Brazilian Journal of Physical Therapy 26 (2022) 100389

Brazilian Journal of Physical Therapy

https://www.journals.elsevier.com/brazilian-journal-of-physical-therapy

SYSTEMATIC REVIEW

Patients should not rely on low back pain information from Brazilian official websites: A mixed-methods review

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Received 28 January 2021; received in revised form 2 October 2021; accepted 17 December 2021
Available online 21 January 2022

KEYWORDS
Access to information;
Consumer health information;
Information dissemination;
Low back pain;
Medical informatics;
Physical therapy

Abstract
Background: Websites from official organizations (e.g., Ministry of Health and Professional Councils) are assumed to be trustworthy sources of information.
Objective: To investigate the credibility, accuracy, and readability of low back pain (LBP) web-based content in Brazilian official websites.
Methods: Mixed-methods review. Google search was used for retrieving web-information about Brazilian trustworthy organizations. We assessed the URLs on three domains: credibility, accuracy, and readability of LBP contents. Qualitative analysis was performed using an open source platform in three stages: (1) organization into thematic units; (2) data exploration; and (3) interpretation of the data and summarization.
Results: We included 84 URLs. Accuracy was assessed for 58 URLs and none fully adhered to the guidelines. Credibility analysis was performed for 67 URLs. Disclosure of authorship was not mentioned in 58 (87%) of the URLs, 63 (94%) did not mention the sources of their information, none presented a declaration of conflict of interest, and 16 (24%) did not provide the date of creation. Readability was assessed for 72 URLs and was classified as "easy" to read in 65%. Six main themes emerged in the qualitative analysis: (1) Explanations and causes for LBP, (2) diagnosis, (3) recommendations about medication, (4) recommendations for coping and self-management, (5) performing exercises, and (6) recommendations for children and adolescents.

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https://doi.org/10.1016/j.bjpt.2022.100389

Conclusions: The reading level is appropriate for patient-oriented information. However, Brazilian official websites demonstrated low credibility standards and while some of the content is partially supported by the current literature, there is also much inaccurate information about LBP.

Introduction

Low back pain (LBP) is responsible for high levels of disability and absenteeism worldwide.[1,2] Low-income and middle-income countries presented the largest increases in disability caused by LBP in the past few decades.[3] Approximately only 10% of LBP is associated with some structural cause or disease.[4,5] Thus, most LBP is termed nonspecific because it is not possible to identify a specific cause.[6] A range of biophysical, psychological, and social factors directly impact the function and social participation of individuals with persistent LBP.[7]

Current clinical practice guidelines highlight the role of education/information to modify patient's unhelpful beliefs and maladaptive behaviors.[8,9] Conversely, inadequate information can contribute to negative beliefs, catastrophic thoughts, avoidance behaviors, and greater use of healthcare services, thus generating greater expense and exposure to unnecessary health procedures.[10,11] For instance, patient's beliefs and behaviors can be reinforced by inadequate information about LBP such as recommendations for extensive bed rest and to avoid physical activities, both increasing physical disability.[11,12]

The internet has become a primary source for health information, providing answers for patients and families about health-related questions or additional material which they did not get from their clinicians.[13,14] Thus, the internet has the potential to eliminate barriers in access to information for patients, but only if online material is trustworthy, and can be read and understood by many different types of users. In contrast, low-quality online information can impact negatively on the clinician-patient interaction and have detrimental effects on patients' health.[14,15] Moreover, previous studies have demonstrated that most online health information is not only unreliable (not trustworthy) ,[16–23] but is presented at a reading level above the standard education level of the general population.[20,24,25] A recent study in LBP found that noncommercial freely accessible websites demonstrated low credibility standards, provided mostly inaccurate information, and lacked comprehensiveness across all types of LBP. However, this study was limited to websites from English-speaking countries.[21]

Although online health materials can be found in non-official sources, official websites such as Government Agencies (e.g., Ministry of Health) and health professional councils and associations should be trustworthy sources of information not only for patients but also for healthcare professionals.[26] These sources of information should play a significant role in providing accurate information and in reducing overuse of health services. However, it is not yet known whether the information about LBP provided by Government Agencies (e.g., Ministry of Health) and health professional councils and associations are in accordance with the current literature. The current study aimed to evaluate the credibility, accuracy, and readability of LBP web-based content in Brazilian websites sponsored by government agencies and professional associations.

Methods

Study design

This study is characterized as a mixed-methods review of information available on the internet, and therefore, the protocol does not need approval by the Ethics Committee. To avoid identification of the sources, each website addresses was coded by the abbreviation URL (Uniform Resource Locator) followed by a number (e.g. URL1). This study followed the Mixed Methods Article Reporting Standards (MMARS) recommendations.[27]

Eligibility criteria

For this review, we considered Brazilian trustworthy websites to be those from official institutions such as government agencies (e.g., Ministry of Health) and health professional councils and associations. Websites had to present content about treatments for either acute, chronic, or radicular LBP. The information about LBP should be freely available on the websites for the general public. Websites that had links to other forms of content presentation, such as downloadable booklets, leaflets, or brochures, were also included. We excluded social media publications, unofficial sites such as newspapers, magazines, and blogs. Specific recommendations for clinicians such as medication dosage or clinical criteria for surgery were not included. Websites that were duplicated, inactive, not related to LBP, or where content was behind a paywall were excluded. In cases of websites where the content was partially behind a paywall, only the free content was assessed.

Search strategy

Two authors (RPS and TPA) conducted the searches independently on July 2020 and updated their search on August 30, 2020. Google was searched for official institutions including Brazilian Government Agencies, medical and physical therapy professional councils and associations. A list of medical professional associations was also obtained from the Brazilian Medical Association (AMB) and from the national physical therapy council (COFFITO). To identify online materials on official websites we used the search terms "lombar", "dor lombar", "dor nas costas", "dor na coluna", in the search field of the institutions' own websites. The same terms were also searched on Google to identify other potentially

relevant online materials. Discrepancies between authors were resolved by discussion; in case of disagreement, a third reviewer was consulted (FJJR). In cases no information was found on the website, the organization was contacted by e-mail (sent on three separate occasions, timed every 15 days) to request the material.

Data extraction

Two authors (RPS and TPA) independently extracted the full text from all included websites on an Excel spreadsheet. One author (FJJR) cross-checked the data.

Quantitative analysis: credibility, readability, and accuracy

Each website was assessed by two independent reviewers (RPS and TPA). Credibility was assessed using the Journal of the American Medical Association (JAMA) benchmark.[28] The JAMA benchmark consists of 4 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 LBP with or without sciatica.[29] We considered authorship 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 were from medical journals. Links to blogs and newspapers were not considered as references. All contents that did not fit the JAMA assessment of credibility were classified as "not applicable" (e.g. downloadable booklets).

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,[30] 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[29] as described by Ferreira et al.[21] 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.[8] Each of the above-mentioned topic was coded by the two reviewers according to 1 of 4 categories, as follows: (1) Accurate/Clearly described; (2) Partially accurate/Description lacks clarity; (3) Inaccurate/Misleading description; (4) Not mentioned. Any coding inconsistencies were discussed between the reviewers until consensus was achieved.

Readability was assessed using the Flesch-Kincaid index adapted for Portuguese.[31] 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 legibility index between five and seven years of schooling is considered appropriate.[32] The Flesch-Kincaid index, used in the analysis, classified the texts into four degrees of reading difficulties: very easy (score between 75 and 100), which would be related to an education level up to the fourth grade of elementary school; easy (scores between 50 and 75), which would be suitable for readers with education level up to the eighth grade of elementary school; difficult (scores between 25 and 50), classified as readable for individuals with high school or university education, and very difficult, (scores between 0 and 25), which would be suitable only for individuals with knowledge of specific academic areas.

Quantitative data were stored using the Microsoft Office Excel version 2013 for Windows (Microsoft, Redmond, Washington, USA) and analyzed using the RStudio software version 1.4.1106 (RStudio, Boston, Massachusetts, USA). Data about Accuracy, Credibility, and Readability were reported as frequencies and proportions.

Qualitative analysis

The text information for each URL was transferred to the text editor of Microsoft Word for Windows (Microsoft, Redmond, Washington, USA) to perform the analysis by domain of themes. Analysis of the text was conducted in 3 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 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).[33] Taguette is an example of qualitative computer-aided data analysis software (CAQDAS), which objective is to facilitate a systematic analysis of unstructured or semi-structured data, particularly text data. The quotes presented in results were translated into English as accurately as possible by the authors (FJJR and LCN).

Results

From the 218 URLs initially included, 80 were duplicates, 54 were excluded due to the absence of any materials or contents not related to LBP. Our final sample consisted of 84 URLs (Supplementary material 1) presented in **Fig. 1**.

Quantitative analysis: accuracy, credibility, and readability

Findings related to content accuracy for LBP are presented in **Fig. 2**. We excluded 26 (31%) URLs because 12 were recommendations to clinicians and 14 did not present contents about the management of LBP. Thus, 58 (69%) URLs were included in this analysis. Topics with the highest rates of accurately/clearly described provided information were the recommendation to remain active (*n* = 17; 29%) and

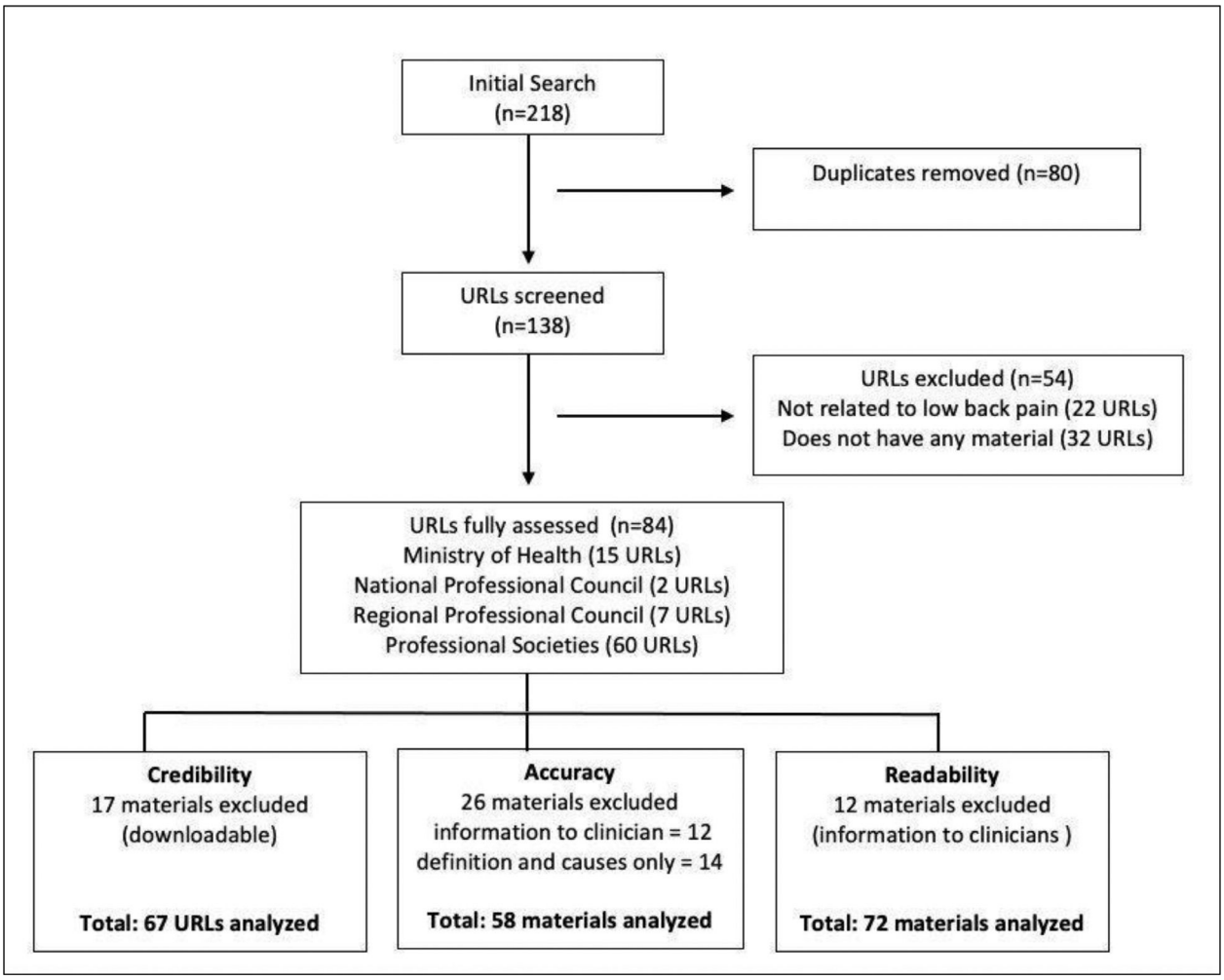

Figure 1 Flowchart of the selection of the URLs included in the study.

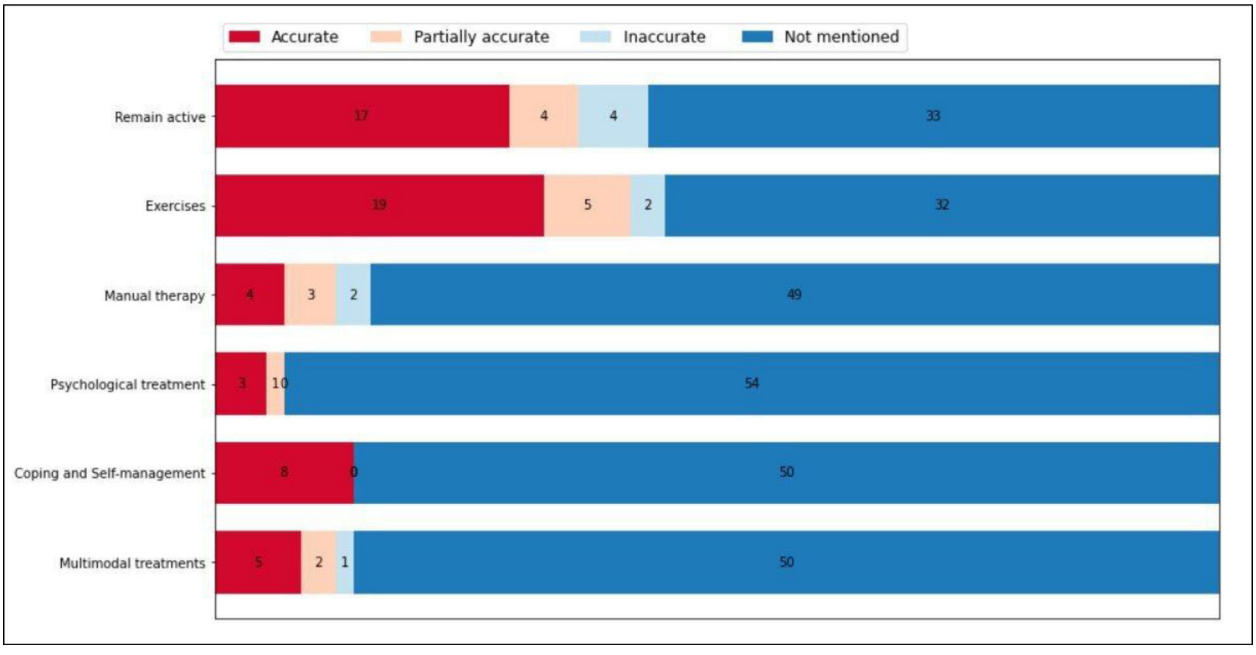

Figure 2 Accuracy of information about low back pain on the URLs assessed (*n* = 58).

recommendations for exercises (*n* = 19; 33%). These topics also presented highest rates of information rated as partially accurate/lacking clarity. The item psychological treatment was presented in three URLs (5%), coping and self-care in eight (14%), multimodal treatments in five (9%), and manual therapies in four (7%).

From the 84 URLs included, 17 (20%) were not analyzed for credibility because their material was only available by download. In the 67 (80%) URLs analyzed, 58 (87%) provided no authorship information, 63 (94%) did not mention the sources of their information, and none presented a declaration of conflict of interest or declared source of funding. In 51 (76%) URLs the date of creation or the last update of the website was presented, with 26 (39%) published after 2016.

The readability of the texts was assessed in 72 (86%) of the included URLs, because in 12 (14%) the contents were specific to clinicians. In 20 (28%) URLs the readability of the text was considered "very easy" to understand, representing a level of education "up to the 4th grade" of elementary school, and in 47 (65%) of the 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

Six main themes emerged in the analysis of the URLs' texts: (1) Explanations and causes for LBP, (2) diagnosis, (3) recommendation about medication, (4) recommendation for coping and self-management, (5) performing exercises, and (6) recommendations for children and adolescents (**Table 1**).

Theme 1: Biomedical explanations for low back pain

The most common causal explanation for LBP were related to physical and structural/anatomical factors such as posture, lifting objects from the floor, incorrect movements, muscle injuries, or disk damage.

Theme 2: Diagnosis

In some URLs, the need for physical examination to rule out serious illnesses was highlighted. Most of the information about the diagnosis emphasized several options for diagnostic tests, such as radiography, magnetic resonance imaging, and electroneuromyography as a manner to obtain additional explanation for the cause of pain. In some of these recommendations for diagnostic tests, the URLs also highlighted that imaging are not always necessary.

Theme 3: Recommendation about medication

Many of the recommendations on the use of medication were based on structural diagnosis and highlighted the use of nonsteroidal anti-inflammatory drugs (NSAIDs), muscle relaxants, antidepressants, corticosteroids, and opioids. Most of these recommendations did not discriminate whether these medications were indicated for acute or chronic pain. Information for other substances such as herbal medicines was also found.

Theme 4: Recommendation about coping and self-management

Coping and self-management were restricted to instructions about how to protect the spine based on postural adjustments in sitting position, sleeping, and lifting and carrying objects. In addition, several URLs presented information about ergonomic adjustments. Some of this information is presented as an effective method to prevent LBP, prevent recurrence, and decrease pain intensity and also duration of LBP. Recommendations including about excessive rest was identified in some URLs.

Theme 5: Performing exercises

The recommendations about exercises were mostly directed to a specific activity, such as Pilates and water exercises. In some URLs there were recommendations to have a professional to guide the practice of exercise. Other URLs recommended individuals to protect the spine during exercise, and in many of them, patient's preference about exercises was not mentioned.

Theme 6: Recommendations for children and adolescents

Low back pain was not recognized a common condition. Most of the recommendations for children and adolescents were related to the use of backpacks providing instructions about the best way to carry, how to distribute the weight, and even to avoid the use of backpacks and give preference to those with wheels.

Discussion

To the best of our knowledge, this is the first study to investigate the credibility, accuracy, and readability of information from Brazilian official websites including Government agencies and national and regional professional councils and professional associations that are available to the lay public. Studies in the past found that content of commercial websites were mostly of poor quality.[34,35] Contrary to our hypothesis, information on official Brazilian freely accessible websites failed to present information consistent with guideline-endorsed treatments. Most sites did not provide information about authorship, sources of information, declaration of conflict of interest, and date of creation and update. In addition, the URLs included in this study did not mention any information about coping and self-management of pain, psychological and multimodal treatments, or on the use of manual therapy. Although the topics with highest rating were to remain active and performing exercises, most of the texts were only partially accurate or lacking clarity in their description. The readability of the texts was considered very easy or easy and was intended for people with seven to eight years of education. This finding is consistent with the literature that recommends a sixth-grade reading level for patient-oriented education information that targets the general population.[36]

The qualitative analysis showed that the vast majority of content is based on a biomedical model with an emphasis on

Table 1 Examples of information on the URLs included.

Theme	Sub-theme	Coding (n)	Examples
Explanation and causes of low back pain	Biomedical causes of back pain	Posture (216) Spine deformities (215) Muscle problems (49) Trauma (16)	*Frequently, the problem is postural, that is, caused by a bad position when sitting, lying down, bending forward or carrying a heavy object. (URL 1)* *Do not sit or stand up straight and pick up something on the floor by bending your spine and not your knees are the main causes of back pain. (URL 10)* *Carrying or lifting too much weight can also compromise the integrity of the muscular system that supports the spine. (URL 15)* *The earlier the medical diagnosis, the greater the chances of recovery from sequelae (URL 39)*
Diagnosis	Biomedical diagnosis and complementary exams	Exams (28)	*The request for imaging must always be supported by a good clinical assessment so that an adequate interpretation of the results of imaging can be made and correlated with the patient's pain (URL 46)* *The x-ray is usually the first exam. Other tests include computed tomography, magnetic resonance imaging and myelography, all with a careful indication and based on a diagnostic hypothesis. (URL 40)*
Recommendation about medication	Anti-inflammatory Others	Medication (49)	*Various medications can be used including analgesics, anti-inflammatories, muscle relaxants, corticosteroids and opioids, always after assessing the risk-benefit of each one. (URL 40)* *Devil's claw (Harpagophytum procumbens): Treatment of acute low back pain and as an adjunct in cases of osteoarthritis. It has anti-inflammatory action. (URL 8)*
Recommendation about coping and self-management	Protect the spine Environmental adjustments Changing habits	Posture recommendations (216) Posture to lift and carry objects (106) Work recommendations (88) Sleep recommendations (29) Rest (28)	*There are several ways to protect the spine against inappropriate postures and movements, reducing the appearance of several problems, as well as the time and intensity of symptoms in those who are in pain, in addition to preventing new episodes (URL 49)* *Supermarket bags must be shared between the two hands. Suitcases and other heavy objects must be carried on a cart. (URL 16)* *Anyone who works at the computer must adopt appropriate postures when sitting. (URL 29)* *Pain is relieved with rest and hot-packs. (URL 21)*
Performing exercises	Physical activities Spine movements	Exercises (111)	When exercising with weights in the gym, protect your spine by lying down or sitting with a back support. Always avoid carrying weight. (URL 1) Recommended physical exercises are walking, Pilates and water exercises. Running is only valid for those who already practiced before starting to feel pain. (URL 41)
Low back pain in children and adolescents	Recommendation for children and adolescents	Children (73)	*We often see children at school carrying a backpack on one side, this can certainly lead to overload of the spine muscles, overload of the shoulder and cause pain in these children. (URL 19)* *There should be no difference in load from one side to avoid compensatory deviations that could be related to pain and the appearance of spinal problems. (URL 55)*

body structure. This can be observed in the explanations about the origin of LBP, diagnosis, coping and self-management instructions, and in the information for children and adolescents. A recent study including 123 websites from consumer organizations, government agencies, hospitals, non-governmental organizations, professional associations, and universities from different English-speaking countries, also identified low credibility of the content which was characterized by inaccurate information about LBP.[21]

More accurate and trustworthy online sources of information are urgently needed for patients in Brazil who are increasingly more relying on the internet for this purpose. Inaccurate information can contribute to overutilization of the healthcare system through the performance of unnecessary tests and seeking ineffective treatments.[37] In addition, much of this inaccurate information can contribute to unhelpful beliefs, maladaptive behaviors, and high levels of disability. It is well recognized that beliefs about the body and pain (e.g. meaning of the pain, causes, consequences, how controllable the pain is) and behaviors (e.g. coping strategies, the moment to seek help, treatment options, and treatment success) play a powerful role in behavioral and emotional responses to pain.[38] Patients and clinicians should be careful when searching for information on LBP, including websites of official health and government organizations. There is a clear need that representative healthcare entities recognize the importance and their role in providing both the professional and the general public with evidence-based information.

Limitations

This study is not free from limitations. First, the main limitation involves our potential inability to identify all relevant institutions in our search strategy. To reduce this limitation, the search was conducted independently by two authors. Second, because we searched for Brazilian Government Agencies, medical and physical therapy professional councils, and associations, information from other healthcare professional organizations (e.g., nursing, psychology organizations) were not included. This decision was taken because we considered that medical and physical therapy councils and associations would be responsible for the majority of information about LBP in Brazil and would be the primary source for the general public. Third, we did not explore the internet using a Google search as an individual would probably do. Information from blogs, unofficial sites, and social networks were not included. It is possible that a large proportion of the population performs free searches in the browser and is directed to this type of material. However, we preferred to search purportedly "trustworthy" websites. The websites of interest were intended to represent healthcare professionals, and should provide accessible and evidence-based information about LBP for many different types of users. Last, the usability of the website was not evaluated. It is possible that usability has an influence on how an individual find the information.

Conclusion

Brazilian official websites sponsored by government agencies and medical and physical therapy professional councils and associations demonstrated low credibility standards. While some of the information was partly supported by the current literature, inaccurate information about LBP was also frequently provided. The reading level of the information is appropriate for patient-oriented education information. Six themes emerged in the qualitative analysis of texts (explanations and causes for LBP, diagnosis, recommendation about medication, recommendation for coping and self-management, performing exercises, and recommendations for children and adolescents).

Conflicts of interest

The authors declare no conflict of interest.

Supplementary materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.bjpt.2022.100389.

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