


BMJ Open Management of acute low back pain in emergency departments in São Paulo, Brazil: a descriptive, cross-sectional analysis of baseline data from a prospective cohort study

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ABSTRACT

Objective To describe management strategies used in public emergency departments in a middle-income country for patients with acute non-specific low back pain.

Design A descriptive, cross-sectional analysis of baseline data from a prospective cohort study.

Setting and participants A study with 600 patients with low back pain presenting in four public emergency departments from São Paulo, Brazil was conducted.

Outcome measures Diagnostic tests, pharmacological interventions, and/or referral to other healthcare professionals were collected. Descriptive analyses were used to report all outcomes.

Results Of all patients, 12.5% (n=75) underwent some diagnostic imaging tests. Medication was administered to 94.7% (n=568) of patients. The most common medications were non-steroidal anti-inflammatory drugs (71.3%; n=428), opioids (29%; n=174) and corticosteroids (22.5%; n=135). Only 7.5% (n=45) of patients were referred to another type of care.

Conclusion There is a need for research data on low back pain from middle-income countries. There was an acceptable rate of prescription for diagnostic imaging tests. However, there were high medication prescriptions and small rates of referrals to other healthcare services. Our findings indicate that there is still a need to implement best practices in the management of acute low back pain at public emergency departments in Brazil.

INTRODUCTION

Although low back pain (LBP) is the most frequent cause of disability globally,¹ acute LBP (ie, duration of symptoms for less than 6 weeks)² is widely known as having a favourable prognosis, and chronic LBP (ie, duration of symptoms longer than 12 weeks)² has a very poor prognosis.³ The majority of acute and chronic LBP cases are non-urgent,³ and clinical practice guidelines recommend that patients with LBP should be managed

Strengths and limitations of this study

- This study enrolled a large sample of patients with acute non-specific low back pain from emergency departments of four Brazilian public hospitals.
- Patients were carefully selected according to eligibility criteria, and there was no interference in the hospital routine or the care provided.
- We cannot generalise our results to the whole country, as the sample was recruited exclusively in São Paulo.
- Although the response rate for study recruitment was good (75%), we do not have further data to support the representativeness of the sample.
- The study's descriptive nature did not allow for comparisons or association analyses.

in primary care.⁴ However, there is a large proportion of patients with LBP who are managed in emergency departments (EDs).⁵

EDs are usually overcrowded settings, and many patients with LBP are discharged from EDs without proper care.⁴ Patients with non-specific LBP frequently receive more specialised care than is necessary, and usually patients do not receive education and reassurance to manage their symptoms.⁴ Despite the high demand of patients with LBP in EDs, there are few efforts to improve the quality of care for these patients based on clinical practice guidelines.⁶

Even though guidelines suggest therapeutic strategies for patients who seek care for LBP only in primary care, such strategies could be used in EDs to improve the quality of care.^{4,6} Clinical practice guidelines consistently do not recommend surgery, pharmacological interventions, bed rest, or routine

use of imaging for patients with acute and chronic LBP as first-line treatments.³ However, there is evidence that these recommendations are not followed in high-income countries.^{7–9} Regarding low/middle-income countries, it is unknown whether the recommendations from guidelines are followed, especially in countries with a different healthcare system, such as Brazil.¹⁰

The healthcare system in Brazil is composed of three sectors: private sector, in which services are financed with public or private funds; private health insurance, with different forms of health plans; and the public system (ie, Unified Health System—SUS in Portuguese), which is financed through taxes, social contributions, out-of-pocket spending and employers' healthcare spending.¹¹ The Brazilian population can use all three sectors, depending on the ease of access and ability to pay.^{10 11}

The Brazilian population has relied on the SUS since its implementation through the 1988 Constitution, when the health of the citizen was recognised as a right and a duty of the state.^{11 12} The assistance proposal from SUS is to make the first contact, preferably by primary care, which is composed of a healthcare team that provides patient care, refers the patient to more complex levels of care, and implements actions to prevent and promote health in the community.^{10 11} The secondary care is based on strategies to provide accessible and rapid acute care to relieve demand on hospital EDs and the assistance of specialised centres.^{11 12} Finally, tertiary care is based on hospital care and EDs, which demands high-cost procedures and high-complexity care.^{11 12} However, it is not uncommon for EDs to be the gateway to the healthcare system in Brazil,¹² where patients are classified according to the severity of their complaints so that they can access the necessary care. Physiotherapists work together with other healthcare professionals to consider the three levels of care in the public and private sectors.¹³ Although increasing, the availability of physiotherapists is low and unequal between assistance levels in Brazil, making access to the service difficult and causing long waiting lists.¹³ The SUS is based on principles of universality, integrity and social participation; however, it is still struggling to enable universal and equitable coverage.^{11 12 14}

Little is known about the management of patients with LBP in EDs.⁸ Therefore, a better understanding about how these patients are being managed in EDs could help to improve the quality of care.⁴ In Brazil, although there is limited published evidence, there are some data showing that patients with LBP in EDs are likely to receive unnecessary imaging, surgery and long hospitalisation.¹⁰ However, there is a lack of studies that have been conducted in middle-income countries investigating the management of LBP in EDs. Therefore, we aim to describe management strategies used in the EDs from a large sample of patients with acute non-specific LBP presenting to Brazilian public EDs.

METHODS

Study design and setting

This cross-sectional, descriptive study was conducted using the baseline data from a large prospective inception cohort investigating the prognosis of patients with acute non-specific LBP.¹⁵ To calculate the sample size, we identified the largest study in the literature investigating the prognosis of non-specific acute LBP with 973 patients.¹⁶ Full details of the sample size calculation are provided in the cohort study report.¹⁵ The study was conducted in EDs of four public hospitals from São Paulo, Brazil. These are academic hospitals, with care provided for resident physicians and advanced practice providers with approximately 240 000 visits per year in the ED. Data were collected between August 2014 and August 2016. This manuscript was reported following the Strengthening the Reporting of Observational Studies in Epidemiology guidelines.¹⁷

Participants

Patients who presented to EDs due to a new episode of LBP were invited to participate. LBP was defined as pain or discomfort between the costal margins and lower gluteal folds, with or without leg pain lasting between 24 hours and 6 weeks (acute LBP), and preceded by a period of at least 1 month without pain.² When arriving in EDs, patients were screened based on the main complaint and were referred to the medical consultation. We enrolled consecutive cases with acute episodes of non-specific LBP, who were referred by the treating physician to the responsible researcher immediately after consultation and screened for red flags through history taking and physical examination. Red flags were associated to patients who presented with neurological impairments (eg, spinal stenosis or radiculopathy) or serious underlying diseases (eg, malignancies, fractures or infections).^{5 8} Finally, the researcher determined if the patient was eligible to participate. The interview was conducted in the ED waiting room. We collected data during business hours on weekdays, until the sample size was met. We did not interfere in the routine of medical consultations, prescribed treatments, laboratory tests, imaging examinations or hospital procedures. All patients were informed about the study's objectives and the relevant ethical aspects, and patients were asked to sign a consent form if they agreed to participate.

We included patients with a new episode of non-specific LBP, meaning the pathological cause of LBP remained unidentified, who were aged between 18 and 80 years, and were presented to EDs. We excluded patients with serious spinal pathologies, such as fractures, tumours, spinal infections, ankylosing spondylitis, cauda equina syndrome and spinal stenosis. We also excluded patients unable to speak Portuguese, pregnant women, and those presenting with inflammatory conditions or kidney diseases.

Patient and public involvement

Patients were not involved in setting the research question or the outcome measures. They were also not involved in

the study's design, management or conduct. Researchers interviewed patients who agreed to participate in the study through a structured questionnaire and released after data collection. The researchers were careful not to change the patients' routines and the care provided at the hospital.

Outcomes

The data were collected through a structured, in-person oral interview immediately after the medical consultation in the ED. Demographic and clinical characteristics (eg, age, gender, body mass index (BMI), marital status and education level) were collected. The BMI was calculated from the reported height and weight. Patients were also asked about the use of previous medication to reduce LBP in the current and previous pain episodes, sudden onset of pain (if the pain started suddenly) and duration of symptoms. We collected information on diagnostic tests, pharmacological interventions and referrals to other healthcare professionals that these patients received. Finally, we collected information on levels of pain intensity during the previous 7 days and disability. The patients self-reported all data and the prescriptions they received from their medical doctors.

- ▶ **Diagnostic tests:** the imaging tests were reported as (1) simple X-rays, (2) magnetic resonance imaging (MRI), (3) computer tomography (CT), (4) ultrasonography, (5) Electro Cardiogram (ECG) and (6) electromyography. Moreover, laboratory tests included (1) blood tests and (2) urinalyses.
- ▶ **Pharmacological interventions:** the pharmacological interventions were grouped according to their pharmacological class (online supplemental appendix 1): (1) non-steroidal anti-inflammatory drugs (NSAIDs), (2) opioids, (3) corticosteroids, (4) muscle relaxants and (5) others (eg, antiemetic, antiepileptic, antidepressant, anxiolytic and multivitamin supplement). In addition, the concomitant use between more than one pharmacological class was also recorded: (1) NSAIDs and corticosteroids; (2) NSAIDs and opioids; (3) NSAIDs and muscle relaxants; (4) NSAIDs, muscle relaxants and opioids; (5) NSAIDs, corticosteroids and opioids; (6) opioids and corticosteroids; (7) opioids and muscle relaxants; and (8) others (varied combinations). The medications were prescribed and/or administered to patients in the ED.
- ▶ **Referrals to another type of care:** the referrals to another type of healthcare were reported as (1) primary care, (2) physical therapy, (3) orthopaedic surgeon and (4) others. We did not record whether the referrals were urgent or elective.
- ▶ **Pain intensity** was measured using the Pain Numerical Rating Scale (NRS).¹⁸ Patients were asked to rate their pain intensity levels during the previous 7 days. The scale ranges from 0 to 10, with 0 representing 'no pain' and 10 indicating 'worst pain possible'.¹⁸
- ▶ **Disability** was measured by the Roland Morris Disability Questionnaire (RMDQ).^{19 20} The RMDQ is a

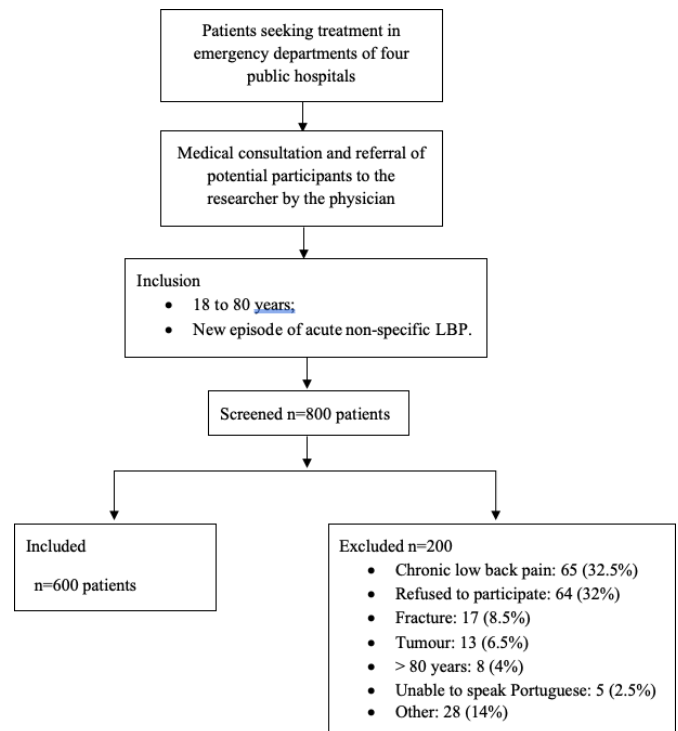


Figure 1 Study screening flow chart. LBP, low back pain.

spine-specific measure to assess disability associated with LBP. RMDQ consisted of a 24-item questionnaire (yes/no) that assessed normal activities of daily living in the actual day of its application.^{19 20} The total score was determined by the sum of all positive answers (0–24), with a higher score indicating a higher level of disability.^{19 20}

Statistical analysis

Descriptive analyses were used to report all outcomes. Categorical variables were described with frequencies (%). Continuous variables with a normal distribution were described as means and SDs. If the data were not normally distributed, we used median and range of 25th–75th percentiles in the analyses. All analyses were conducted using SPSS V.19.0 for Windows.

RESULTS

From the 800 patients initially evaluated, 200 (25%) were ineligible to participate. Of these, 108 (54%) did not meet the inclusion criteria; 64 (32%) declined to participate and 28 (14%) reported other reasons (figure 1).

A total of 600 patients with acute non-specific LBP agreed to participate and were included in the study: 58% (n=348) of the participants were women; 42.7% (n=256) were married and most patients were overweight. The mean age was 43.2 years; 54.5% (n=327) of the patients had previously taken medication; 69.2% (n=415) of the patients had a history of LBP; 85.3% (n=512) had sudden onset of pain; and the median values of pain intensity (0–10 NRS) and disability (0–24 RMDQ score) were 8 and 17, respectively (table 1). The response rate of patients

Table 1 Demographic and clinical characteristics of patients with acute non-specific LBP in the EDs (n=600)

Characteristics	
Age (years; mean/SD)	43.2 (13.7)
Gender, female (%)	348 (58)
Marital status, married (%)	256 (42.7)
Body mass index (mean/SD)	26.9 (5.0)
Previous medication intake (%)	327 (54.5)
Previous LBP episode (%)	415 (69.2)
Sudden onset of pain (%)	512 (85.3)
Duration of symptoms (weeks; median/IQR)	1 (0)
Pain intensity (0–10; median/range)	8 (3)
Disability (0–24, median/range)	17 (9)

Categorical variables are expressed in percentage, and continuous variables are expressed in mean and SD or median and 25th–75th percentile range. EDs, emergency departments; LBP, low back pain.

who were invited to participate in the study was 75%; 800 patients were invited to participate, and 600 patients agreed to answer the questionnaire. No admissions to the hospital were observed.

In terms of diagnostic strategies used by ED physicians, 12.5% (n=75) of the patients underwent some types of diagnostic imaging test. Of these patients, 11.2% (n=67) received simple X-rays; 1.2% (n=7) were tested by MRI and 0.5% (n=3) were tested by CT scans. However, only 0.2% (n=1) underwent ultrasonography. No patient was submitted to laboratory tests, electromyography or ECG.

Table 2 presents the most common medications used by the participants. Medication was administered for most patients (94.7%; n=568) during their stay in the EDs. NSAIDs (71.3%; n=428), opioids (29%; n=174), corticosteroids (22.5%; n=135) and muscle relaxants (16.5%; n=99) were administered frequently alone or combined with other medications. In addition, a combination of different medication classes was given for symptom relief. The pharmacological classes that most commonly combined only one medication were NSAIDs and corticosteroids (12.3%; n=74), opioids (7.7%; n=46) and muscle relaxants (5.7%; n=34).

A small proportion of patients with acute non-specific LBP in EDs were referred to another type of care (7.5%; n=45). The most frequent referrals were to primary care (3.8%; n=23), physiotherapy (2%; n=12) and orthopaedic surgeons (1.7%; n=10).

DISCUSSION

We aimed to describe management strategies used in EDs from a large sample of patients with acute non-specific LBP presenting to Brazilian public EDs. We observed that 12.5% of cases were investigated further using imaging tests. With regard to therapeutics procedures, we observed that most patients (94.7%) were managed

Table 2 Common medication classes prescribed and administered for patients with acute non-specific LBP in EDs (n=600)

	N (%)
Isolated medication class	
NSAIDs	428 (71.3)
Opioids	174 (29)
Corticosteroids	135 (22.5)
Muscle relaxants	99 (16.5)
Others	17 (2.8)
Total	568 (94.7)
No medication provided	
	32 (5.3)
Combined medication class	
NSAIDs and corticosteroids	74 (12.3)
NSAIDs and opioids	46 (7.7)
NSAIDs and muscle relaxants	34 (5.7)
NSAIDs, muscle relaxants and opioids	17 (2.8)
NSAIDs, corticosteroids and opioids	14 (2.3)
Opioids and corticosteroids	13 (2.2)
Opioids and muscle relaxants	11 (1.8)
Others (varied combinations)	27 (4.5)
Total	236 (39.3)

Categorical variables were expressed as frequencies and percentages. EDs, emergency departments; LBP, low back pain; NSAIDs, non-steroidal anti-inflammatory drugs.

using medication. Finally, a small proportion of patients (7.5%) were referred to another type of care at the time of discharge.

This is the first study that investigated all management practices, including diagnostic and therapeutic strategies, and referrals to another level of care used at EDs from a middle-income country. The strength of our study is that we enrolled a large sample of patients with acute non-specific LBP from EDs of four Brazilian public hospitals. However, our findings cannot be generalised to private hospitals. Moreover, besides the large sample, we cannot generalise our results to the whole country, as Brazil has a continental dimension. Additionally, we do not have data to support the representativeness of the sample in São Paulo, the largest city in Brazil. We did not differentiate the medications that were administered or prescribed in the ED, and we did not collect data on adverse events experienced by patients during their visits to EDs. Finally, we have not performed comparisons or association analyses, which could be considered limitations.

LBP clinical practice guidelines recommend against routine use of imaging for diagnosing^{21–23} because it is not able to improve outcomes.²⁴ The use of imaging for the diagnosis of acute LBP should be restricted to patients presenting a cluster of specific red flags,^{25 26}

trauma or progressive signs of neurological symptoms, whereas laboratory tests should be performed only when malignancy or infection is suspected.⁷ Although these recommendations are widely known, studies conducted in EDs from high-income countries have shown that diagnostic rates through imaging and laboratory tests remain relatively high.⁷⁻⁹ We observed that Brazilian physicians prescribed less imaging (12.5%), compared with American (30.5%),⁷ Canadian (29.5%)⁸ and Australian physicians (23.5%).⁹ In addition, our results indicate that diagnostic strategies in Brazil are in accordance with the best available evidence,^{27 28} as the rates of imaging for diagnosing are low regardless of the reasons involved. Finally, we observed that the diagnostic strategies aligned with guidelines, avoiding unnecessary exposure to imaging and laboratory tests and preventing waste of financial resources.

Currently, guidelines recommend that pharmacological treatment for LBP should be preferentially prescribed when there is an inadequate response to non-pharmacological interventions.^{22 23 29} However, our results showed that physicians prescribed and delivered medications to most patients (94.7%). These data are alarming, as the efficacy of most medications for patients with acute LBP is questionable.²⁸ In addition, the prognosis of acute LBP is usually favourable,³⁰ and most patients would require little or no formal medical care.^{26 28} We observed that NSAIDs, including those with analgesic-only action, were the most commonly prescribed medication, even though indiscriminate use may be responsible for triggering adverse effects, such as cardiorenal toxicity, liver issues and gastrointestinal symptoms.^{3 28} Furthermore, the majority of guidelines recommend NSAIDs as a second line of treatment.^{22 23 29} In addition, we found that NSAID prescriptions were extremely higher than those observed from high-income countries, such as the USA (49.5%),⁷ Canada (35.4%)⁸ and Australia (38.3%).⁹ On the other hand, our results partially adhere to guidelines, which recommend the use of NSAIDs instead of more powerful analgesic drugs.^{22 23 29} We noted that EDs from high-income countries (ie, the USA, Canada and Australia) have higher opioid prescription rates (61.7%,⁷ 34.5%⁸ and 69.1%⁹) compared with our findings (29%). The therapeutic strategies used by Brazilian physicians were probably based on evidence demonstrating that efficacy between non-opioid and opioid analgesic is similar,³¹ and the benefits caused by opioids should be weighed against potential harms.^{32 33} In addition, our results suggest that Brazilian physicians were more cautious when prescribing opioids in EDs compared with physicians from high-income countries. Finally, we observed that corticosteroids, muscle relaxants and combined medications were less often prescribed. These therapeutic strategies are in accordance with guidelines that currently recommend that some of these medications have limited use in selected patients for short term only.^{22 23 29}

Although guidelines recommend patient education and advice to remain active as the first line of care,^{22 23 29} we observed that the majority of patients only received pharmacological treatment. We supposed that one way to provide appropriate care in these cases would be to refer patients to primary care, where the healthcare team could provide education and advice for these patients. There is evidence that patient education in primary care does provide long-term reassurance.³⁴ However, we observed that a minority of patients were referred to primary care or another type of care for further assistance. Data from high-income countries, such as Canada, have shown referral rates of approximately 41.2% to a family physician, 11.2% to a specialist and 5.5% to a hospital referral.⁸ A systematic review, including data from Australia, Italy, the USA, the UK, Canada and Spain, shows that 8% of the patients are referred from ED to surgical review, and 11% are referred to specialists.³⁵ Low referral rates observed in our study may be due to difficulties faced by the Brazilian public health system, such as difficulty in scheduling appointments and long waiting lists for primary care.¹⁰ In the private sector, the rates of specialist consultation, imaging and unnecessary surgeries are higher than in the public sector because of the ease of access and the willingness to pay.¹⁰ Finally, we observed that referral rates of physiotherapy and specialist physicians were also low. Physiotherapy is included in all levels of care in Brazil, but there is an imbalance between the need for physiotherapy care and the availability of physiotherapy care.¹³ Although it is notable that the availability of physiotherapy care in Brazil is increasing, some strategies to manage the demand related to access and improvement of health systems are still needed.¹³ On the other hand, the typical ED is not designed to provide hands-on treatments,⁴ and our available data show a low rate of referrals from primary care to physiotherapy and no data regarding referrals from ED to physiotherapy care.³⁵ However, the data corroborate evidence that indicates acute LBP has a favourable clinical course, and more complex treatment is usually not required.^{26 28 30}

Disability associated with LBP is linked to the social and economic contexts of people's lives.³⁶ Therefore, investigating the management of LBP in EDs is necessary to recognise if there is a need to change the management of LBP according to the current guideline's recommendations.⁴ Our results are important for future policy implementation to ensure health systems become more efficient at managing patients with LBP and to avoid expenditure of low-value care resources. Further studies are needed to investigate if the management of LBP in the private sector is similar to the management in the public sector. Moreover, high-quality studies from low/middle-income countries are needed to understand the management of LBP in different social and economic conditions and to prevent the use of harmful and wasteful practices. Our findings indicate that although the physicians adopt some practices recommended by guidelines, there is still a need to implement best practices in the management of acute LBP at public EDs in Brazil.



CONCLUSION

There was an acceptable rate of prescription for diagnostic imaging tests (12.5%; n=75). On the other hand, there were high medication prescription rates (94.7%; n=568) and smaller rates (7.5%; n=45) of referrals to another type of care.

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Contributors All authors critically revised the manuscript and approved the final version of the manuscript. Please find below a detailed description of the role of each author. ISO—conception and design, acquisition of data, analysis and interpretation of data, drafting and revision of the manuscript. SST—interpretation of data, drafting and revision of the manuscript. AAV—interpretation of data, drafting and revision of the manuscript. ACA—acquisition of data, drafting and revision of the manuscript. FCdM—interpretation of data, drafting and revision of the manuscript. RKAO—interpretation of data, drafting and revision of the manuscript. LOPC—conception and design, analysis, interpretation of data and critical revisions for important intellectual content. LdCMC—guarantor, conception and design, analysis, interpretation of data and critical revisions for important intellectual content.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not required.

Ethics approval This study has been conducted in accordance with the ethical standards of the 1964 Declaration of Helsinki. The Ethics and Research Committee from Universidade Cidade de São Paulo approved this study (number 25315713.7.0000.0064). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The full dataset for this study is available upon request.

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