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Prevalência de dor crônica entre adultos na Amazônia Brasileira: um estudo transversal de base populacional

Orientador: Prof. Dr. Renan Lima Monteiro

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Trabalho de Conclusão de Curso (TCC) apresentado ao Curso de Graduação em Fisioterapia da Universidade Federal do Amapá, como requisito para obtenção do título de Bacharel em Fisioterapia (TCC 2).

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SUMÁRIO

CONSIDERAÇÕES INICIAIS

O presente Trabalho de Conclusão de Curso é apresentado no formato de artigo científico, em conformidade com as diretrizes institucionais para TCC na modalidade artigo. Este estudo tem como objetivo contribuir para a produção de conhecimento na área da fisioterapia de dor e musculoesquelética. O manuscrito foi submetido para publicação na *European Journal of Pain*, periódico científico internacional de referência na área de pesquisa em dor, com o propósito de ampliar a disseminação dos achados e fomentar o debate científico sobre o tema em âmbito nacional e internacional.

O comprovante de submissão e o registro de que o manuscrito se encontra em processo de avaliação pela revista encontra-se anexado a este trabalho.

ARTIGO

Prevalence of chronic pain among adults in the Brazilian Amazon: a population-based cross-sectional study

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ABSTRACT

Background: Chronic pain is a major public health problem, associated with substantial functional, psychosocial, and economic consequences, particularly in low- and middle-income regions, as the northern Brazilian Amazon. The aim of this study was to estimate the prevalence of chronic pain and to characterize the sociodemographic profile of the adult population living in the state in the northern Brazilian Amazon.

Methods: This population-based, cross-sectional study was conducted between February and September 2025, using both online and in-person data collection. A total of 365 individuals aged 18 years or older were included. Chronic pain was defined as pain persisting for three months or longer.

Results: The prevalence of chronic pain was 55.8%, with predominance of women, young adults, single individuals, those self-identified as mixed race/ethnicity, and economically active individuals. Most individuals with chronic pain reported moderate to severe pain intensity, indicating a relevant clinical impact. Approximately one third reported the presence of associated diseases.

Conclusion: The findings reveal a high prevalence of chronic pain in a predominantly young population. This study provides original population-based evidence from an underrepresented region of Brazil, highlighting a substantial burden of chronic pain among young and economically active adults in northern Brazilian state.

Keywords: Chronic Pain, Prevalence, Cross-Sectional Studies, Public Health, Brazil, Amazon

BACKGROUND

Chronic pain is a major global public health problem affecting individuals' lives, impacting not only physical health but also psychological and social well-being(Kawai et al., 2017; Meints and Edwards, 2018). Evidence suggests that the persistence of pain can induce trigger alterations in the central nervous system, exacerbating conditions such as fibromyalgia, low back pain, and arthritis, resulting in significant functional limitations, reduced mobility, and impaired quality of life (Borisovskaya et al., 2020). In addition, many individuals people with chronic pain present common typical impairments, including depression, anxiety, sleep disturbances, fatigue, and non-restorative sleep, factors that contribute to the worsening of the clinical status and increased disability(Nugraha et al., 2019).

The burden of chronic pain is particularly pronounced in low- and middle-income countries, where it represents one of the leading causes of years lived with disability and restriction of social participation(Vos et al., 2020) Beyond its clinical impact, chronic pain substantially affects occupational performance and productivity, generating considerable social and economic costs(Anselmo et al., 2024; Santiago et al., 2023). Socioeconomic adversity, including unemployment and financial instability, has been consistently associated with a higher risk of high-impact chronic pain, underscoring the need for approaches that integrate clinical pain management with strategies addressing social determinants of health(Weissman et al., 2023).

In Brazil, chronic pain is recognized as a significant public health issue, with national studies reporting high prevalence rates and substantial levels of suffering and functional impairment(Santiago et al., 2023). However, estimates vary widely across studies, reflecting methodological heterogeneity and, importantly, the lack of representative data from all regions of the country. This limitation is especially evident in the Northern region of Brazil, where

population-based studies on chronic pain remain scarce and existing national surveys include insufficient representation of this macroregion(Aguiar et al., 2021; Souza et al., 2017).

This absence of robust epidemiological data from the northern region of Brazil, hampers a comprehensive understanding of the magnitude and characteristics of chronic pain in this context, marked by geographic, socioeconomic, and healthcare access disparities States such as Amapá, located in the extreme north of Brazil, are consistently underrepresented in national health surveys, limiting the development of region-specific public health policies and interventions(Aguiar et al., 2021).

METHODS

Aim

The present study aimed to estimate the prevalence of chronic pain among individuals aged 18 years or older residing in a northern state of Brazil, as well as to characterize the sociodemographic profile of the individuals living with chronic pain in this Amazon region.

Study design

A population-based, cross-sectional, descriptive study was conducted, with data collected through both online and or in person modalities.

Population and sample size

The target population comprised individuals aged 18 years or older residing in the state of Amapá, Brazil. According to data from the most recent Demographic Census conducted by the Brazilian Institute of Geography and Statistics in 2022, the total population of Amapá was 733,759 inhabitants. For the population aged 18 years or older, the sample size was calculated assuming a 95% confidence level, a sampling error of 5 percentage points, and estimated population proportion of 50%. Based on these parameters, the minimum required sample size

was estimated at 385 individuals. Sample size calculation was performed using the *Estatística Bauru USP* software.

Eligibility criteria

Participants were eligible if they were aged 18 years or older and had residing in the state of Amapá for at least six months, ensuring greater representativeness of the local population.

Individuals were excluded if they presented cognitive deficits or severe medical conditions that prevent participation, such as terminal illnesses, decompensated psychiatric disorders, hospitalization in critical condition, or severe sensory deficits without the possibility of adaptation.

Data collection procedures

Data were collected between February and September 2025, both online and in person. For the online modality, the questionnaire was disseminated via social media under the title "Survey on the health of the population of Amapá," encouraging the participation of individuals with and without chronic pain in order to reduce selection bias and enhance sample representativeness. In-person data collection was carried out in high-traffic locations, including public squares, bus stops, avenues, and street markets, aiming to reach diverse population profiles and improving the representativeness of chronic pain prevalence estimates in the state.

Pilot testing

Prior to the main data collection, a pilot test was conducted using a convenience sample to assess the participant's adherence and response time. The mean response time was approximately six minutes, which was considered satisfactory, and resulted in good adherence, as 27 out of 30 individuals who received the questionnaire completed it.

Outcome measures

All participants provided sociodemographic information, including sex, age, marital status, family income, occupational status, educational level, self-identified race/ethnicity, presence of diseases or comorbidities, and lifestyle habits such as smoking and alcohol consumption(Souza et al., 2017).

Prevalence of chronic pain

Chronic pain was defined as pain persisting for a period equal to or longer than three months(Raja et al., 2020). Participants who reported pain lasting three months or longer proceeded to the second stage of the questionnaire, which assessed pain intensity and pain-related characteristics according to established criteria.

Pain intensity

Pain intensity was assessed using the Numerical Rating Scale (NRS), ranging from 0 (no pain) to 10 (unbearable pain), and categorized as mild (0–3), moderate (4–6), and severe (7 - 10)(Ferreira et al., 2011).

Data analysis

Data were stored and organized using Microsoft Office Excel® 2019. Information collected in person was initially recorded on paper and subsequently digitized. The Jamovi Version 2.2 was used to statistical analysis. Prevalence was calculated using the following formula: prevalence = (number of respondents with chronic pain / total number of participants) × 100. Descriptive statistical were used to characterize the sample.

RESULTS

A total of 365 individuals were enrolled in this study. Of these, 299 (81.9%) completed the questionnaire online, whereas 66 participants (18.1%) responded through in person data collection. Overall, chronic pain was reported by 204 individuals, corresponding to a prevalence of 55.8%.

Among participants with chronic pain, the mean age was 33.2 ±12.0 years. This group predominantly composed of women (71.6%), single individuals (68.1%), and participants who self-identified as mixed race/ethnicity (55.9%). Nearly half of the individuals had completed higher education (48.0%), and 41.2% reported household income above three minimum wages. Most participants were employed (63.2%), did not smoke (90.7%), did not consume alcoholic beverages (51.0%), and reported engaging in physical activity (60.8%). The presence of at least one disease or comorbidity was reported by 32.4% of individuals with chronic pain (Table 1).

Regarding pain intensity, 48.0% of the participants reported severe pain, followed by moderate pain 42.2%, and mild pain 9.3%. One participant did not indicate pain intensity, and this value was treated as missing due to an error in completing the online questionnaire.

Table 1 - Sociodemographic and clinical characteristics of individuals with and without chronic pain (N = 365)

Variables	Chronic pain (N=204)	Without pain (N=161)
Age (years)	33.2 ±12.0	31.8 ±13.5
Female	146 (71.6%)	97 (60.2%)
Marital status		
Single	139 (68.1%)	119 (73.9%)
Married	57 (27.9%)	36 (22.4%)
Divorced	5 (2.5%)	4 (2.5%)
Widowed	3 (1.5%)	2 (1.2%)
Race/Ethnicity		
White	54 (26.5%)	56 (34.8%)
Mixed race/ethnicity	114 (55.9%)	84 (52.2%)
Black	34 (16.7%)	19 (11.8%)
Asian	1 (0.5%)	1 (0.6%)
Indigenous	1 (0.5%)	1 (0.6%)
Educational level		
Illiterate	0	0
Incomplete elementary	3 (1.5%)	0
Completed elementary	2 (1.0%)	2 (1.2%)
Incomplete secondary	5 (2.5%)	1 (0.6%)
Completed secondary	43 (21.1%)	32 (19.9%)
Incomplete higher	53 (25.0%)	58 (36.0%)
Completed higher	98 (48.0%)	68 (42.2%)
Household income		
Up to 1.5 minimum wages	50 (24.5%)	34 (21.1%)
From 1.5 to 2 minimum wages	34 (16.7%)	37 (23.0%)

From 2 to 3 minimum wages	36 (17.6%)	24 (14.9%)
Above 3 minimum wages	84 (41.2%)	66 (41.0%)
Employment status		
Yes	129 (63.2%)	90 (55.9%)
Smoking		
Yes	19 (9.3%)	16 (9.9%)
Alcohol consumption		
Yes	100 (49.0%)	65 (40.4%)
Disease or comorbidity		
Yes	66 (32.4%)	23 (14.3%)
Physical activity practice		
Yes	124 (60.8%)	121 (75.2%)
Pain intensity – (NRS score)	**N (%)**	-
None (0)	0	-
Mild (1 – 3)	19 (9.3%)	-
Moderate (4 – 6)	86 (42.2%)	-
Severe (7 – 10)	98 (48.0%)	-
Anatomical pain region	**(%)**	-
Head and neck	4.1%	-
Trunk	26.3%	-
Upper limbs	19.0%	-
Lower limbs	48.6%	-
Widespread pain	1.6%	-

Legend: NRS – Numerical Rating Scale; N – Sample size

DISCUSSION

The present study sought to assess the prevalence of chronic pain and to characterize the sociodemographic profile of adults residing in the state of Amapá, Brazil. The findings indicate that more than a half of the sample reported chronic pain (55.8%). Individuals with chronic pain were predominantly female, young, and more frequently single and self-identified as mixed race/ethnicity. A substantial proportion also reported to practice physical activity. In addition, most participants with chronic pain experienced moderate to severe pain intensity, highlighting the significant impact of this condition on daily life.

The prevalence of chronic pain observed in Amapá (55,8%) was higher than that reported in previous studies. In Brazil, a systematic review conducted by Aguiar et al.(Aguiar et al., 2021) identified an average prevalence of 45.59%. In the largest city in Brazil, São Paulo, the prevalence was 28.1%(Ferreira et al., 2016). In less developed regions, such as in the

Northeast region of Brazil, chronic pain prevalence has been estimated at 41.4%(Vasconcelos and Araújo, 2018). Internationally, prevalence rates are lower in many high-income countries, including 18.4% in the United States(Pitcher et al., 2019), and 12% in Spain, although Norway reports a notably high prevalence of 48%, the highest prevalence of chronic pain in Europe(Rometsch et al., 2025). In South America, a population-based study conducted in Chile reported a chronic pain prevalence of 32.1%(Bilbeny et al., 2018). These comparisons highlight the particularly elevated prevalence observed in the present study.

Differences in data collection methods may partially explain the variability in chronic pain prevalence across studies. Evidence suggests that online and in-person population-based survey studies may yield significantly different estimates. In a national online survey conducted in Brazil reported a chronic pain prevalence of 76.17% among 27,345 adults (Carvalho et al., 2018). In Israel, a similar online survey found a chronic pain prevalence of 31.3% among 1,647 individuals aged 18 years or older(Sharon et al., 2022). In the present study, which predominantly relied on online data collection, the prevalence of chronic pain was 55.8% among 365 adults. Variations in sample size, participant characteristics, and recruitment strategies likely contribute to these discrepancies. Online survey-based studies may be affected by self-selection bias, as dissemination strategies may disproportionately reach individuals with greater familiarity with digital technologies or those already engaged with health-or pain-related networks.

The predominance of online data collection in this study may have influenced the age of the sample. According to Kelfve et al.(Kelfve et al., 2020) and Poli et al.(Poli et al., 2019), online surveys tend to include a higher proportion of younger individuals, as older adults have limited access to or familiarity with digital platforms, reducing their likelihood of participation. Conversely, some online surveys do not corroborate this assumption, as they report a high predominance of older adults in their samples(Carvalho et al., 2018; Sharon et al., 2022). In

less developed regions such as Amapá, restricted internet access among older adults may still compromise their representation in online studies. This context may help explain the predominance of younger individuals in the present sample, which largely comprised economically active participants who are exposed to occupational demands and more likely to engage in physical activity. This profile contrasts with the classical pattern described in the literature, where chronic pain is more commonly associated with older age, sedentary behavior and economic inactivity(Fayaz et al., 2016; Larsson et al., 2017; Nijs et al., 2020; Piper et al., 2023). These findings may reflect a shift in the age distribution of chronic pain, potentially driven by daily stressors, including work-related pressures and daily life demand.

Psychosocial factors, including mood disturbances, sleep problems, and interpersonal stress are well-established contributors to pain experience(Garnaes et al., 2021). Evidence indicates that young adults report higher levels of irritability than older age groups, which may help to explain the growing burden of chronic pain in this population(Perlis et al., 2024). A systematic review by Murray et al.(Murray et al., 2022) also identified a global increase in chronic pain prevalence among young adults, affecting 11.6% of the population worldwide. Barriers to healthcare access may favor pain persistence and worsening, with negative impacts on productivity, mental health, and functional capacity(Anselmo et al., 2024). Additionalyy, prolonged working hours, sedentary occupations, occupational stress, excessive use of electronic devices and financial instability have been associated with increased nociceptive sensitivity and poorer chronic pain outcomes (Dunn et al., 2024)(Weissman et al., 2023). These factors may partially explain the high prevalence of chronic pain observed among economically active young adults in Amapá.

Approximately one-third of participants with chronic pain reported the presence of comorbities. Multimorbidity, commonly observed in populations from the Northern region of Brazil(Araujo et al., 2018), is a recognized contributor to chronic pain, as it worsens functional

impairment and reduces coping capacity. Recent studies show that individuals with two or more health conditions are more likely to report chronic pain and worse quality of life(Dunn et al., 2024; Rodrigues et al., 2021). Thus, the proportion of participants with comorbidities in this study may help explain the high prevalence of chronic pain observed in this study.

Sex differences may have influenced the observed prevalence of chronic pain. The predominance of women among participants is consistent with evidence showing greater pain sensitivity, lower pain thresholds and tolerance, and a higher likelihood of chronic pain diagnoses among females, including headaches, musculoskeletal pain, abdominal pain, arthritis, fibromyalgia, and temporomandibular disorders(Keogh et al., 2024). Population-based studies also indicate higher prevalence rates of chronic pain among women. Carvalho et al.(Carvalho et al., 2018), found that 84.6% of individuals reporting chronic pain in Brazil were women, while U.S. data also indicate a higher prevalence of high-impact chronic pain among females(Pitcher et al., 2019).

Regarding the pain intensity, 9.3% of participants reported mild pain, 42.2% moderate pain, and 48.0% severe pain. This distribution aligns with population-based studies conducted in different countries showing that chronic pain frequently presents at moderate to severe levels. Similar patterns have been reported in Chile(Bilbeny et al., 2018), Brazil(Santiago et al., 2023) and Pakistan(Amjad et al., 2023). Higher pain intensity is closely associated with impairments in work-related functions and daily activities(Mine et al., 2020; Singh et al., 2024). In United States, 6% to 8% of adults experience high-impact chronic pain(Lucas and Sohi, 2024), highlighting the burden of severe pain and need for target public health strategies.

This study provides novel and more robust data on the prevalence of chronic pain in the northern region of Brazil and also allowed describe a profile of people living with chronic pain in amazon region. By characterizing chronic pain in a predominantly young population, the findings offer insights that may conduct analyses and discussions focused on this age group.

Nevertheless, some limitations should be considered. Pain data were obtained through self-report, which may be subject to recall bias, and no formal clinical diagnosis was used to confirm pain conditions. Despite the use of mixed data collection methods, the predominance of online responses may have limited the representativeness of the sample. Additionally, the study was restricted to a single state, not encompassing other territories in the northern region of Brazil.

CONCLUSION

The present study identified a chronic pain prevalence of 55.8% among adults residing in the state of Amapá, Brazil, predominantly among women, in individuals self-declared as mixed ethnicity, single, economically active, and with higher education. Chronic pain intensity was predominantly moderate to severe, indicating a relevant clinical impact. These findings expand the understanding of chronic pain in the Brazilian Amazon highlighting the urgent need for the public health strategies to underserved regions of the Brazilian Amazon.

LIST OF ABBREVIATIONS

USP – University of São Paulo

NRS - Numerical Rating Scale

N – Number of samples

DECLARATIONS

Ethics approval and consent to participate

This study was approved by the Research Ethics Committee of the Federal University of Amapá (7.439.480). All participants received verbal and written explanations, and those who agreed to participate provided written informed consent prior to data collection.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

All authors made substantial contributions to the study, including the conception and design, drafting of the manuscript or critical revision for important intellectual content, and final approval of the version to be submitted. RLM, APM, VCCG, and CECS contributed to the study design, manuscript writing, submission, and overall project management. VCCG and CECS were responsible for data acquisition. All authors read, provided critical feedback on, and approved the final manuscript.

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COMPROVANTE DE SUBMISSÃO

European Journal of Pain

Prevalence of chronic pain among adults in the Brazilian Amazon: a population-based cross-sectional study

--Manuscript Draft--

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Abstract:	Background Chronic pain is a major public health problem, associated with substantial functional, psychosocial, and economic consequences, particularly in low- and middle-income regions, as the northern Brazilian Amazon. The aim of this study was to estimate the prevalence of chronic pain and to characterize the sociodemographic profile of the adult population living in the state in the northern Brazilian Amazon. Methods This population-based, cross-sectional study was conducted between February and September 2025, using both online and in-person data collection. A total of 365 individuals aged 18 years or older were included. Chronic pain was defined as pain persisting for three months or longer. Results The prevalence of chronic pain was 55.8%, with predominance of women, young adults, single individuals, those self-identified as mixed race/ethnicity, and economically active individuals. Most individuals with chronic pain reported moderate to severe pain intensity, indicating a relevant clinical impact. Approximately one third reported the presence of associated diseases. Conclusion The findings reveal a high prevalence of chronic pain in a predominantly young population. This study provides original population-based evidence from an underrepresented region of Brazil, highlighting a substantial burden of chronic pain among young and economically active adults in northern Brazilian state.
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