# Credibility, accuracy and readability of patient-oriented information about low back pain on Brazilian websites: a mixed-method review

*Credibilidade, acurácia e legibilidade das informações orientadas ao paciente sobre dor lombar em sites brasileiros: uma revisão de método misto*

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## ABSTRACT

**BACKGROUND AND OBJECTIVES**: Low-quality online health-related content may lead to ineffective or harmful decision-making from patients related to their healthcare. The aim of this study was to evaluate the credibility, accuracy and readability of web-based content on Brazilian websites.

**METHODS**: This is a mixed-method review with exploratory sequential design. Google was selected as the search engine for retrieving web-information about low back pain (LBP) in Brazilian websites. We assessed the URL on three domains: credibility, accuracy, and readability. Qualitative analysis of each URL was performed in three steps: (1) organization into thematic units; (2) data exploration; and (3) interpretation of the data and summarization.

**RESULTS**: Credibility was assessed in 135 URLs, 72 (53%) URLs had no authorship, 119 (88%) did not mention the sources of their information, none presented a declaration of conflict of interest or the declared source of funding, 76 (56%) URLs present the date of creation. Accuracy was assessed in 121 URLs and none fully adhered to the guidelines. Readability was assessed in 128 and texts were classified as "very easy" or "easy" to read. Five main themes emerged in the qualitative analysis: (1) Explanations and causes for low back pain, (2) diagnosis, (3) recommendation about treatment, (4) recommendation for coping and self-management, and (5) lifestyle factors.

**CONCLUSION**: Content analysis of web-based searches on the Brazilian Portuguese language demonstrated low credibility standards, mostly inaccurate information, and moderate-high readability levels about low back pain.

**Keywords**: Access to information, Consumer health information, Information dissemination, Low back pain, Medical informatics.

## RESUMO

**JUSTIFICATIVA E OBJETIVOS**: O conteúdo on-line relacionado à saúde quando apresenta baixa qualidade pode levar a tomadas de decisão ineficazes ou prejudiciais por parte dos pacientes. O objetivo deste estudo foi avaliar a credibilidade, acurácia e legibilidade do conteúdo em portais brasileiros.

**MÉTODOS**: Esta é uma revisão de método misto com design sequencial exploratório. O Google foi selecionado como o mecanismo de busca para recuperar informações da web sobre dor lombar em sites brasileiros. Avaliamos os URL em três domínios: credibilidade, acurácia e legibilidade. A análise qualitativa de cada URL foi realizada em três etapas: (1) organização em unidades temáticas; (2) exploração de dados; e (3) interpretação dos dados e resumo.

**RESULTADOS**: A credibilidade foi avaliada em 135 URLs, 72 (53%) URLs não tinham autoria, 119 (88%) não mencionavam as fontes de suas informações, nenhuma apresentava declaração de conflito de interesse ou fonte de financiamento declarada, 76 (56%) URLs apresentam a data de criação. A acurácia foi avaliada em 121 URLs e nenhuma aderiu totalmente às diretrizes. A legibilidade foi avaliada em 128 e os textos foram classificados como "muito fáceis" ou "fáceis" de ler. Cinco temas principais emergiram na análise qualitativa: (1) Explicações e causas da dor lombar, (2) diagnóstico, (3) recomendação sobre tratamento, (4) recomendação para enfrentamento e autogerenciamento e (5) fatores de estilo de vida.

**CONCLUSÃO**: A análise de conteúdo de pesquisas baseadas na web, no idioma português do Brasil, demonstrou baixos padrões de credibilidade, acurácia e níveis moderados a altos de legibilidade sobre a dor lombar.

**Descritores**: Acesso à informação, Disseminação da informação, Dor lombar, Informação de saúde ao consumidor, Informáticas médicas.

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**HIGHLIGHT**

• Information about low back pain in Brazilian websites failed to meet guideline-endorsed recommendations.

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## INTRODUCTION

Low back pain (LBP) is a major problem throughout the world[1]. The clinical course of LBP is benign; however, some people will not recover and will develop chronic LBP with different levels of disability[2]. Although current guidelines about LBP recognize the role of education, the content that should be included is not clear. This gap opens a window to different interpretation of what content should be included and how it should be presented.

Currently, the internet has become the primary source for health-related information for patients and families to find which they did not get from their clinicians[3,4]. In fact, health-related information is among the most sought after topics on the internet[5]. However, the information found in the internet often lacks scientific rigor. Low-quality online information can impact negatively on clinicians-patient dynamic, patient compliance, contribute to over-utilization of the healthcare system, unnecessary tests and ineffective treatments[6]. The literature presents evidence that noncommercial freely accessible websites from English-speaking countries demonstrated low credibility standards, provided mostly inaccurate information, and lacked comprehensiveness across all types of low back pain[7].

In the Brazilian context, a study found that LBP information offered on YouTube™ is often not evidence-based with only 29.5% of the videos presenting at least one diagnostic recommendation from clinical guidelines, and 50% reported a treatment recommendation that aligned with clinical guidelines[8]. Likewise, information about low back pain provided by Brazilian official websites (government agencies, medical and physical therapy professional councils and associations) failed to meet many guideline-endorsed recommendation[9]. Recently, it was found that Brazilian official websites demonstrated low credibility standards and inaccurate information about LBP[9]. The first study of this group was limited to official websites. However, people from the general public likely prefer to search for health-related information on Google rather than official websites. For the present study preparation, the objective was to evaluate the credibility, accuracy and readability of LBP web-based content on Brazilian websites.

## METHODS

This study was characterized as mixed methods review with exploratory sequential design of the information available on the internet. All materials were coded by their Uniform Resource Locator (URL). The study followed the Mixed Methods Article Reporting Standards (MMARS) recommendations[10].

Google was selected as the search engine for retrieving web-information about LBP in Brazilian Portuguese language. A Google search for "*dor lombar", "lombalgia", "coluna lombar", "dor na coluna"* and *"lumbago"* was performed in December of 2021. Each term was searched on Google by two independent reviewers (RPS and TPA). Inclusion criteria consisted of the first 20 websites of each term retrieved on Google search that cover LBP information to the general population. URLs that were duplicated, inactive, not related to LBP, or where behind a paywall were excluded. Two authors (RPS and TPA) independently extracted the full text from all included websites on an Excel spreadsheet and rated each website on three domains: credibility, accuracy, and readability.

## DATA ANALYSIS

**Credibility, accuracy, and readability of LBP-specific content**

Credibility was assessed using the 4-item Journal of the American Medical Association (JAMA) benchmark[11]and especially its graphical, user-friendly subset, the World Wide Web (the Web. The JAMA benchmark consists of four elements: (1) currency of information, (2) declaration of authorship, (3) presentation of a list of references, and (4) disclosure of any conflict of interest, funding, or sponsorship. Each item was categorized as yes, no, or not reported. The website was considered to be up-to-date if its date of publication or last update had been subsequent to the publication date of the 2017 American College of Physicians guidelines for the management of low back pain with or without sciatica[12]. Authorship was considered to be declared when single or multiple authors (with at least one registered healthcare professional) were listed or when authorship was attributed to a working group. References were considered only if they come from medical journals.

Accuracy was defined as the number and proportion of website recommendations that were judged clear and accurate according to the 2015 Evidence-Informed Primary Care Management of Low Back Pain[13], the 2016 National Institute for Health and Care Excellence (NICE) guidelines (https://www.nice.org.uk/guidance/ng59) and the 2017 American College of Physicians guidelines for the management of low back pain with or without sciatica[12] as described by study[7].

This was done by comparing the content identified on each website with that published in the guidelines on the following domains: definition, causes, risk factors, and treatment/management. The content was analyzed within six recommendations endorsed by the guidelines: education and guidance to stay active, exercise as therapy, manual therapy, combined physical and psychological programs, self-management principles and multimodal treatment[14]. Each of the above-mentioned topic was coded by the two reviewers according to 1 of 4 categories, as follows: (1) accurate/clear described; (2) partially accurate/description lacks clarity; (3) inaccurate/misleading description; (4) not mentioned. Any inconsistencies were discussed between the reviewers until consensus was achieved.

Readability was assessed using the Flesch-Kincaid index adapted for Portuguese[15]. A readability index usually analyzes the level of education necessary for a reader to understand a certain text and measures the structural difficulty of the text (words, syllables and length of sentences). For the general public, written content that requires a readability index between five and seven years of schooling is considered appropriate[16].

The Flesch-Kincaid index, used in the analysis, classified the texts into four degrees of reading difficulties: very easy (score between 75-100), which would be related to an education level up to the fourth grade of elementary school; easy texts (scores between 50-75), which would be suitable for readers with education level up to the eighth grade of elementary school; difficult texts (scores between 25-50), classified as readable for students in high school or university, and very difficult texts, (scores between 0-25), which would be suitable only for specific academic areas. Results are presented descriptively, including absolute values and frequency of each label for all criteria.

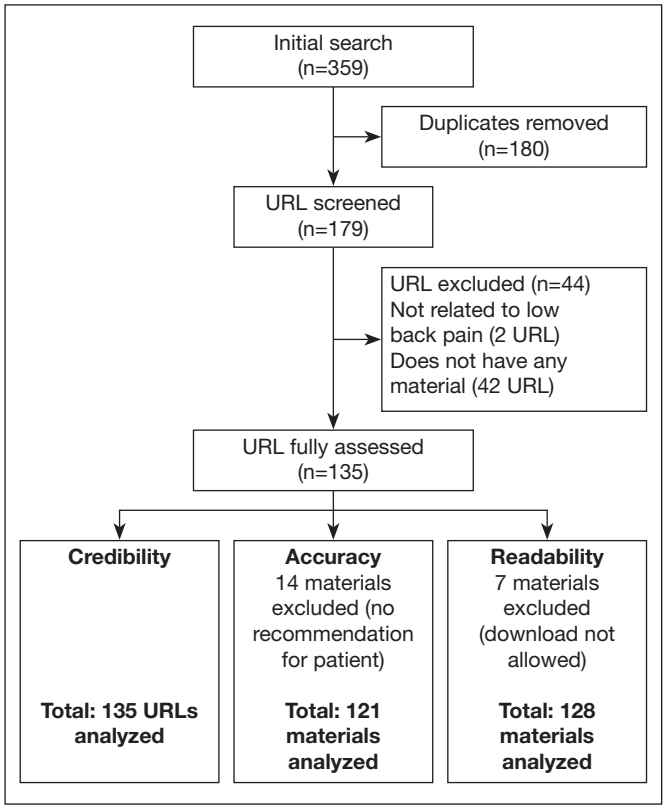


**Figure 1**. Flowchart of the selection of the URL included in the study.

**Qualitative analysis**

The text information for each URL was transferred to the Microsoft Word for Windows™ text editor to perform the analysis by domain of themes. Analysis of each text was performed in three steps by two previously trained authors (RPS and TPA): (1) organization into thematic units (words or phrases that described the themes presented in the texts); (2) data exploration, which involved the careful reading and organization of the data into categories (these categories were created according to the frequency of the thematic units identified in step (1); and (3) interpretation of the data and summarization. All authors approved the thematic units and categories created during data analysis. The qualitative analysis and synthesis were performed using an open source online platform (Taguette)[17]. Taguette is an example of qualitative computer-aided data analysis software, whose objective is to facilitate a systematic analysis of unstructured or semi-structured data, particularly text data.

## RESULTS

The initial search identified a total of 359 URLs, 180 were duplicates, 44 were excluded, resulting in a total of 135 fully assessed URLs (Figure 1).

**Credibility, accuracy and readability analysis**

In the 135 URLs analyzed, 72 (53%) URLs had no authorship, 119 (88%) did not mention the sources of their information, none presented a declaration of conflict of interest or the declared source of funding, 76 (56%) URLs present the date of creation and 71 of these (93%) were published after 2016.

A total of 121 (90%) URLs was included in the accuracy analysis. Topics with the highest rates of information provided as "accurate/clearly described" were the recommendation to remain active (n=43; 36%) and exercises (n=68; 56%). Topics not included were: psychological treatments (n=115; 95%), and multimodal treatments (n=109; 90%) (Figure 2).

The readability of the texts was assessed in 128 (95%) URLs. In 38 (30%) the text was considered "very easy" to understand,

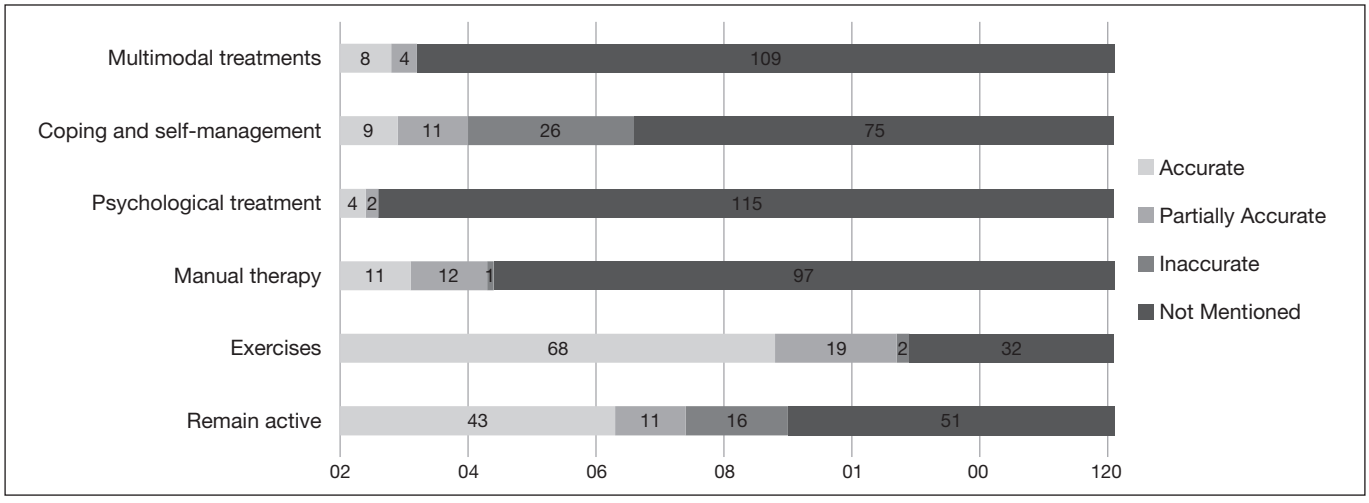


**Figure 2**. Accuracy of information about low back pain on the URL assessed (n = 121).

representing a level of education "up to the 4th grade" of elementary school and in 90 (70%) URLs the degree of difficulty of reading was classified as "easy", equivalent to a level of "up to the 8th grade" of elementary school.

**Qualitative analysis**

Five main themes emerged in the analysis of the URL texts: (1) Explanations and causes for low back pain, (2) diagnosis, (3) recommendation about treatment, (4) recommendation for coping and self-management, and (5) the influence of lifestyle factors (Table 1).

## DISCUSSION

The current study complements the knowledge on the available information about LBP on Brazilian websites. The information related to LBP on Brazilian websites failed to meet many guideline-endorsed recommendations. Most of the content does not present information about authorship, sources of information or declaration of conflict of interest. In addition, the websites analyzed does not mention information about psychological treatments and multimodal treatments. The readability of the texts was considered "very easy" or "easy" to read. The results

**Table 1.** Examples of information extracted from the URL in the qualitative analysis.

| Theme | Sub-theme | Coding (n) | Examples |
|---|---|---|---|
| Explanations and causes for low back pain | Cause of low back pain attributed to biomedical factors | Posture (287)<br>Muscular (120)<br>Spine deformities (237)<br>Injury/trauma (99)<br>Work (56)<br>Sciatica (129)<br>Diseases (102) | *An inadequate posture at work, especially office workers, on the couch at home, when using the cell phone or computer and when sleeping, contribute a lot to low back pain. (URL20)*<br>*A herniated disc can cause irritation or compression to the sciatic nerve, resulting in pain. (URL31)* |
| | Risk Factors | Age (48)<br>Smoking (27)<br>Overweight (72)<br>Sedentary lifestyle (58) | *The chronic form (of low back pain) usually happens among the elderly; the pain is not as intense, but it is almost permanent. (URL19)*<br>*Smoking is believed to decrease the supply of oxygen to the disc, causing it to break down more quickly. (URL89)*<br>*Sedentary lifestyle is one of the main causes of low back pain. (URL14)* |
| Diagnosis | Assessment and complementary tests | Imaging tests (63) | *More than 90% of the time, the diagnosis and cause are established with a good conversation with the patient and a thorough physical examination. When in doubt, the next step is plain radiography. (URL19)*<br>*The main recommendation is to look for an orthopedist and have tests done to find out the real cause of the pain and the extent of the injury. (URL17)* |
| Recommendation about treatment | Conservative treatment | Exercise/movement (293)<br>Drugs (161)<br>Manual Techniques (57)<br>Rest (43)<br>Back support belt (8) | *The initial goal of treatment is pain relief. Several medications can be used, including analgesics, anti-inflammatory drugs, muscle relaxants, steroids and opioids, always after evaluating the risk-benefit of each one of them" (URL120)*<br>*Use back support belt to correct posture and protect your lower back. (URL56)*<br>*Spinal manipulation, performed by a chiropractor or certain other doctors (such as osteopathic physicians), can also provide relief when combined with an exercise program. (URL111)* |
| | Surgical treatment | Surgery (60) | *Surgery may be an option if symptoms have not responded to other treatments and continue to intensify. (URL92)*<br>*In some cases, surgeries are performed to correct the anatomy and relieve low back pain. However, in addition to the risk during the procedure, the pathology can happen again, as the body remains unprepared for daily movement. (URL13)* |
| Recommendation for coping and self-management | Information on work, posture, lifting and carrying objects | Posture (287)<br>Weight (110)<br>Work (56) | *Try to maintain a good posture. The habit of using correct postures should be developed, especially when there is a need to remain seated or standing for a long time. But it is always important to take "breaks" to get out of the same position. (URL100)*<br>*Avoid carrying too many weights and inappropriately (URL99)* |
| Influence of lifestyle factors | Lifestyle guidance | Sleep (29)<br>Nutrition (19) | *Keeping a healthy and balanced diet, rich in anti-inflammatory foods is essential not only to maintain health, but to help minimize inflammation and discomfort caused by low back pain. (URL101)*<br>*Social isolation can reduce the level of physical activity, as well as raise anxiety levels and worsen sleep quality. All these factors contribute to the onset or persistence of low back pain. (URL42)* |

were in accordance with previous studies that analyzed commercial websites and found that they were mostly of poor quality[18,19]. URLs included does not mention information about psychological and multimodal treatments or on the use of manual therapy. The most accurate information was the recommendation to remain active (36%) and exercise (56%). In previous research by the authors of this study (including the official websites), it was found that the recommendation to remain active (n=17; 29%) and recommendations for exercises (n=19; 33%) presented the highest rates of "accurately/clearly described" rate, while psychological treatment (n=3; 5%), coping and self-care (n=8; 14%), multimodal treatments (n=5; 9%), and manual therapies (n=4; 7%) were the contents less mentioned[9].

The qualitative analysis showed that online available information presents a strong focus on biomedical aspects to explain risk factors, cause and diagnosis of LBP. Biomedical explanations about low back pain remain predominant on Brazilian websites, even those presented on official websites. Unlike the previous study, in the present research no information was identified for children and adolescents[9].

As for the limitations of the present study, the goal was to reproduce, as best as possible, the way the lay public searches for information about LBP on the Internet. Several terms were used in the Google search, including even those that are not frequent, such as lumbago. In addition, this study sought to reduce methodological flaws by including two trained authors. The fact that the first 20 URLs of each term were included can be considered a limitation. However, it was decided that this number was sufficient to find a site that could be identified by a patient when searching for health-related information on the Internet. On the other hand, it must be recognized that some websites were not included, and this limitation should be considered when interpreting the results. Although the role of social media in disseminating health-related information is recognized, there was no search for information on these media.

**Implications to practice**

Patients can access online health-related information not necessarily to validate information, gather additional information and to help with decision making. However, people in Brazil should be cautious when searching for information on LBP online on general websites. Inaccurate information can contribute to overutilization of the healthcare system, unnecessary tests and ineffective treatments[6]. These results should be a cause of great concern to professional societies, governments, and users. Efforts to offer more accurate and trustworthy online sources of information about LBP for patients in Brazil are urgently needed.

## CONCLUSION

Content analysis of web-based searched on Brazilian Portuguese language demonstrated low credibility standards, provided mostly inaccurate information, and moderate-high readability levels about LBP. Patients should be careful when searching for information on LBP online in Brazil.

## AUTHORS' CONTRIBUTIONS

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Data Collection, Research, Writing - Preparation of the Original, Writing - Review and Editing
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