

Chronic pain patients in the Brazilian private healthcare system: a claim database study with the experts' perspective

Pacientes com dor crônica no sistema de saúde suplementar brasileiro: um estudo de banco de dados com a perspectiva dos especialistas

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ABSTRACT

Objective: This study aimed to describe the demands and costs from chronic pain patients over the private Brazilian healthcare system. **Methods:** This was a retrospective claim database study to assess the resource utilization of pain patients in the private setting. We used a four-year follow-up period to assess inpatient, outpatient, and procedures reported. Further, we promoted a forum of discussion with five pain experts and healthcare managers to address the management of chronic pain and assistance models. **Results:** We identified 79,689 patients with chronic pain. The orthopedist was the main medical specialist consulted with a total number of 38,879 visits performed. The ophthalmologist, cardiologist, gynecologist, and general practitioner were also frequently consulted (rheumatologist was seldom consulted). Among non-medical specialists, the physical therapist was consulted 87,574 times by 12,342 patients (15% of the entire cohort). Among chronic pain patients, 96% performed at least one exam and 86% of the patients presented at least one ER visit during the follow-up period. In 4 years, we estimate that pain patients costed more than 3 billion reais to the private health care system. According to the experts' opinions, a fragmented healthcare system and the lack of patient centered interdisciplinary approaches contributes to a high ineffective pain management leading to a high use of resources. **Conclusion:** There is an urgent need to change the chronic pain care model in the Brazilian private setting. Qualification in pain management, a multidisciplinary patient centered care, integrated approaches, pain centers, and patients' education may help changing this scenario.

RESUMO

Objetivo: O objetivo do estudo foi descrever as demandas e custos dos pacientes com dor crônica no sistema privado de saúde brasileiro. **Métodos:** Neste estudo retrospectivo do banco de dados administrativo, avaliamos a utilização de recursos de pacientes com dor no ambiente privado. Em um período de quatro anos, avaliamos internações, visitas ambulatoriais e procedimentos. Adicionalmente, promovemos um fórum de discussão com cinco especialistas em dor e gerentes de saúde para abordar o manejo da dor e os modelos de assistência. **Resultados:** Identificamos 79.689 pacientes com dor crônica. O ortopedista foi o principal especialista médico consultado, com 38.879 visitas realizadas. O oftalmologista, o cardiologista, o ginecologista e o clínico geral também foram consultados com frequência (o reumatologista foi raramente consultado). Entre os especialistas não médicos, o fisioterapeuta foi consultado 87.574 vezes por 12.342 pacientes (15% de toda a coorte).

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Entre os pacientes, 96% realizaram pelo menos um exame e 86% apresentaram pelo menos uma consulta de emergência durante o período. Em 4 anos, estimamos um custo de mais de 3 bilhões de reais para o sistema privado de saúde. De acordo com as opiniões dos especialistas, um sistema de saúde fragmentado e a falta de abordagens centradas no paciente contribuem para um manejo ineficaz da dor, resultando em um alto uso de recursos. **Conclusão:** Há necessidade de mudar o modelo de manejo da dor crônica no sistema privado brasileiro. Qualificação dos profissionais, atendimento multidisciplinar centrado no paciente, abordagens integradas, centros de dor e educação dos pacientes podem ajudar a mudar esse cenário.

Introduction

Chronic pain is related to long-lasting changes on peripheral and central nervous systems leading to patient's negative physical, emotional, cognitive, psychosocial and functional repercussions; dampens quality of life and causes major impacts on healthcare systems throughout the world. According to the Global Burden of Disease Study, chronic pain is one of the leading causes of disability and financial burden worldwide in all ages (GBD 2019 Diseases and Injuries Collaborators, 2020; Cieza *et al.*, 2020; Sá *et al.*, 2019; Souza *et al.*, 2017), affecting approximately 20% of world population. However, the prevalence of chronic pain in the Brazilian population is higher, ranging from 26% to 40% (Souza *et al.*, 2017).

Even though chronic pain is an important public health problem, there is little data related to chronic pain patients' characteristics among the Brazilian population. Most recent data showed that patients who seek ambulatory care specialized in pain usually experience severe pain, with a predominance of mixed pain (a combination of nociceptive and neuropathic mechanisms) (Castro *et al.*, 2019). Lower limbs and lumbar region are the main sites of pain complaint leading to a diagnosis of low back pain in most cases. Likewise, there are scarce data on pain management in Brazil. In general, most data are related to low back pain (Carregaro *et al.*, 2020; de David *et al.*, 2020). Previous study highlighted the overutilization of health services by patients with low back pain as one of the main problems for proper pain management (Torres *et al.*, 2019). High rates of medical consultation, exams, and surgeries are observed in the Brazilian healthcare system (Ferreira *et al.*, 2019). Especially in the private setting, patients would seek different medical specialists to address the chronic pain. Nevertheless, other issues contribute to the burden of chronic pain in Brazil: segregated care, poor knowledge about pain management, even among healthcare professionals, lack of high-quality data on pain patients (Ferreira *et al.*, 2019).

Therefore, the aim of this study was to collect data on Brazilian patients with chronic pain in the private healthcare perspective. Additionally, to fully assess the burden of pain in the Brazilian population, several key opinion leaders (KOLs) provided their perspective on the current landscape of the pain patient's journey across the private healthcare system.

Methods

The study was conducted on a two-step approach: (i) first, we used a claim database provided by Orizon, which contains data from several private Health Maintenance Organizations (HMO) in Brazil, to retrospectively assess the healthcare utilization of patients identified with any ICD-10 code related to pain; (ii) second, a discussion board gathering KOLs on pain management and on the Brazilian healthcare system model was conducted to discuss the claim database results and to address the current scenario of the private insured patients care. No ethical approval was required following the national regulation number 510/2016 (Conselho Nacional de Saúde, 2016), since we use only anonymized secondary data. All the specialists who participated in the study provided their consent prior to the discussion board.

Patient selection

Patients with chronic pain were identified on the Orizon claim database based on the ICD-10 claims reported at emergency room (ER) or hospital admission. The following ICD-10 codes were used to identify the patients with pain: F-45, F45.0, F45.1, F45.4, R52.1, R52.2, R52.9, M79.1, M79.2, M79.6, M79.7, G56, G56.1, G56.2, G56.3, G56.4, G56.8, G56.9, G62, G62.0, G62.1, G62.2, G57, G57.0, G57.1, G57.2, G57.3, G57.4, G57.5, G57.6, G57.8, G57.9, G58, G58.0, G58.7, G58.8, G58.9, G61, G61.0, G61.1, G61.8, G61.9, G63, G62.8, G62.9. Data were extracted from 01st January 2013 to 31st December 2019. Exclusion criteria included patients with any ICD-10 pain claim before January 2015 – to guarantee no previous hospitalization; patients who received a pre-defined list of medication (Supplementary Table 1 – List of pre-defined drug considered as exclusion criteria) on an inpatient setting 24 months prior to the first pain ICD-10 claim; patients with no claim two years prior and two years after the first pain ICD-10 reported.

Data source

In Brazil, around 25% of the population has private healthcare coverage (Malta *et al.*, 2017), even though the public healthcare services are universally available. Herein, we extracted outpatient, inpatient, ambulatory, and laboratory exams information from the Orizon database, an administrative claim database that covers over 9 million beneficiaries from several private HMO in Brazil. This administrative claim database is presented as procedure and diagnosis codes

from billing records which include some demographic data, procedures (inpatient and outpatient setting), medical and non-medical consultation, costs, among other variables. All data were assessed on patient-level since this database contains a unique patient identifier.

Outcome

The primary outcome of the retrospective component of the study was to describe the use of healthcare resource and their associated costs for patients who experienced a hospital admission or ER visit related to pain condition between 2015 and 2017. The medical and ambulatory costs and services used by these patients two-years prior and two-years after the first pain ICD-10 claim report were analyzed. Costs and healthcare resource utilization (HCRU) included exams, medical appointment, and ER visits.

Statistical analysis

As an observational cross-sectional secondary database descriptive study, no statistical hypothesis was intended, and only descriptive analysis were performed to describe the HCRU and costs for pain management in the Brazilian private setting. We summarized the results as absolute frequencies and percentages (%) for categorical variables, and by measures of central tendency and dispersion for continuous variables. Also, percentages were calculated over the number of patients with available (non-missing) data. Costs were calculated by summing all billed items and expressed by the ticked value: total cost per event divided by the number of patients who experienced the event. Monetary adjustments were performed for each type of variable according to the inflation value for the period (2013-2019), considering the actual value (2019) based on the Orizon database. All costs are presented in Brazilian Reais (BRL). The methodology applied is internationally recognized for construction of health cost variation indexes, such as S&P Healthcare Economic Composite e Milliman Medical Index.

Discussion board

A focus group discussion between the KOLs took place to further complement the assessment of the results found in the database study and to address the journey of patients with pain across the Brazilian Private Healthcare System. The meeting brought together six experts in pain management and/or representatives of Health Insurance companies and Population Health Specialists. The meeting was conducted online with all participants and had three hours of duration.

A specific material based on current literature and database analysis was developed to explore the patients' journey across the pain management in Brazil private setting. This guideline was separated into 3 sections to better address the chronic pain burden: 1) Patients' profile, diagnosis, and patient identification; 2) HCRU; 3) Direct and indirect costs. For each of these sections, general considerations were

addressed based on the literature review, the results of the database studies, and clinical/professional experience. A summarized description of all comments is provided below.

Results

Chronic pain prevalence

Between January 2015 and December 2017, we identified 79,689 patients that met the eligibility criteria and were considered as patients with chronic pain (Figure 1). Considering that in the database there was an average of 9.5 million insured patients during this period, the proportion of patients with chronic pain was very low, ranging from 1.14% in 2019 to 2.63% in 2015.

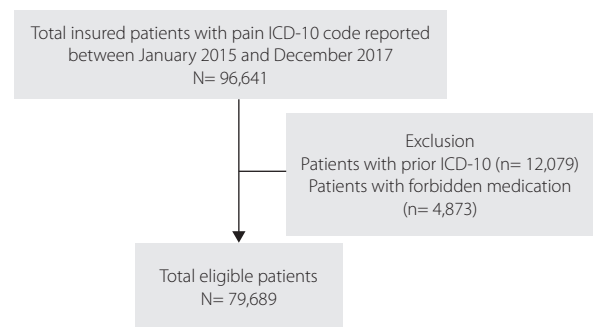


Figure 1. Patient disposition.

In relation to expert's perspective, the speeches captured in the meeting highlighted that at the private healthcare system the identification of patients, based on the ICD-10 reported on administrative claims, is not reliable, since this information is not mandatory. This selection bias contributes to an underestimated prevalence of patients with chronic pain. Additionally, as in most cases the pain is seen as a symptom of other systemic conditions, the pain is rarely reported as the main cause of the ambulatory visits or hospitalization. There is a lack of knowledge, by the healthcare professionals, on how to recognize patients with pain and how to address them correctly. Therefore, the pain is mostly underreported in Brazil.

Healthcare resource utilization – Medical and non-medical visits

We observed a high number of medical consultations (242,419) during the four years of analysis. However, only 60% of the patients with chronic pain presented any medical consultation. Thus, the mean number of medical consultations per patient was 5.1 (Table 1). The orthopedist was the main medical specialist consulted with a total number of 38,879 visits performed. Nevertheless, this medical specialty was sought by 19,738 of the patients, with a mean number of 2.0 visits per patient. The ophthalmologist was consulted 33,452 times, with a mean number of 1.6 visits per patient.

Cardiologist, gynecologist, and general practitioner were the other medical specialties more consulted (Table 2). Among non-medical specialists, the physical therapist was consulted 87,574 times by 12,342 patients (15% of the entire cohort), thus we observed a mean number of 7.1 visits per patient. The psychologist was the specialty with more recurrency, with a mean number of 15 visits per patient.

Speech analysis of experts' perspective showed that the high number of medical visits suggest a low effectiveness of the private healthcare system in managing the patient with pain. In several cases, the patients seek for different medical specialists to treat the pain with no success. As a result, the pain becomes chronic and the search for treatment ends up following a vicious cycle. This also justifies that the main

Table 1. Healthcare resource utilization of the chronic pain patients during a 4-year follow-up period

| Patient (N) | 79,689 |
|--|----------------------|
| Total costs | BRL 3,370,483,020.76 |
| Medical consultation | |
| Cost | BRL 37,360,700.54 |
| Total number of elective medical appointment, N | 242,419 |
| Patients with medical appointment, N (%) | 47,602 (60) |
| Mean of elective medical appointment per patient | 5.1 |
| Exams* | |
| Cost | BRL 378,354,129 |
| Total number of exams, N | 8,231,450 |
| Laboratorial exams, N (%) | 6,821,151 (83) |
| Image exams, N (%) | 1,091,465 (13) |
| Other, N (%) | 300,834 (4) |
| Patients who performed exams, N (%) | 76,308 (96) |
| Mean of exams performed per patient | 107.6 |
| Emergency room | |
| Cost | BRL 258,993,734.58 |
| Total number of ER attendance | 512,090 |
| Number of patients with ER attendance, N (%) | 66,176 (86) |
| Mean of ER attendance per patient | 7.5 |

*Include laboratory and image exams

Table 2. Medial and non-medical visits consulted by chronic pain patients during a 4-year follow-up period

| | Total number of consultations | Number of insured with consultation | Mean number of consultations per patient |
|-------------------------------|--------------------------------------|--|---|
| Medical specialist | | | |
| Orthopedist | 38,879 | 19,738 | 2.0 |
| Ophthalmologist | 33,452 | 20,951 | 1.6 |
| Cardiologist | 17,552 | 9,922 | 1.8 |
| Gynecologist | 10,408 | 5,536 | 1.9 |
| General practitioner | 8,143 | 4,490 | 1.8 |
| Non-medical specialist | | | |
| Physical therapist | 87,574 | 12,342 | 7.1 |
| Psychologist | 66,685 | 4,447 | 15.0 |
| Nutritionist | 11,342 | 4,576 | 2.5 |
| Speech therapist | 13,936 | 1,809 | 7.7 |
| Occupational therapist | 2,691 | 281 | 9.6 |

specialist consulted is the orthopedist, as they are usually associated with musculoskeletal disorders management. The number of patients with a non-medical specialty follow-up reinforce the perception of the fragmentation of care, showing a lack of interdisciplinarity. There is a communication gap between the specialties which contributes to a compromised management and high use of resources.

Healthcare resource utilization – Exams

Among chronic pain patients, 96% did perform at least one exam within the 4 years period. There were 8,213,450 exams performed with a mean number of 107.6 exams per patient (Table 1). Laboratorial and image exams comprised 83% and 13% of all exams performed in the period.

Speech analysis captured during the board meeting suggested that there is a high proportion of unnecessary exams, which also confirms the low effectiveness of the healthcare system.

Healthcare resource utilization – ER visits

We observed a high number of ER visits (512,090). Nevertheless, 86% of the patients presented at least one ER visit during the period, resulting in a mean number of 7.5 visits per patient (Table 1). Based on the experts' perspective it was observed that as the patients with chronic pain are not adequately treated, they remain in the health care system indefinitely. This leads to a recurrent ambulatory visit, where the patients are evaluated by a general practitioner that is unable to provide the correct management. Therefore, we observed a refractory patient with a high use of healthcare resources.

Healthcare resource utilization – Costs

During the 4 years of follow-up, the pain patients cost the private health care system more than three billion Reais. The highest expenditure was related to the exams, with a total cost of BRL 378,354,129.00 and a mean cost of BRL 4,958,25 per patient. The costs associated to the ER visits also contributed to the high cost of pain patients, with a total cost of BRL 258,993,734.58 and a mean ticked per patient of BRL 3,798.90.

According to the specialists' speech analysis, the lack of an adequate management of chronic pain patient leads to an expensive and ineffective patients' journey. The entry point of these patients is usually the ER, where untrained professionals provide inadequate treatments. In this setting, the main causes and mechanisms of pain are not adequately evaluated and poorly treated. Moreover, multidisciplinary health services driven to chronic pain patients are very scarce throughout the country, even in larger centers. This leads to a fragmented care of chronic pain patients in an ineffective and expensive vicious circle of continuous misuse of medical resources.

Discussion

The present study explored the journey of patients with pain across the Brazilian Private Healthcare System. We observed

a very low proportion of pain patients compared to literature data (Goren *et al.*, 2014), probably due to the underestimated number of pain-related ICD-10 reports in the Orizon database. Nevertheless, when we analyzed the data of the more than 79,000 pain patients identified, we observed a high utilization of resources. Although not all the identified resources can be directly associated with the pain management, it was estimated that these patients had costed more than 3 billion Reais to the private healthcare insurance between 2015 and 2019.

One of the greatest difficulties in analyzing data from administrative databases is the accurate identification of patients with the condition of interest. In general, this search depends on the ICD-10 reporting which, for the Brazilian private insurance claims, is not mandatory information. Several other factors could contribute to the misleading prevalence of pain patients within the Orizon database. One of the key factors is the fact that, in most cases, chronic pain is considered a symptom of another systemic condition, and therefore, it is not reported. Additionally, the health care professionals are not properly trained on how to identify and treat chronic pain patients. Castro *et al.* reinforced that most of the patients assisted in the ambulatory pain have already been treated by several different medical specialties without success. They refer this to a lack of training of health professionals that has no specialization on pain purposes (Castro *et al.*, 2019). Finally, although one in four Brazilians have access to private insurance, in 13% of the time they seek medical assistance in the public services (Fontenelle *et al.*, 2019).

Among the pain patients identified in the Orizon database, we observed a high use of resources, specially, for laboratory/image exams and ER visits. The number of laboratory tests observed here were very high, showing how these patients are subjected to often unnecessary tests. Ferreira *et al.* reported that this pattern is mainly observed in the private healthcare system and is potentially linked to the great number of unnecessary imaging and lumbar surgeries performed in Brazil (Ferreira *et al.*, 2019). According to the specialists consulted, these data reinforce the low effectiveness of the private healthcare services in properly managing pain patients, resulting in an endless search for assistance. Indeed, we observed a recurrency in the HCRU, suggesting that the chronic pain patient is not adequately treated.

It is worth noting, that the orthopedist was the main medical specialty consulted, suggesting that the pain was mainly associated with musculoskeletal disorders. Following the orthopedists, ophthalmologists, cardiologists, gynecologists, and general practitioners were the medical specialties more consulted. Since we evaluated real-world data and all the information contained in the database was considered, medical specialties often not associated with pain management, such as the ophthalmologist, were widely consulted, and we cannot rule out the possibility that they were routine follow-up. Rheumatologists, however,

were seldom consulted. Indeed, in Brazil the number of rheumatologists is nearly 2000, highlighting how little pain-focused management is available for this population. Nevertheless, in general, we observed a low rate of medical consultation throughout the 4 years of follow-up. Since we did not capture reimbursement or out-of-pocket usage information, we cannot rule out the possibility that patients have been followed up by other medical specialists. Conversely, for non-medical specialties, such as physical therapist, psychologist, and occupational therapist, we observed a high number of visits per patients. This high rate is somehow expected since the frequency with which patients are followed up by these specialties is usually greater (three – four times a month). However, the number of patients with non-medical consultations is relatively low, suggesting that the care is fragmented across the private healthcare system. According to the specialist opinion, the lack of interdisciplinarity in patient care contributes to an inadequate management of the chronic pain patients leading to a recurring resource utilization.

Ferreira *et al.* observed that the overutilization of health resources contributes to the economic burden of pain patients (Ferreira *et al.*, 2019). Due to the complexity of pain patients' profile and management, direct and indirect cost are very difficult to estimate. Between 2012 and 2016, it was estimated at US\$ 2.2 billion expenditure with low back pain, which was mainly associated with loss of productivity (Carregaro *et al.*, 2020). In this study, it was assessed the direct costs from public healthcare setting. Herein, we observed that only the direct costs associated to pain patients in the private setting exceeded BRL 3 billion. Important to emphasize that the resource utilization and cost herein presented did not considered out-of-pocket and reimbursed procedures and medical/non-medical visits. Therefore, we expected that the real costs associated to the chronic pain patients are even higher.

Limitations

Some limitations must be acknowledged. As any claim database study, the lack of clinical information prevented us to have a more accurate information on the patients' characteristics. Therefore, we use a broad selection of ICD-10 conditions that could represent the pain patients, despite their severity and etiology (neuropathic and non-neuropathic). These parameters directly impact the total use of resource and costs; however, we did not make any distinction based on the type of pain.

As a cross-sectional study, we analyzed the total amount of resources used and their associated costs for patients with any of the ICD-10 listed. It is not possible to confirm whether the resources and costs are directly associated to the pain management or if they are related to any other medical condition.

A selection bias could have impacted the data since the ICD-10 coding is not a mandatory information on the billing claims report. Additionally, in several cases the primary condition is reported as the main cause, thus the pain is underreported since it is considered as a symptom. Therefore, some patients may have been missing.

The experts' perspectives considered their own clinical and professional experiences as healthcare managers. It may not reflect the opinion of all healthcare providers. However, all information included herein was based on the assessment of their consensus speeches.

Conclusions

The administrative claims data reinforce the experts' perspectives that the pain patients' in Brazil have not been properly treated, leading to a massive resource utilization and high costs to the private healthcare insurances. There is an urgent need to review the model of care of chronic pain patients in the private sector in Brazil. According to the panel of specialists, some of the following measures may help to promote the necessary changes in this scenario, leading to a better and cost-effective care for chronic pain patients: a) promoting health professionals qualification in pain management in primary care; b) improving integrated multidisciplinary care and unified patients' database; c) promoting patient centered approaches for chronic pain in a multidisciplinary integrated pain centers for second and third care; d) patients' education to clarify the nature of chronic pain conditions, learning of self-care preventive, therapeutic and non-medical integrated approaches and rational means to seek for medical treatment for chronic pain.

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Supplementary Table 1. List of forbidden medications

| |
|-----------------|
| Valproic acid |
| Amitriptiline |
| Cabamazepin |
| Ciclobenzaprine |
| Clomipramine |
| Codeine |
| Desipramine |
| Duloxetine |
| Fenitoina |
| Fluoxetine |
| Gabapentine |
| Imipramina |
| Meloxicam |
| Metadone |
| Milnaciprina |
| Moclobemide |
| Morfina |
| Nortriptile |
| Oxycodone |
| Pramipexole |
| Pregabalin |
| Tramadol |
| Tropisetron |