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Chronic back pain among Brazilian adults: data from the 2019 National Health Survey

Dor crônica na coluna entre adultos brasileiros: dados da Pesquisa Nacional de Saúde 2019

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ABSTRACT

Objective: To estimate the prevalence of chronic back pain (CBP) and its associated factors. **Methods:** This cross-sectional study analyzed the 2019 National Health Survey, with 88,531 adults, using logistic regression to identify associated factors. **Results:** CBP was reported by 21.6% of adults and was more likely to occur among women (odds ratio — OR=1.27; 95% confidence interval — 95%CI 1.19–1.35), increased with age: 25–34 years (OR=1.30; 95%CI 1.11–1.51), 35–44 (OR=1.78; 95%CI 1.54–2.07), 45–54 years (OR=2.23; 95%CI 1.91–2.59), 55–64 years (OR=2.47; 95%CI 2.12–2.88), and 65 years or older (OR=2.17; 95%CI 1.85–2.54); among smokers (OR=1.24; 95%CI 1.13–1.35); ex-smokers (OR=1.30; 95%CI 1.21–1.39); those who mentioned heavy housework (OR=1.41; 95%CI 1.31–1.53); obesity (OR=1.12; 95%CI 1.03–1.21); hypertension (OR=1.21; 95%CI 1.11–1.32); high cholesterol (OR=1.53; 95%CI 1.42–1.65); with self-rated health — with a very good reference — in the gradients: good (OR=1.38; 95%CI 1.23–1.55), regular (OR=2.64; 95%CI 2.34–2.98), poor (OR=4.24; 95%CI 3.64–4.94), and very poor (OR=5.24; 95%CI 4.13–6.65); its likelihood was lower in adults with complete elementary school/incomplete high school (OR=0.82; 95%CI 0.75–0.90) and complete high school/incomplete higher education (OR=0.87; 95%CI 0.81–0.95). **Conclusion:** Back pain has a high prevalence and shows associations with demographic and socioeconomic factors, lifestyle, chronic diseases, and self-rated health.

Keywords: Low back pain. Health surveys. Adult. Risk factors.

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INTRODUCTION

Back pain is a common health problem that results in disability, reduced functional capacity, and work leaves[1]. The demand for health services, such as appointments, examinations, medications, physical therapy, hospitalizations, and surgeries, has increased among individuals with back pain[1,2]. These events often cause absenteeism, decreased productivity, leaves, high social security costs, and early retirement[2-5].

Back pain includes neck pain, thoracic back pain, and low back pain resulting from different musculoskeletal diseases, intervertebral disc disorders, spondylosis, or radiculopathies[5]; however, it may not present a specific cause[6]. The literature indicates that stress, incorrect movements during physical activity, and work overload can intensify back pain[7].

Population-based surveys have shown an increased prevalence of these diseases. In 2008, the National Household Sample Survey (*Pesquisa Nacional por Amostra de Domicílios* — PNAD) revealed that 13.5% of the adult population reported back pain[8]. In 2013, the National Health Survey (*Pesquisa Nacional de Saúde* — PNS 2013) estimated a chronic back pain (CBP) prevalence of 18.6% (95% confidence interval — 95%CI 17.8–19.1)[8,9]. Despite the differences in research methodology, since PNAD interviewed the person responsible for the household while PNS randomly selected the respondent, back pain was the second cause of reported morbidity in both studies[8,9]. In addition, in both studies, the prevalence was higher among women and tended to increase with age, especially after 50 years[8,9]. A study conducted during the coronavirus disease 2019 (COVID-19) pandemic found an estimated prevalence of back pain of 45.2% (95%CI 43.7–46.6). This high value was attributed to a worse lifestyle, increased anxiety and stress, and higher sedentary and home office time, often without adjusting the workstation[7].

Given the high CBP prevalence and growth, as well as its negative effects on work, health services, the economy, and quality of life, monitoring this health problem[7] becomes important, and the 2019 PNS is a relevant instrument for this follow-up. Thus, the current study aims to estimate the CBP prevalence and its associated factors. The findings of this work may contribute to improving the knowledge of the CBP scenario and assist in the elaboration of specific actions to control the factors associated with this problem.

METHODS

This is a cross-sectional study based on data from the 2019 PNS, conducted by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* — IBGE) in partnership with the Ministry of Health. PNS is representative of Brazilian adults living in private households in urban and rural areas, the five geographic macro-regions, the 26 states and the federal district, and state capitals[9].

The sample size calculation used the results of some 2013 PNS indicators, and the sampling plan adopted was a three-stage cluster sampling with stratification of primary sampling units (PSU), composed of census tracts or sets of tracts. The first stage involved randomly selecting PSUs with probability proportional to size. The second stage selected a number of households in each PSU, totaling 108,525. The third stage randomly picked a resident aged 15 years or older from the list of eligible residents of the chosen household[10]. The final sample consisted of 94,114 households, with interviews and a response rate of 93.6%. The database results from a complex sampling plan with unequal selection probabilities, including a correction factor for losses[9,10].

Data were collected using personal digital assistants. The adult selected for the individual interview answered the chronic diseases module. This study selected residents aged 18 years or older who answered positively to the question: "Do you have a chronic back condition, such as chronic back or neck pain, low back pain, sciatic pain, vertebrae or disc problems?". The number of respondents was 88,531 individuals. Thus, the outcome analyzed in the study was the CBP prevalence measured by the positive response to the previous question.

The literature highlights that CBP is associated with sociodemographic variables, such as gender, age, unhealthy lifestyles, comorbidities, and exposure to excessive work[1,11]. We used this theoretical model of association to include the following explanatory variables:

- Sociodemographic characteristics: gender; age group in years (18−24, 25−34, 35−44, 45−54, 55−64, 65 or more); schooling (illiterate/incomplete elementary school; complete elementary school/incomplete high school; complete high school/incomplete higher education; complete higher education); ethnicity or skin color (white, black, multiracial); area of residence (urban and rural);
- Lifestyles: smoking (non-smoker; ex-smoker; smoker); heavy housework (yes or no); heavy physical activity at work (yes or no); watching TV for more than three hours (yes or no); consumption of five or more healthy food groups that are fresh or minimally processed and considered protective for chronic diseases the day before the interview (yes or no); consumption of five or more ultra-processed food groups the day before the interview (yes or no); recommended consumption of fruits and vegetables — five or more daily servings (yes or no); consumption of red meat in five or more days a week (yes or no); regular candy consumption — five or more days a week (yes or no); regular soft drink consumption — five or more days a week (yes or no); alcohol abuse — five or more days a week (yes or no); high salt consumption (yes or no);

- Metabolic risk factors and morbidities: measured and classified by body mass index (BMI) (normal, overweight — BMI≥25, or obesity — BMI≥30, calculated according to self-reported weight and height responses) and presence of self-reported chronic diseases: hypertension, high cholesterol (yes or no);
- Health status assessment (very good, good, regular, poor, and very poor). We performed a chi-square test between the outcome variable and the explanatory variables considering a 0.05 significance level. The multiple logistic regression model was used to obtain odds ratio (OR) estimates and the 95%CI[12]. The first model selected explanatory variables associated with the outcome (CBP), and the final model consisted of variables with p<0.05[12]. The analysis was performed in the survey module for complex samples of the Data Analysis and Statistical software (STATA), version 14 (StataCorp., CollegeStation, United States of America).

PNS data are available online for public access and use (https://www.ibge.gov.br/estatisticas/sociais/saude/9160-pesquisa-nacional-de-saude.html?=&t=microdados).

The National Human Research Ethics Committee of the Ministry of Health approved the research (opinion no. 3,529,376, 2019 edition). All participants signed the informed consent form (ICF).

RESULTS

In Brazil, CBP was reported by 21.6% of adults, of whom 24.5% (95%CI 23.7–25.2) were women. The CBP prevalence was higher with increasing age of 25–34 years, 13% (95%CI 12–14); among illiterate individuals/those with incomplete elementary school, 29.2% (95%CI 28.2–30.1); and those living in rural areas, 23.7% (95%CI 22.5–25.0). Regarding lifestyle, CBP was more prevalent among ex-smokers, 27.4% (95%CI 26.3–28.4) and smokers, 24.1% (95%CI 22.7–25.5); and respondents who mentioned heavy housework, 26.7% (95%CI 25.4–28.0). Regarding metabolic factors, the CBP prevalence was higher in overweight individuals, 22.1% (95%CI 21.3–22.9), obese individuals, 25.9% (95%CI 24.7–27.0), and those who reported hypertension, 33.2% (95%CI 31.9–34.5) or high cholesterol, 36.4% (95%CI 34.9–37.9). The health status assessment showed a higher dose-response gradient among those who considered their health very poor, 52.9% (95%CI 47.8–58). The other categories showed no statistically significant difference (Table 1).

After adjustment for all model variables, those that remained associated with CBP and statistically significant (p<0.05) were:

- Sociodemographic characteristics: female gender (OR=1.27; 95%CI 1.19–1.35) and adults aged 55 to 64 years (OR=2.47; 95%CI 2.12–2.88). Adults with complete high school/incomplete higher education (OR=0.87; 95%CI 0.81–0.95) were less likely to have CBP;

Table 1. Prevalence and 95% confidence interval (95%CI) of chronic back pain in individuals aged 18 years or older, according to sociodemographic characteristics, lifestyles, morbidity, metabolic risk factors, and health status assessment. 2019 National Health Survey, Brazil.

Total	%*	95%CI (LL, UL)	p-value[‡]
	21.6	**21.0–22.1**	
Sociodemographic			
Gender			
Male	18.3	17.6–19.0	<0.001
Female	24.5	23.7–25.2	
Age group (years)			
18 to 24	9.3	8.2–10.4	
25 to 34	13	12.0–14.0	
35 to 44	19.1	18.1–20.2	
45 to 54	26.3	25.0–27.6	<0.001
55 to 64	31.3	29.9–32.7	
65 and over	31.3	30.0–32.5	
Schooling			
Incomplete elementary school	29.2	28.2–30.1	
Incomplete high school	18.2	16.9–19.4	<0.001
Incomplete higher education	16.8	15.9–17.6	
Complete higher education	18.6	17.4–19.8	
Ethnicity/skin color[‡]			
White	22	21.2–22.9	
Black	21	19.7–22.3	0.2795
Multiracial	21.3	20.6–22.0	
Area			
Urban	21.2	20.6–21.8	0.0003
Rural	23.7	22.5–25.0	
Lifestyle			
Tobacco use			
Non-smoker	18.5	17.9–19.2	
Ex-smoker	27.4	26.3–28.4	<0.001
Smoker	24.1	22.7–25.5	
Heavy housework			
No	20.6	20.0–21.2	<0.001
Yes	26.7	25.4–28.0	
Heavy physical activity at work			
No	21.8	21.2–22.4	0.1727
Yes	21	20.1–22.0	
TV >3 hours			
No	21.1	20.5–21.8	0.0085
Yes	22.6	21.7–23.5	
Protective foods			
No	21.7	21.1–22.3	0.4852
Yes	21.3	20.3–22.3	
Ultra-processed foods			
No	22.4	21.8–23.0	<0.001
Yes	16.5	15.2–17.8	
Fruits and vegetables			
No	21.5	20.9–22.1	0.6099
Yes	21.9	20.6–23.1	

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Table 1. Continuation.

Total	%*	95%CI (LL, UL)	p-value[†]
	21.6	21.0–22.1	
Regular red meat consumption			
No	22.2	21.6–22.8	0.0001
Yes	20	19.0–21.0	
Regular candy consumption			
No	21.7	21.1–22.2	0.4267
Yes	21.1	19.8–22.4	
Regular soft drink consumption			
No	22	21.4–22.5	<0.001
Yes	17.9	16.0–19.7	
Alcohol abuse			
No	22.3	21.7–22.9	<0.001
Yes	18.1	17.0–19.2	
High salt intake			
No	21.5	21.0–22.1	0.6521
Yes	21.9	20.4–23.4	
Metabolic risk factors and morbidity			
BMI[§]			
Normal	19.2	18.4–19.9	<0.001
Overweight	22.1	21.3–22.9	
Obesity	25.9	24.7–27.0	
Hypertension			
No	17.9	17.3–18.5	<0.001
Yes	33.2	31.9–34.5	
Cholesterol			
No	19	18.5–19.6	<0.001
Yes	36.4	34.9–37.9	
Health status assessment			
Very good	11.2	10.1–12.3	<0.001
Good	16.3	15.7–17.0	
Regular	32.2	31.2–33.2	
Poor	46.4	44.0–48.9	
Very poor	52.9	47.8–58.0	

LL: lower limit; UL: upper limit; *weighted estimates: weight of the resident selected with calibration; [†]chi-square test; [‡]Asian and indigenous categories excluded; 0.01% of missing data for ethnicity/skin color; [§]0.96% of missing data for body mass index (BMI).

- Lifestyles: the probability of having CBP was higher in ex-smokers (OR=1.30; 95%CI 1.21–1.39), those who reported alcohol abuse — five or more days a week (OR=1.11 95%CI 1.01–1.21), and heavy housework (OR=1.41; 95%CI 1.31–1.53). We found no association between food consumption and back pain;
- Metabolic risk factors: the chance of having CBP was higher in individuals with obesity (OR=1.12; 95%CI 1.03–1.21), hypertension (OR=1.21; 95%CI 1.11–1.32), and high cholesterol (OR=1.53; 95%CI 1.42–1.65);
- Health assessment: the likelihood of CBP was higher among those who self-rated their health as very poor (OR=5.24 95%CI 4.13–6.65), with the reference being very good (Table 2).

Table 2. Factors associated with chronic back pain in adults aged 18 years or older, adjusted for all model variables. 2019 National Health Survey, Brazil.

Variables	OR*	95%CI (LL, UL)	p-value
Sociodemographic			
Gender			
Male	1		<0.001
Female	1.27	1.19–1.35	
Age group (years)			
18 to 24	1		<0.001
25 to 34	1.30	1.11–1.51	
35 to 44	1.78	1.54–2.07	
45 to 54	2.23	1.91–2.59	
55 to 64	2.47	2.12–2.88	
65 and over	2.17	1.85–2.54	
Schooling			
Incomplete elementary school	1		
Incomplete high school	0.82	0.75–0.90	<0.001
Incomplete higher education	0.87	0.81–0.95	<0.001
Complete higher education	0.97	0.88–1.07	0.52
Lifestyle			
Tobacco use			
Non-smoker	1		<0.001
Ex-smoker	1.30	1.21–1.39	
Smoker	1.24	1.13–1.35	
Alcohol abuse			
No	1		0.02
Yes	1.11	1.01–1.21	
Heavy housework			
No	1		<0.001
Yes	1.41	1.31–1.53	
Metabolic risk factors and morbidity			
BMI[†]			
Normal	1		
Overweight	1.05	0.98–1.13	0.15
Obesity	1.12	1.03–1.21	<0.001
Hypertension			
No	1		<0.001
Yes	1.21	1.11–1.32	
Cholesterol			
No	1		<0.001
Yes	1.53	1.42–1.65	
Health status assessment			
Very good	1		
Good	1.38	1.23–1.55	<0.001
Regular	2.64	2.34–2.98	
Poor	4.24	3.64–4.94	
Very poor	5.24	4.13–6.65	

OR: odds ratio; LL: lower limit; UL: upper limit; *OR estimates: weight of the resident selected with calibration; 95%CI: 95% confidence interval; [†]0.96% of missing data for body mass index (BMI).

DISCUSSION

The 2019 PNS data showed that approximately one-fifth of the adult Brazilian population (21.6%) reported CBP. After adjustment for all model variables, those that remained associated with a higher CBP prevalence were: female gender, age greater than 25 years; low schooling;

history of smoking and ex-smoking; alcohol abuse; heavy housework; obesity; hypertension; high cholesterol; and worse self-rated health status.

The study revealed that women have higher chances of developing CBP than men, corroborating the literature[13-15]. According to 2013 PNS studies, CBP prevalence was greater among women, 21.1% (95%CI 20.2–22.0), compared to men, 15.5% (95%CI 14.7–16.4), although the growth among men was higher in the period (18%)[1]. Explanations for the higher prevalence among women involve anatomical features, such as shorter stature, lower muscle mass, lower bone mass, and more fragile joints, resulting in increased spinal overload[3,4,11]. Other evidence shows that, during pregnancy, women experience greater flexibility of spinal and hip ligaments due to the action of hormones such as relaxin, estrogen, and progesterone, resulting in increased lordosis, muscle contractures, and abnormal posture, given the progressive fetal growth[1]. Back pain also tends to increase in the postpartum period as a consequence of inadequate positions when breastfeeding, the child's weight, and other factors[1,14,16].

Housework remained associated in the multivariate model. It often results in intense, repetitive work, with non-ergonomic posture, which can lead to back pain[1,15,16]. In general, this activity is more practiced by women due to society's sexist culture, which defines this work as female work[17].

A study conducted in the city of Bauru (São Paulo) found a higher prevalence of low back pain in women (60.9%) compared to men[18]. For women, low back pain was associated with occupational activity, involving frequent weight lifting, forward-leaning standing position, forward-leaning sitting position, and sitting position at the computer three or more days a week. This finding reinforces that uncomfortable ergonomic positions in occupational activities are associated with CBP in the female population[18].

Ergonomic and occupational factors (such as self-reported uncomfortable or tiring position and work stress) are significantly associated with low back pain only in females, according to results from a study conducted in New Zealand[19]. Women who worked in more uncomfortable positions for a quarter- or half-time period were 1.45 (95%CI 1.11–1.91) and 1.51 (95%CI 1.04–2.20) more likely to report lumbar symptoms than those whose work did not involve such situations, respectively. In addition, the CBP likelihood in women who declared their work as mildly/moderately stressful and very/extremely stressful was 1.77 (95%CI 1.27–2.46) and 2.27 (95%CI 1.46–3.52), respectively, indicating that CBP is associated not only with uncomfortable postures among women but also with work stress[19].

Increasing age resulted in greater CBP, corroborating previous Brazilian studies, such as 2003 PNAD, 2008 PNAD[1,8], and 2013 PNS[1]. As age advances, individuals experience reduced flexibility and progressive musculoskeletal degeneration, with postural problems becoming more frequent. Data from the Ministry of Social Security indicate that back pain progresses with age and is more frequent after 55 years[20].

People with low schooling showed a higher chance of having CBP, agreeing with the previous studies 2008 PNAD[8] and 2013 PNS[1]. This fact may be associated with this population's higher exposure to low-skilled, strenuous work, in addition to the high proportion of older adults with low schooling. Another explanation would be their lower access to health services and treatments[1,7].

The study found a higher CBP prevalence among smokers and ex-smokers, even after adjustment for all variables. The literature points to nicotine as a cause of immune system activation, predisposing to rheumatic diseases and low back pain[1,21]. The finding of an association with alcohol abuse has not been described in the literature and needs to be better explored.

Obesity is an important factor associated with greater back pain, and its prevalence has increased in the Brazilian population[9]. Increased weight overloads the muscles and the motor system, resulting in inflammatory processes in the bones and higher vertebral wear, favoring low back pain and disc herniation[1]. Reducing obesity through public health promotion policies, regulating the prices of ultra-processed foods, and encouraging the consumption of healthy foods and the practice of physical activity are crucial[22,23].

The presence of chronic diseases, such as hypertension and high cholesterol, was associated with CBP. These chronic diseases are also associated with aging and comorbidities[8,24].

Worse levels of self-rated health showed higher degrees of association with CBP. These results agree with literature findings, which report a positive association between CBP and worse self-perceived health[1,3,25]. We emphasize that this qualitative indicator has great sensitivity and predictive capacity for negative health situations, including mortality[1,26].

Study limitations include those inherent in cross-sectional studies with restricted causality inference, which may have affected the associations described herein. Given the self-reported prevalence, the values may have been overestimated. On the other hand, the sample is representative of the Brazilian population. Therefore, the findings of this study are close to the Brazilian reality since they were based on PNS data, considered the gold standard of Brazilian health surveys, as it is the most complete and comprehensive health research in the country[10].

In conclusion, the high CBP prevalence in the Brazilian population stands out. CBP was associated with the female gender, increasing age, low schooling, history of smoking and ex-smoking, alcohol abuse, heavy housework, obesity, hypertension, high cholesterol, and worse self-rated health status. Knowing these associations is important to address prevention and health care measures.

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The findings of this study contribute to better knowing the scenario of these diseases, demonstrating the need for specific actions aimed at controlling and reducing obesity, smoking, as well as the practice of strenuous physical activity, which are directly associated with this problem.

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RESUMO

Objetivo: Estimar a prevalência da dor crônica na coluna (DCC) e os fatores associados à sua ocorrência. **Métodos:** Estudo transversal analisando a Pesquisa Nacional de Saúde 2019, com 88.531 adultos, usando regressão logística para identificar fatores associados. **Resultados:** A DCC foi apontada por 21,6% dos adultos, mostrou maior chance em mulheres (*odds ratio* — OR=1,27; intervalo de confiança de 95% — IC95% 1,19–1,35), aumentou com a idade de 25–34 anos (OR=1,30; IC95% 1,11–1,51), 35–44 (OR=1,78; IC95% 1,54–2,07), 45–54 anos (OR=2,23; IC95% 1,91–2,59), 55–64 anos (OR=2,47; IC95% 2,12–2,88) e 65 anos ou mais (OR=2,17; IC95% 1,85–2,54); fumantes (OR=1,24; IC95% 1,13–1,35); ex-fumantes (OR=1,30; IC95% 1,21–1,39); que citaram atividade física doméstica pesada (OR=1,41; IC95% 1,31–1,53); obesidade (OR=1,12; IC95% 1,03–1,21); hipertensos (OR=1,21; IC95% 1,11–1,32); colesterol aumentado (OR=1,53; IC95% 1,42–1,65); autoavaliação, cuja referência era muito boa, mostrou gradiente boa (OR=1,38; IC95% 1,23–1,55); regular (OR=2,64; IC95% 2,34–2,98), ruim (OR=4,24; IC95% 3,64–4,94), e muito ruim (OR=5,24; IC95% 4,13–6,65); e menor chance em adultos com ensino fundamental completo/ensino médio incompleto (OR=0,82; IC95% 0,75–0,90) e médio completo/superior incompleto (OR=0,87; IC95% 0,81–0,95). **Conclusão:** A dor na coluna tem elevada prevalência e mostra associação com fatores demográficos, socioeconômicos, estilo de vida, doenças crônicas e autoavaliação de saúde.

Palavras chave: Dor lombar. Inquéritos epidemiológicos. Adulto. Fatores de risco.

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