (%)	
		≤ 10 years	>10 years	≤ 10 years	>10 years
Male	18–29	9.27	6.65	2.29	9.91
	30–49	11.74	8.07	5.01	10.80
	≧ 50	7.63	3.16	7.39	4.94
Female	18–29	8.47	8.45	1.70	11.92
	30–49	12.99	9.19	9.53	13.35
	≧ 50	11.40	2.98	14.54	8.61

*Educational level = years of school completed.

Table 3. Sample weights applied in the post-stratification adjustment.

Sex	Age (years)	Educational level*	
		≤ 10 years	>10 years
Male	18–29	4.05	0.67
	30–49	2.34	0.75
	≧ 50	1.03	0.64
Female	18–29	4.99	0.71
	30–49	1.36	0.69
	≧ 50	0.78	0.35

*Educational level = years of school completed.

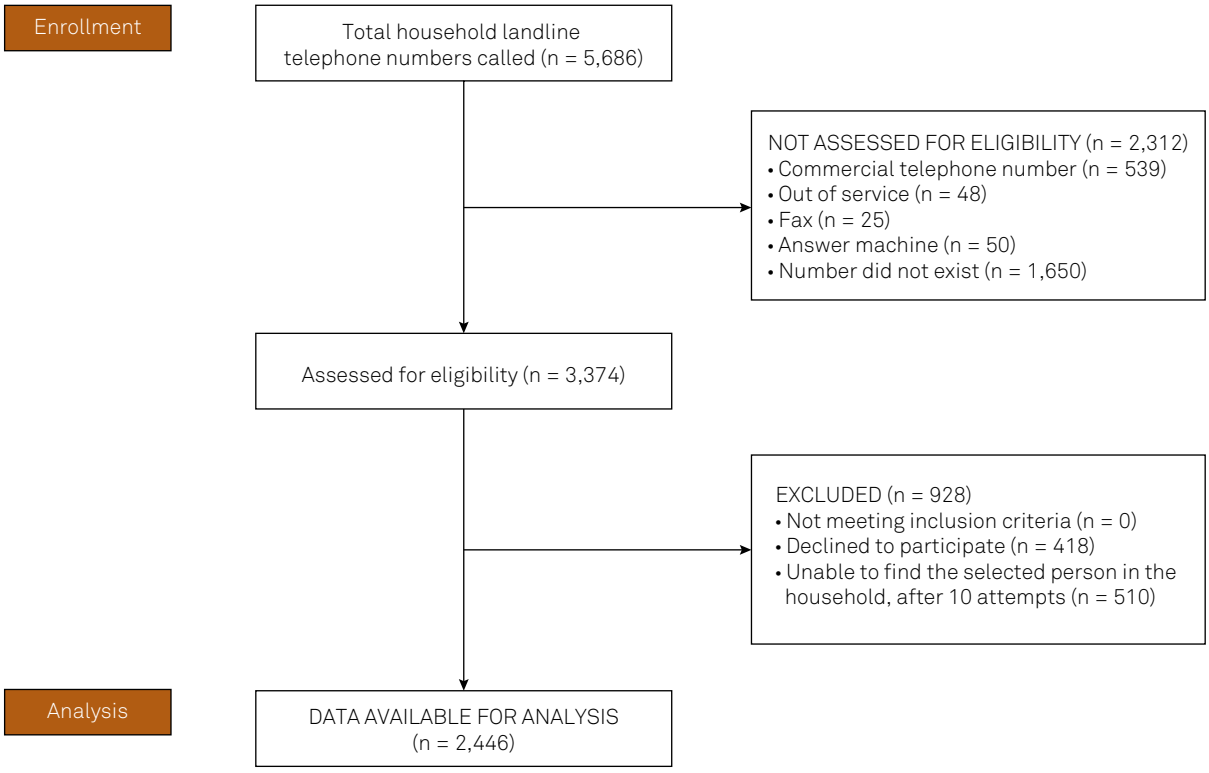

Figure. Study inclusion flow diagram.

The prevalence of CP was higher in women than in men (34.7% vs. 20.6%; p = 0.001) and in the 45–64 year age group (33.9%), followed by the 30–44 year age group (p < 0.001). Pain had a tendency to be more prevalent with increasing age (p < 0.001) and with fewer years of schooling (p < 0.001). Separated/divorced (39.0%) and widowed individuals (37.9%) reported CP more frequently than single and married responders (p = 0.021).

We observed a higher prevalence of CP among obese and overweight individuals, but this association was not statistically significant. There was no significant association between CP and work status (p = 0.78) or between CP and religion (p = 0.20).

The multiple logistic regression analyses confirmed the association between CP and sex, age, and level of education (Table 6). Female gender (OR = 2.0; p < 0.001), age higher than 65 years compared with the 18–29 year age group

Table 4. Sociodemographic characteristics of respondents adjusted to the structure of the Brazilian general population.

Variable	Respondents	
	N	% (weighted)
Sex		
Male	927	46.5
Female	1505	53.5
Missing	14	-
Age (years)		
18–29	536	32.8
30–44	797	32.0
45–64	759	26.4
≥ 65	340	8.8
Missing	14	-
Work status		
Housewife	451	17.5
Unemployed, but have not actively looked for a job	74	4.0
Unemployed, but have actively looked for work	94	5.3
Retired	347	9.9
Employed	1026	43.1
Freelance	338	16.7
Student	69	3.5
Missing	47	-
Nutritional status		
Underweight	56	2.3
Normal weight	1172	51.7
Overweight	756	33.4
Obese	304	12.7
Missing	158	-
Years of schooling		
Illiterate	97	4.1
1–7 years	510	26.9
8–10 years	406	30.4
11–14 years	930	26.0
≥ 15 years	489	12.5
Missing	14	-

Table 5. Prevalence of chronic pain according to sociodemographic characteristics.

Variable	Prevalence of chronic pain		p
	N	%*	
Chronic pain			
Yes	713	28.1	-
Sex			
Male	190	20.6	0.001
Female	523	34.7	
Age (years)			
18–29	111	22.2	< 0.001
30–44	239	29.3	
45–64	269	33.9	
≥ 65	94	28.5	
Marital status**			
Single	191	23.8	0.021
Married	379	29.1	
Separate/divorced	66	39.0	
Widower	76	37.9	
Religion**			
No religion	65	27.6	0.200
Catholicism	409	26.1	
Protestantism	155	33.4	
Spiritualism	40	33.7	
Others	36	28.0	
Work status**			
Housewife	154	33.3	0.078
Unemployed, but have not actively looked for a job	22	24.0	
Unemployed, but have actively looked for work	26	21.7	
Retired	111	36.0	
Employed	258	23.4	
Freelancer	118	35.7	
Student	15	15.8	
Years of schooling**			
Illiterate	35	33.7	0.607
1–7 years	168	29.7	
8–10 years	134	29.8	
11–14 years	257	25.9	
≥ 15 years	119	23.5	

*Prevalence of pain corrected *a posteriori* for the design effect; **Participants who did not answer the questions were excluded.

(OR = 1.4; p = 0.019), and fewer years of education (< 15 years) were associated with higher odds of having CP (OR = 1.3–1.6; p < 0.04) (Table 7). The greatest chance of having CP was observed among respondents reporting concomitant muscular complaints (adjusted OR = 6.4; p = 0.016), fibromyalgia (adjusted OR = 4.7; p = 0.031), spinal disorders (adjusted OR = 3.8; p < 0.001), heart diseases lasting one year or less (adjusted OR = 3.7; p = 0.007), arthritis (adjusted OR = 3.5; p < 0.001), rheumatism (adjusted OR = 3.4; p = 0.007), depression (adjusted OR = 3.3; p = 0.003), and anxiety/psychiatric disorders (adjusted OR = 3.3; p = 0.0001).

Pain characteristics and treatment

The mean intensity of the average pain in the past 24 hours was 6.8 (SD = 2.4) (Table 8). The most frequent body location of pain was legs and feet (22.5%), followed by the back and the neck (21.1%), and chest (17.2%). The duration of pain was often prolonged (55.8 ± 84.1 months). Only 25% of the respondents had suffered from CP for less than one year.

The interviewers asked respondents whether their pain was being treated in any way in the past 12 months. Most respondents (58.5%) had taken medications for their pain in the last 12 months, but only 16% of respondents had used non-pharmacological methods, remedies or therapies for pain.

DISCUSSION

It is still unknown whether pain is more prevalent in countries with a low HDI, and this is mainly due to the lack of studies assessing CP exclusively in this populations[11,12].

Table 6. Factors associated with the presence of chronic pain among the São Paulo general population: multivariate model.

Variable	Adjusted odds ratio	p
Sex		
Male	1	
Female	2.0	< 0.001
Age (years)		
18–29	1.0	
30–44	1.5	0.145
45–64	1.8	0.357
≥ 65	1.4	0.019
Years of schooling completed*		
Illiterate	1.5	0.116
1–7 years	1.4	0.028
8–10 years	1.6	0.030
11–14 years	1.3	0.040
≥ 15 years	1.0	

*Participants who did not answer the questions were excluded.

Table 7. Association between reported presence of medically diagnosed co-morbidities or medical conditions and the prevalence of chronic pain among the São Paulo general population.

Variable	Survey respondents		Prevalence of chronic pain* (%)	OR	p	Adjusted OR**	p
	N	%***					
Spinal diseases	541	18.8	53.7	4.0	< 0.001	3.8	< 0.001
Headaches/migraine	484	20.4	44.7	2.6	< 0.001	2.3	< 0.001
Anxiety/other psychiatric disorder	340	13.0	53.9	3.7	< 0.001	3.3	0.001
Depression	245	8.9	56.9	3.9	0.001	3.3	0.003
Diabetes	202	6.7	46.0	2.3	0.001	1.8	0.008
Arthritis	153	4.5	61.7	4.4	< 0.001	3.5	< 0.001
Rheumatism	128	4.6	61.7	4.5	0.001	3.4	0.007
Surgery (< 1 year before)	178	7.2	42.6	2.0	0.046	1.9	0.094
Osteoporosis	78	2.3	56.4	3.4	0.001	2.6	0.005
Fracture (< 1 year before)	71	2.6	45.5	2.2	0.107	2.1	0.153
Fibromyalgia	71	2.2	68.5	5.8	0.010	4.7	0.031
Heart diseases (< 1 year before)	69	2.9	59.7	4.0	0.007	3.7	0.007
Endometriosis	40	1.4****	46.0	1.6	0.170	1.6	0.278
Work-related musculoskeletal disease	52	1.5	49.5	2.5	0.021	2.2	0.022
Traumatic injury (< 1 year before)	48	1.7	45.2	2.1	0.049	2.5	0.026
Cancer	32	1.0	42.7	1.9	0.119	1.7	0.210
Muscular disorder	22	0.9	72.5	6.9	0.003	6.4	0.016
Sequelae of stroke	18	0.9	63.4	4.5	0.094	4.9	0.129

*Weighted prevalence; **Odds ratio (OR) adjusted to sex, age, and years of education;***Percentage after adjustment (weighted) to the total sample (2,446 respondents); ****Percentage after adjustment (weighted) to the total number of women (1,514);

Table 8. Clinical characteristics of chronic pain and its treatment.

Variable	N	%
Pain location		
Head (excluding neck)	104	15.0
Chest	94	17.2
Back (including neck)	161	21.1
Arms and hands	93	12.2
Legs and feet	166	22.5
Multiple places	95	12.0
Pain treatment (past 12 months)		
Medicines		
Yes	428	58.5
No	285	41.5
Prescription medicines		
Yes	304	39.1
No	409	60.9
Non-drug therapies		
Yes	154	16.5
No	559	83.5
Physiotherapy		
Yes	66	6.7
No	647	93.3
Acupuncture		
Yes	33	3.2
No	680	96.8
Massage		
Yes	43	5.0
No	670	95.0
Physical exercise		
Yes	19	2.1
No	694	97.9
	Mean (SD)	**Median (Q1-Q3)**
Intensity of pain (past 24 hours)		
Average	6.8 (2.4)	7.0 (5.0–9.0)
Worst	7.7 (2.4)	8.0 (6.0–10.0)
Lowest	5.1 (2.4)	5.0 (3.0–7.0)
Intensity of pain (past 3 months)		
Average	6.9 (2.5)	7.0 (5.0–9.0)
Pain duration (months)	55.8 (84.1)	24 (10–60)

One could expect a higher prevalence of CP in low-HDI populations since HDI is defined by three dimensions (i.e., longevity, mean years of schooling and income) and two of these dimensions are known to be associated with CP (years of schooling and income)[22,23]. Also, the prevalence of some diseases associated with CP — such as HIV/AIDS[24] and leprosy — is higher in developing countries, which have a significant proportion of cases located in the sub-Saharan Africa[24]. In the present study, the observed prevalence of CP, defined as daily pain lasting for three months or longer, was 28.1%. This was similar to previous studies that used the same CP definition and were conducted in other countries such as Spain (23.4%)[9], Finland (35.1%)[25], France (31.7%)[10], and the USA (26.0%)[26]. Some studies used the World Health Organization's six-month definition of CP, while most studies employed the International Association for the Study of Pain's three-month cut-off[1,6]. However, in some instances, CP was defined as the presence of "painful symptoms lasting longer than 45 days"[5] and in others, CP was defined as any pain lasting more than three months in the individual's life, given that it was also present in at least one episode in the preceding 30 days[12]. For instance, Cabral et al.[12] found a 42% prevalence of CP using this latter definition in a sample of individuals living in a neighborhood of São Paulo, while persistent pain, defined as pain present in 50% of the days in the preceding three months, was reported to occur in only 28.5% of this sample.

The prevalence of CP and its associated characteristics in the general population of developing countries has been rarely assessed, with varying definitions and sample sizes[11,12]. The present study provided information regarding sex, age, level of education, and a high response rate to the telephone interviews was obtained, reaching a total of 2,446 participants. The minimum sample size recommended for population-based surveys has been reported to be 2,000 individuals per city[2,27], and this is the largest study available so far in low HDI individuals[11,12].

In the city of São Paulo, the landline telephone coverage is approximately 76% and can be considered adequate for studies such as this. Nevertheless, to reduce the bias due to sample and population distribution differences, the data underwent post-stratification weighting. The study design weights were adjusted to the distribution of age, sex, and level of education of the São Paulo's population. This procedure ensures the sample representativeness and internal validity and has rarely been employed previously.

The majority of the factors associated with CP observed in the present study were similar to results reported in other studies in developed countries. Women reported CP more frequently than men (34.7% vs. 20.6%). In European countries and Canada the difference between men and women varied from 16.9% to 56% for women, and from 11% to 28% for men[9,13,14,15,22]. Although epidemiologic studies clearly demonstrated that women have a higher pain prevalence than men, animal and human experimental pain studies are not strongly consistent. According to some recent reviews, women have greater pain sensitivity (lower levels of threshold and tolerance), activate specific brain regions in response to pain stimuli, and inhibit pain less than men (difference in endogenous pain modulation). In addition, psychosocial factors and gonadal hormones, mainly estradiol, have been shown to increase the risk of pain occurrence. The prevalence of CP increases progressively with age. This association was observed previously[9,13,14,22,28]. In one study, the prevalence was higher among people aged 67 years or more than among the 16–24 year age group[22]. In the present study, the CP prevalence was higher in the 45–64 year age group than in other groups reporting CP. This higher prevalence of CP among middle-age adults was also observed in Israel and France[10,19].

Regarding education, individuals with fewer years of schooling had a higher chance of having CP than those with higher levels of schooling, as reported previously[13,19,22,28]. These data suggested that independent of the country's development level, people with lower educational levels present a higher risk for CP. The reasons for this are manyfold, and may reflect different degrees of cognitive reserve[29] and coping in more and less educated individuals. In fact, it has been suggested that patients with a better cognitive reserve may present with less CP after surgery[30]. However, cross-sectional studies do not allow one to infer causal relationships between these associated factors. For example, since the duration of pain was relatively high in our sample, it cannot be ruled out that long-lasting CP negatively interfered with patients' quality of life and daily activities to a point where the number of years of education was also reduced because of the burden of CP. Regardless of sex, age, and educational level, CP was associated with co-morbidities. Respondents who reported muscular disorders, fibromyalgia, back and spine diseases, heart diseases in the last year, arthritis, rheumatism, depression, and anxiety or any other psychiatric disorder were more than twice as likely to report CP.

There are some limitations to this study that should be considered. The first limitation is the use of cross-sectional data, which limits our ability to draw conclusions about the direction of effects. Data collection was conducted through structured telephone interviews, which may have overlooked other potential contributors to CP risk in adults. Differences in outcomes of interest according to methods for collecting data may introduce bias to the study, so it is important to highlight that the prevalence of CP in the general population should be followed up throughout the year because pain profiles may change over time. Differences in health measurements between telephone and face-to-face interviews may cause some researchers to question the suitability of telephone surveys. Concerning the external validity of the study, São Paulo has the largest population in Brazil, and about 10% of the general Brazilian population lives in its metropolitan area. In fact, compared to Brazilian data, São Paulo has a similar life expectancy (77 years, compared to 73 in Brazil), lower than 0.9 HDI (0.80, compared to 0.744 in Brazil), men:women ratio (0.89, compared to 0.95 in Brazil), percentage of the population in poverty (28.1%, compared to 31.7% in Brazil), and illiteracy (10.8% compared to 9.6% in Brazil)[16,17,18,31].

In conclusion, the prevalence of CP was high in the city of São Paulo and similar to the prevalence observed in developed countries. The highest prevalence was found in women, in the 34–64 year age group, in respondents reporting low educational level (< 15 years) and several co-morbidities. The present study provides evidence on the high prevalence and burden of CP in a developing country population and should be used to support treatment and prevention policies in this population.

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