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ORIGINAL RESEARCH ARTICLE

What do people search online about sciatica? What answers do they get from Dr. Google? A mixed analysis of Italian web-based data

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ABSTRACT

Introduction: Spine-related leg pain (SRLP), also commonly referred to as sciatica, is characterized by many unanswered questions. Nowadays, patients search for information online to find answers not provided by clinicians. Therefore, this work aimed to (i) collect the main questions and keywords searched by the Italian general population related to SRLP, (ii) analyze the content of the most clicked web pages, (iii) investigate its alignment with evidence-based recommendations, and (iv) assess their credibility and (v) readability.

Methods: SEMrush was used to collect questions, keywords, search volumes, and web pages. Credibility was assessed through the QUality Evaluation Scoring Tool (QUEST). Readability was evaluated by the Gulpease index. Thematic and content analyses were performed.

Results: Monthly search volumes ranged from 4,400 to 33,100. QUEST scores ranged from 1 to 14 out of 28. Readability scores ranged from 20 to 47 out of 100. Common themes highlighted the roles of medications and physiotherapy, the value of doing effortless activities, and the importance of sleep. Content analysis showed that 11 codes (41%) were aligned with, 7 (26%) were contradicted by, and 26 (96%) were entirely omitted from at least one web page.

Conclusion: The findings suggest that inaccurate, poorly credible, and difficult-to-read information on SRLP are common online, leading to plausible targets for the educational intervention of clinicians dealing with SRLP patients. Clinicians are now more aware of the questions that their patients could be asking to Google and the answers it provides about SRLP.

Keywords: Disinformation, Public Health, Health Education, Health Literacy, Consumer Health, Sciatica

What is already known about this topic?

- *Patients with sciatica reportedly need clear and simple information. Consequently, they might look for information online. Furthermore, patients generally feel the need to be guided by their clinicians through the information retrieved on the Internet.*

What does the study add?

- *Inaccurate, poorly credible, and difficult to read information on sciatica are common online. Clinicians are now more aware of the questions and answers retrieved on Google. This knowledge will help clinicians tailor their educational intervention.*

Introduction

Sciatica is an old and umbrella term that can refer to any back or leg pain (1,2). However, in most cases, it usually refers to pain that radiates from the glute and lower back area to the lower leg and foot (3). Nevertheless, due to its heterogeneity, research studies found it difficult to provide clinicians and patients with a clear picture of its incidence, prevalence, prognosis, and most effective treatment options (4). For this and other reasons, it was recently suggested to abandon the term sciatica and replace it with spine-related leg pain (SRLP) (4). While older investigations suggested its incidence to be 5 cases per 1000 people (5), a more recent one reported a mean of about 20 cases per 1000 people per year from 2013 to 2021 in Dutch general practice (6). The reported prevalence varied from 1.2% to 43% when systematically considering all the studies published until 2006 (7), whereas recent investigations resulted in an 11% and 10% prevalence among patients presenting to their Denmark and Italian general practices, respectively (8,9). Although the prognosis is generally favorable, high-quality evidence

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for this is lacking as well, as it is challenging to explore these aspects due to both heterogeneity and ethical issues (10,11).

A globally recognized and less dubious feature of SRLP, instead, is the suffering and psychological distress that characterize the experiences and reduced quality of life of these patients (12–14). Indeed, patients with SRLP show significant associations between their symptoms and psychological factors (e.g., fear, anxiety, catastrophizing) as well as coping strategies (e.g., isolation, acting out defensive style) resulting in a decreased quality of life (15,16). Qualitative research so far has consistently shown that one of the main needs of these patients is the provision of clear and simple information about their condition (17,18).

Nowadays, one of the most common and accessible strategies to gather relevant information is to search specific keywords and questions online to find the answers that science and healthcare professionals are not always able to provide the patient with. The easiest and most widely used web browser for finding such answers is Google. (19). Previous works showed that approximately 50% of patients presenting with various conditions have navigational needs (i.e., the need to seek out additional types of online health-related information and from a greater variety of sources) (20,21). Furthermore, a common theme among patients is their expectation to be guided towards the highest quality information by their healthcare professionals (22). Indeed, research suggested that not only did patients with SRLP align with these behaviors, but some were not even aware of the need to critically appraise online content (23). Unfortunately, Google's websites do not necessarily report credible and easily comprehensible information (24,25). In fact, recent evidence related to tendons and low back pain highlighted the need for higher-quality online health-related content (26,27).

For these reasons, it is essential for clinicians to be aware of the main questions asked by the general population about SRLP and, even more importantly, understand what information patients – among other people – may have already encountered on websites when they come to the clinician's clinic. To the authors' knowledge, such an analysis of web-based data, specifically concerning SRLP, has never been performed in Italian or in any other language. Additionally, the existing literature so far has not thoroughly investigated these themes for several musculoskeletal disorders.

Considering these premises, the aims of this work were to (i) collect the main questions and keywords searched by the Italian general population concerning SRLP, (ii) analyze the content of the most clicked web pages for each of the question found previously, and (iii) assess credibility and (iv) readability of these web pages. Following the reviewers' suggestions, a post-hoc analysis was conducted to investigate whether the content of the most clicked web pages aligned with evidence-based recommendations.

Methods

This study consists of cross-sectional analyses of web-based data concerning SRLP. It followed the methodology of the analyses performed by Rio et al. and Hauber et al. on tendons and low back pain, respectively (26,27). However, details and significant differences are outlined in the following paragraphs.

Where applicable, the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) guideline was followed to report data (28). See the Supplementary File 1 for further details.

Questions and search terms

SEMrush (Inc., Boston, MA, 2008) was used to collect the most frequently searched questions and keywords about SRLP by the Italian general population (29). SEMrush is an online platform that offers a range of tools for marketing research and analysis. It uses a machine learning algorithm that allows it to collect accurate data regardless of the searcher's location and history of searches. The search was run on August 07th, 2024 through the "Keyword Magic Tool" for the term "sciatica". This latter term was preferred to others due to its popularity among the Italian general population and to a higher total volume of searches, proved by a preliminary analysis, compared to other similar keywords.

Keywords and questions were collected and ordered according to their volume of search. Keywords significantly redundant with each other were excluded, and the first ten were listed and reported along with their search volume. Questions asked to Google followed the same procedure: duplicates or significantly similar questions were removed, and the first five were listed and reported. For each of these questions, the five most consulted web pages were collected. Figure 1 outlines the research process.

Credibility

Credibility of every web page was assessed through the QUality Evaluation Scoring Tool (QUEST) by two independent authors (ME, AA) and disagreements were solved through consensus (30). In addition, the authors reached out to the developers of QUEST and obtained further information on how to accurately interpret its domains. This tool was selected due to its reliability values, ease of use, and ability to assess important domains not considered by other tools (e.g., JAMA benchmark).

The QUEST tool involves 7 items investigating authorship, attribution, conflict of interest, currency, complementarity, and tones (30). Each item has its own distinct numerical evaluation scale in order to assign the weighted score that best describes the item, which must then be summed with the others for a total score ranging from 0 to 28 – higher scores are indicative of higher credibility of the online information. It was validated for the screening of health-related online information quality, showing high levels of intra-rater reliability (Cohen's $k = 0.7 - 1.0$; $p < .05$) (30).

Readability

Readability of each web page was assessed online through the Gulpease index (31) autonomously by a single author (ME). This index is automatically calculated using a fixed formula that takes into account multiple variables: the number of sentences, letters, and words. It consists of a score

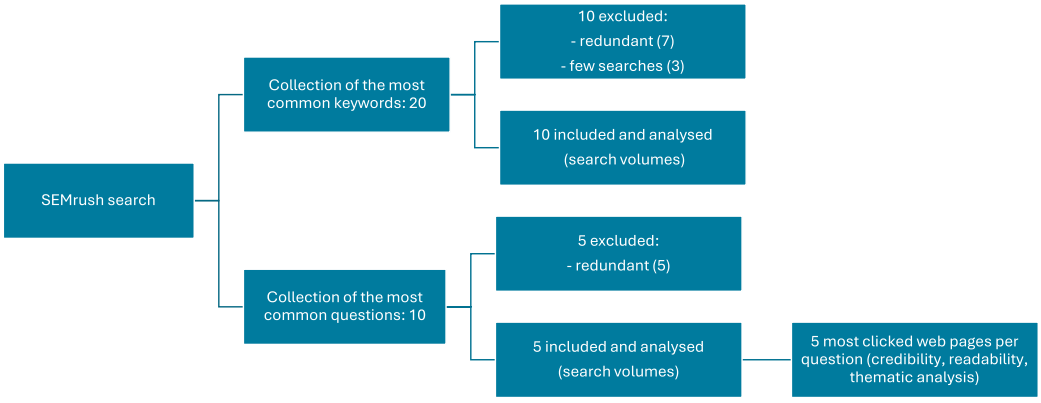


FIGURE 1 - Flowchart of the research procedure.

ranging from 0 to 100 where higher scores equal higher readability. Another output of the Gulpease index is the level of comprehensibility according to three different levels of the reader's educational background (i.e., elementary, medium and higher education).

This index was developed by Italian linguists at "La Sapienza" University of Rome specifically for the Italian language, and its validation was achieved through the analysis of several texts' comprehensibility performed by people with different levels of education (32).

Qualitative analyses

Thematic analysis

The most consulted web pages were then qualitatively analyzed following the six steps and recommendations of the thematic analysis (33). Specifically, (i) the authors familiarized themselves with the texts of all the web pages related to a single question and identified potential items of interest; (ii) initial codes were generated to categorize data relevant to answering the question, and codes across different web pages began to emerge; (iii) major and broad themes were created to identify patterns among web pages; (iv) initial themes were reviewed and modified based on their relevance to the initial question; (v) final themes were developed and named; (vi) a report was produced detailing these themes and how they helped answer the initial question. Themes, along with subthemes were found inductively and iteratively, as recommended. The relevant text of all web pages answering the same question was analyzed by one author without software support (ME) and by a second one (MC) supported by ATLAS.ti (34). Results were then compared and integrated (35). The same process occurred for each question.

Content analysis

A content analysis was conducted to determine whether the content of web pages aligned with current guidelines' recommendations. This analysis followed the established methodology guidelines (36,37). The document developed by the National Institute for Health and Care Excellence (NICE) was chosen due to its scientific rigour and plausible publication date (38) – the initial codebook was developed by one author (MC) to summarize diagnosis and treatment codes. Two other authors (ME, AA) supported this process by providing feedback and leading to the final document (Supplementary File 2). To enhance clarity and comprehensibility, the authors ensured that each code of the developed codebook related to one or more than one similar recommendations provided by the NICE guideline. Web pages were analyzed by one author (ME) who categorized each NICE code into "aligned", "misaligned", or "not reported". Online text that did not fit into any a-priori determined codes was excluded and not taken into consideration. The reporting of this analysis highlighted the total number and percentages of web pages aligning, misaligning, and not mentioning each code extracted by the NICE guidelines.

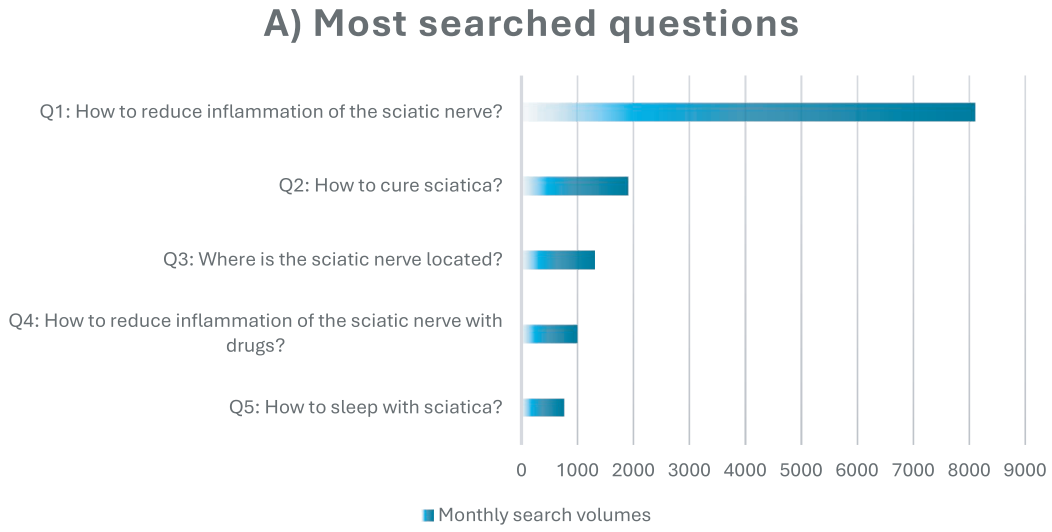
Results

The five most searched questions on sciatica by the Italian general population are listed in Figure 2, *panel A*. Search volumes of questions ranged from 750 to 8100 monthly. The Uniform Resource Locators (URLs) of the five most clicked web pages for each of the five questions are outlined in the Supplementary File 3. The total number of web pages was 19, due to three of these being among the five most clicked web pages for more than one question.

The most searched keywords included remedies for sciatica (e.g., quick ones, homemade, exercise), ways to manage pain and inflammation both with and without drugs, sciatic symptoms, and the sciatic nerve itself (Fig. 2, *panel B*). Search volumes ranged from 4400 to 33100 per month.

Credibility

Credibility assessment of the five most consulted web pages per question resulted in total score values ranging from 1 to 14 out of 28 possible points. Notably, none of the web pages scored more than one on the *Attribution* item, meaning that none of the web pages referred to at least one identifiable scientific article. Conflicts of interest were high for 9 out of 19 different web pages, especially concerning *Question 5*. Ten different web pages supported the patient-physician relationship. None of the web pages showed a score higher than



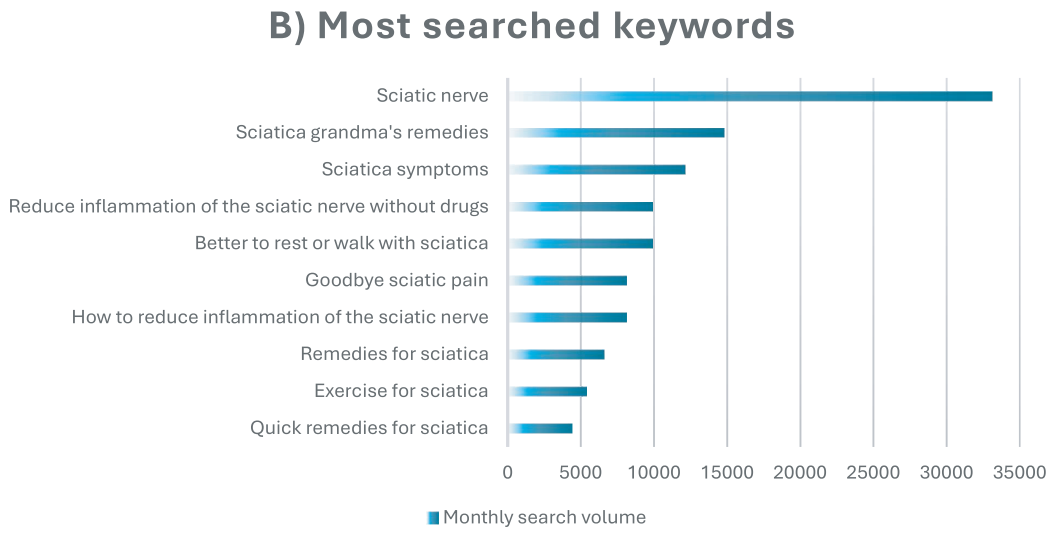


FIGURE 2 - Graphical representation of the most searched questions (panel A) and keywords (panel B) related to SRLP and their respective search volumes.

one on the *Tones* item and 15 of them resulted in authors supporting their claims without discussing the limitations but using cautious vocabulary (i.e., score of 1). See Table 1 for further details.

Readability

Readability assessment of the five most clicked web pages per question showed low Gulpease indexes (Table 2). Indexes ranged from 47 to 20, and it was estimated that people with an elementary educational background would find 100% (i.e., 25) of the web pages "*almost incomprehensible*". People with a medium education would find 21 out of 25 web pages "*very difficult*" to understand, with the remaining four rated as "*almost incomprehensible*". Subjects with a higher educational background would rate 16 web pages as "*easy*" to understand, 8 as "*difficult*", and one as "*very difficult*".

Qualitative analyses

Thematic analysis

Qualitative analysis of the most clicked web pages highlighted the following themes per question (Fig. 3): Question 1 included "Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) first, stronger meds then", "Rest initially, move eventually but… avoid efforts with your back!", "Physiotherapy to stretch & mind your posture!", and "Explore homemade remedies"; Question 2 highlighted "Acute pain: rest (not too much) & meds", "Subacute pain & prevention: physiotherapy", "Last resort: surgery", and "Favorable prognosis: 6 weeks"; Question 3 resulted in "The longest nerve in the body", and "Many places, many functions"; Question 4 included "NSAIDs as first line therapy", and "Do not misuse meds"; Question 5 resulted in "As difficult as it is important", "There are ways to ease falling asleep", and "Different postures to sleep".

TABLE 1 - Assessment of credibility of online information through the QUality Evaluation Scoring Tool (QUEST) and its domains showed for each of the most clicked web pages per question

Web page	QUality Evaluation Scoring Tool (QUEST)							
	Authorship[a] (0-2)	Attribution[b] (0-3) x 3	Type of study[c,d] (0-2)	Conflict of interest[e] (0-2) x 3	Currency[f] (0-2)	Complementarity[g] (0-1)	Tones[h] (0-2) x 3	Total score (0-28)
Question 1: *How to reduce inflammation of the sciatic nerve?*								
1.a[i]	0	1	0	0	0	1	1	7
1.b	2	0	0	0	2	1	1	8
1.c[j]	0	0	0	2	0	0	1	9
1.d	2	0	0	1	2	0	0	7
1.e[k]	2	0	0	2	2	1	1	14
Question 2: *How to cure sciatica?*								
2.a	2	0	0	2	1	0	1	12
2.b	2	0	0	0	2	0	1	7
2.c[k]	2	0	0	2	2	1	1	14
2.d[i]	0	1	0	0	0	1	1	7
2.e	0	0	0	2	2	0	1	11
Question 3: *Where is the sciatic nerve located?*								
3.a[i]	0	1	0	0	0	1	1	7
3.b	2	0	0	1	2	0	1	10
3.c	2	1	0	1	2	1	0	13
3.d	0	0	0	0	0	1	1	4
3.e	0	0	0	0	0	1	1	4
Question 4: *How to reduce inflammation of the sciatic nerve with drugs?*								
4.a[i]	0	1	0	0	0	1	1	7
4.b	0	0	0	1	2	1	1	9
4.c[j]	0	0	0	2	0	0	1	9
4.d	0	0	0	1	2	1	1	9
4.e	0	0	0	1	2	1	0	6
Question 5: *How to sleep with sciatica?*								
5.a[i]	0	1	0	0	0	1	1	7
5.b	1	0	0	0	2	0	1	6
5.c	1	0	0	0	2	0	1	6
5.d	1	0	0	0	0	0	0	1
5.e	0	0	0	0	0	1	1	4

[a]0 – No indication of authorship or username; 1 – All other indications of authorship; 2 – Author's name and qualification clearly stated.
[b]0 – No sources; 1 – Mention of expert source, research findings (though with insufficient information to identify the specific studies), links to various sites, advocacy body, or other; 2 – Reference to at least one identifiable scientific study, regardless of format (e.g., information in text, reference list); 3 – Reference to mainly identifiable scientific studies, regardless of format (in >50% of claims).
[c]for articles scoring 2 or 3 on *Attribution*.
[d]0 – In vitro, animal models, or editorials; 1 – All observational work; 2 – Meta-analyses, randomized controlled trials, clinical studies.
[e]0 – Endorsement or promotion of intervention designed to prevent or treat condition (e.g., supplements, brain training games, foods) within the article; 1 – Endorsement or promotion of educational products & services (e.g., books, care home services); 2 – Unbiased information.
[f]0 – No date present; 1 – Article is dated but 5 years or older; 2 – Article is dated within the last 5 years.
[g]0 – No support of the patient-physician relationship; 1 – Support of the patient-physician relationship.
[h]0 – Fully supported (authors fully and unequivocally support the claims, strong vocabulary such as "cure", "guarantee", and "easy", mostly use of non-conditional verb tenses ("can", "will"), no discussion of limitations); 1 – Mainly supported (authors mainly support their claims but with more cautious vocabulary such as "can reduce your risk" or "may help prevent", no discussion of limitations); 2 – Balanced/cautious support (authors' claims are balanced by caution, includes statements of limitations and/or contrasting findings)
[i]same web page
[j]same web page
[k]same web page

TABLE 2 - Indexes of readability and level of comprehensibility for each of the most clicked web pages per question

Web page	Gulpease index	Elementary education	Medium education	Higher education
Question 1: *How to reduce inflammation of the sciatic nerve?*				
1.a[a]	43	Almost incomprehensible	Very difficult	Easy
1.b	38	Almost incomprehensible	Very difficult	Difficult
1.c[b]	42	Almost incomprehensible	Very difficult	Easy
1.d	37	Almost incomprehensible	Very difficult	Difficult
1.e[c]	41	Almost incomprehensible	Very difficult	Easy
Question 2: *How to cure sciatica?*				
2.a	45	Almost incomprehensible	Very difficult	Easy
2.b	32	Almost incomprehensible	Almost incomprehensible	Difficult
2.c[c]	41	Almost incomprehensible	Very difficult	Easy
2.d[a]	43	Almost incomprehensible	Very difficult	Easy
2.e	37	Almost incomprehensible	Very difficult	Difficult
Question 3: *Where is the sciatic nerve located?*				
3.a[a]	43	Almost incomprehensible	Very difficult	Easy
3.b	35	Almost incomprehensible	Almost incomprehensible	Difficult
3.c	42	Almost incomprehensible	Very difficult	Easy
3.d	47	Almost incomprehensible	Very difficult	Easy
3.e	36	Almost incomprehensible	Very difficult	Difficult
Question 4: *How to reduce inflammation of the sciatic nerve with drugs?*				
4.a[a]	43	Almost incomprehensible	Very difficult	Easy
4.b	46	Almost incomprehensible	Very difficult	Easy
4.c[b]	42	Almost incomprehensible	Very difficult	Easy
4.d	31	Almost incomprehensible	Almost incomprehensible	Difficult
4.e	20	Almost incomprehensible	Almost incomprehensible	Very difficult
Question 5: *How to sleep with sciatica?*				
5.a[a]	43	Almost incomprehensible	Very difficult	Easy
5.b	47	Almost incomprehensible	Very difficult	Easy
5.c	47	Almost incomprehensible	Very difficult	Easy
5.d	47	Almost incomprehensible	Very difficult	Easy
5.e	40	Almost incomprehensible	Very difficult	Difficult

[a]same web page; [b]same web page; [c]same web page

Answers to how one could cure (i.e., *Question 1*) or reduce the inflammation causing their sciatica, both with (i.e., *Question 4*) and without (i.e., *Question 2*) medications, focused on the use of NSAIDs, frequently alerting about their adverse effects, and on the role of stronger medications in cases of severe and persistent symptoms: "*NSAIDs like ibuprofen and naproxen can help decrease the inflammation. When pain persists, stronger medications like corticosteroids and opioids could be prescribed. However, […] their long-term use is not recommended*".

Another key point discussed by many web pages was the role of rest and physical activity. Most of these advocated in favor of gentle activities as soon as possible, to decrease the negative effects of inactivity: "*Unlike what is commonly thought, if you have sciatica, it is not recommended to spent days in the bed: while it can help decreasing your pain, it quickly backfires and hampers the healing and recovery processes*".

Furthermore, the role of physiotherapy practices was commonly discussed. While some suggested starting with physiotherapy in a subacute phase, others recommended to wait until the symptoms were solved and as a means of prevention: "*When the pain is too severe, it is better to avoid manipulations, massages, or exercises that could move some vertebras and worsen the symptoms. […] Once pain-free, instead, exercising helps to prevent new attacks*".

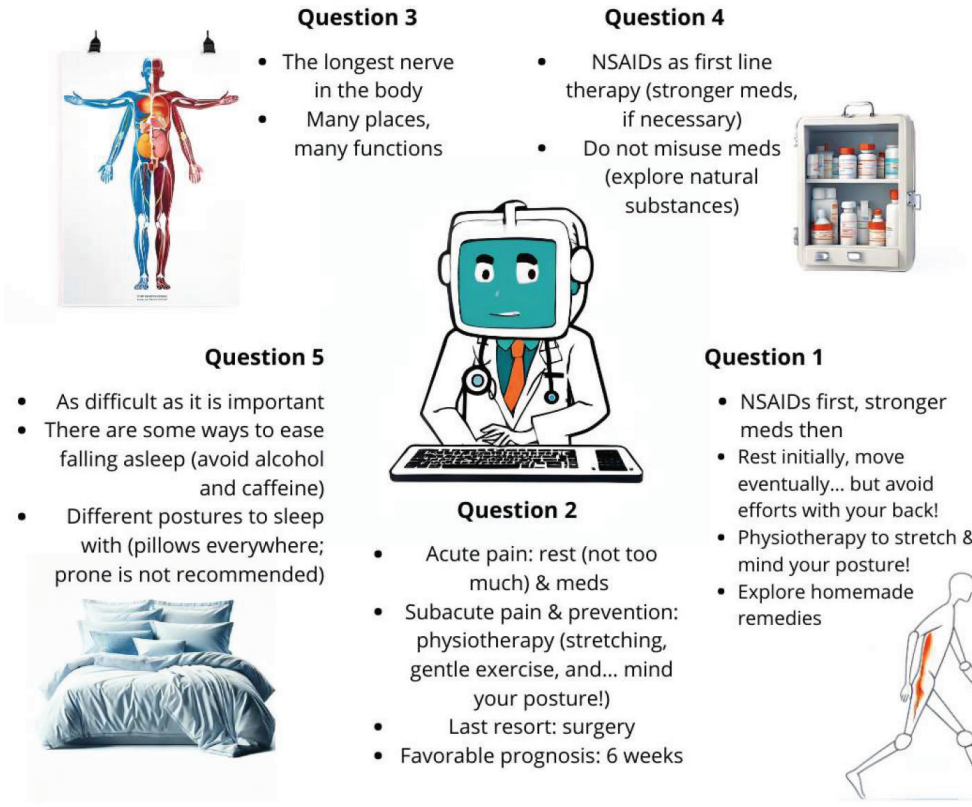


FIGURE 3 - Representation and list of all the main themes per question: Question 1, "How to reduce inflammation of the sciatic nerve?"; Question 2, "How to cure sciatica?"; Question 3, "Where is the sciatic nerve located?"; Question 4, "How to reduce inflammation of the sciatic nerve with drugs?"; Question 5, "How to sleep with sciatica?".

However, all the web pages were consistent with the suggestion of avoiding certain postures, exercises, and efforts as these would be bad for the patients' backs and likely lead to further damage: "*[…] stretching and soft activities are very helpful, and use your legs instead of your back when lifting weights to dampen the weight and keep the right posture*".

Given the favorable prognosis, about which all web pages agreed on, the patient was recommended to wait before considering more invasive options of treatment (e.g., surgery) and to look out for specific signs and symptoms suggesting a malignant pathology (e.g., tumour, cauda equina) and requiring urgent investigations (e.g., imaging tests).

Answers to "where the sciatic nerve is located" (i.e., *Question 3*) were similar among web pages and provided in-depth explanations of its course and functions throughout the leg.

Online information on how to sleep with sciatica (i.e., *Question 5*) highlighted the invaluable role of sleep for one's general health and how frequently it is impaired by this condition: "*Sleep is crucial for both mental and physical health. However, falling asleep could be very hard if you have night pain and burning sensations from your back to your foot. […] A poor-quality sleep seems to negatively impact the perception of pain*".

Several postures and pillows' positionings were thoroughly described together with advice about what to do and not to do to fall asleep more easily: "*To improve your sleep quality, you can follow these suggestions: choose a high-quality mattress […] to help you keep a good posture at night […]; use extra pillows […]. Memory foam pillows […] allow you to relax your spine; relax and soften your muscles before going to sleep. […] with a hot shower […]. And stretching exercises […]; decrease the amount of alcohol and caffeine […]*".

Content analysis

Out of the twenty-seven extracted codes, eleven (41%) resulted in at least one web page reporting online content in line with guidelines' recommendations. The remaining sixteen (63%) did not show online content aligned with their recommendations, either because it was misaligned (four codes, 15%) or because it was not mentioning any recommendations (twelve codes, 44%). Three codes (i.e., #8, #11, and #26) showed at least one web page aligning and one misaligning to them, accounting for a total of seven codes (26%) contradicted by web pages. Twenty-six (96%) codes resulted in at least 78% of web pages not reporting any information about the content of their recommendation. Further details on the codes and web pages alignment can be found in the Supplementary File 2 and Table 3, respectively.

Discussion

To the best of the authors' knowledge, this is the first study investigating the questions and keywords searched online by the Italian general population related to SRLP. This web-based data analysis has not been performed in any other language or country so far. Additionally, this is the first work to thoroughly analyze credibility, readability, and content of the most clicked web pages.

TABLE 3 - Summary of the extracted codes and content analysis of the included web pages

"To do" recommendation	No (%) of aligned web pages	No (%) of misaligned web pages	No (%) of non-reporting web pages
Diagnosis			
1. Exclude specific causes of symptoms (e.g., cancer, infection, trauma, inflammatory diseases)	3 (15.8%)	0 (0%)	16 (84.2%)
2. Consider using risk stratification tools (e.g., STarT Back) to inform shared decision-making about stratified management	0 (0%)	0 (0%)	19 (100%)
3. Based on risk stratification, offer simpler and less intensive support for people likely to improve quickly, while offering more complex and intensive support for those at risk of poorer outcomes	0 (0%)	0 (0%)	19 (100%)
4. Explain that imaging may not be needed	0 (0%)	0 (0%)	19 (100%)
5. Consider imaging in specialist settings of care (e.g., musculoskeletal interface clinic or hospital) if the results are likely to change management	0 (0%)	0 (0%)	19 (100%)
Treatment			
6. Provide advice and information to help patients self-manage their symptoms	18 (94.7%)	0 (0%)	1 (5.3%)
7. Consider a group exercise program that accounts for people's specific needs, preferences and capabilities	2 (10.5%)	0 (0%)	17 (89.5%)
8. Consider manual therapy, only as part of a treatment package including exercise	1 (5.3%)	2 (10.5%)	16 (84.2%)
9. Consider psychological therapies, only as part of a treatment package including exercise	0 (0%)	0 (0%)	19 (100%)
10. Consider a combined physical and psychological program for people with persistent symptoms	1 (5.3%)	0 (0%)	18 (94.7%)
11. Promote and facilitate return to work and normal activities	3 (15.8%)	1 (5.3%)	15 (78.9%)
12. If the patient is already taking medicines, explain the risks of continuing them	0 (0%)	0 (0%)	19 (100%)
13. Be aware of the risk of harms and limited evidence of benefit from the use of non-steroidal anti-inflammatory drugs (NSAIDs)	1 (5.3%)	0 (0%)	18 (94.7%)
14. If prescribing NSAIDs, take into account the person's risk factors, the lowest effective dose, and the shortest possible period of time	0 (0%)	0 (0%)	19 (100%)
15. Consider epidural injections of local anaesthetic and steroid in people with acute and severe sciatica	1 (5.3%)	0 (0%)	18 (94.7%)
16. Consider spinal decompression when non-surgical treatment has not improved pain or function and their radiological findings are consistent with sciatic symptoms	3 (15.8%)	0 (0%)	16 (84.2%)
"Not to do" recommendation	**No (%) of aligned web pages**	**No (%) of misaligned web pages**	**No (%) of non-reporting web pages**
Diagnosis			
17. Do not routinely offer imaging in non-specialist settings	6 (31.6%)	0 (0%)	13 (68.4%)
Treatment			
18. Do not offer traction	0 (0%)	0 (0%)	19 (100%)
19. Do not offer rocker sole shoes	0 (0%)	0 (0%)	19 (100%)
20. Do not offer foot orthotics	0 (0%)	0 (0%)	19 (100%)
21. Do not offer ultrasound	0 (0%)	1 (5.3%)	18 (94.7%)
22. Do not offer percutaneous electrical nerve simulation (PENS)	0 (0%)	0 (0%)	19 (100%)
23. Do not offer transcutaneous electrical nerve simulation (TENS)	0 (0%)	1 (5.3%)	18 (94.7%)
24. Do not offer interferential therapy	0 (0%)	0 (0%)	19 (100%)
25. Do not offer belts or corsets	0 (0%)	2 (10.5%)	17 (89.5%)
26. Do not offer gabapentinoids, other antiepileptics, oral corticosteroids or benzodiazepines as there is no overall evidence of benefit and there is evidence of harm	1 (5.3%)	3 (15.8%)	15 (78.9%)
27. Do not offer opioids for managing persistent symptoms	0 (0%)	2 (10.5%)	17 (89.5%)

Searches performed by the Italian general population on Google yielded keywords and questions mainly concerning various ways to manage their SRLP (e.g., how to sleep, how to reduce inflammation with or without drugs). This was consistent with qualitative studies showing that patients perceived web resources as necessary for understanding and accessing treatment options (23). Another set of searches was related to the location of the sciatic nerve, possibly highlighting the concerns and fears arising from the experience of pain throughout the whole lower limb (18).

In line with previous research, credibility values were primarily low with none of the web pages scoring higher than 14 out of 28 possible points, as measured by the QUEST (Table 1) (24,25). Particularly concerning was that only two web pages referred to scientific research findings, albeit without providing sufficient information to identify the studies. The remaining web pages did not reference any external source. This finding, combined with substantial conflicts of interest and biased information, underscores the necessity of critically appraising online health-related content (25). Moreover, the challenges that patients face in this process emphasize the crucial role that healthcare professionals play, not only delivering updated information but also in guiding patients effectively through navigating online resources (22,25).

Another consistent finding across all web pages was their poor readability, with scores as low as 20 out of 100 possible points on the Gulpease scale (Table 2) (32). Notably, none of the web pages scored higher than 47 points, reinforcing the need for health-related content to be written more clearly (39,40). Indeed, the educational background analysis showed that only a limited number of web pages were classified as "easy" to read and understand, and even then, this was true only for individuals with higher educational levels. This finding aligns with other research studies in health-related fields (39,40), suggesting that the poor readability of online information may partially explain the relationship between lower educational attainment and poorer clinical outcomes among patients with SRLP (41–43).

The results coming from the content analysis suggested a persistent discrepancy between NICE guideline recommendations and the information most commonly featured on web pages (Table 3). Several core points (e.g., discouraging routine imaging, minimizing reliance on certain medications, risk stratification) were often undervalued, oversimplified, or even contradicted. Moreover, many web pages appeared to emphasize short-term strategies while offering minimal insight into interventions that guidelines strongly recommend, including consistent self-management support and exercise-based treatments. This mismatch reflects a broader – but not yet well explored – trend observed for other musculoskeletal conditions such as tendinopathies (unpublished data) and low back pain – online resources frequently lag behind current best practices and rarely provide nuanced, evidence-based perspectives. (26)

Notably, this work showed that people searching about sciatica online often do so in highly practical terms, focusing on immediate relief (e.g., "How to reduce inflammation," "How to cure sciatica,"). Web pages thus gravitated toward "user-friendly" suggestions like rest, NSAIDs, avoiding strenuous exercise, and trying homemade remedies, in a perpetuating vicious cycle. While this aligns with what musculoskeletal patients typically seek and expect (44), it also raises the more complex and widely debated question: "*Should healthcare professionals give patients what they want?*" (45). Indeed, across questions 1, 2, and 4 (on reducing inflammation with or without drugs and how to cure sciatica), the main themes included prioritizing medications (e.g., NSAIDs first, stronger meds if pain persists), some acknowledgment of physiotherapy (i.e., typically only after an initial rest phase), and repeated warnings to avoid "effort" with the back. While these short-term approaches may resonate with individuals seeking immediate symptom relief, they do not necessarily align with guideline-adherent practices that advocate for stratified care and exercise-based programs (38,46), thereby possibly influencing the answer to the aforementioned question (45).

Despite acknowledging a generally favorable prognosis, the online guidance of avoiding exertions or "bad" postures, and prioritizing pain relief at all costs, could inadvertently reinforce fear of "harmful" movement. This may potentially delay the return to daily activities or undermine the perceived importance of physiotherapy and routine activities during both the acute and subacute phases (47,48). In fact, established guidelines recommend swift but measured engagement in exercise and advocate watchful waiting before considering imaging, underscoring that routine imaging tests can be counterproductive unless their results are expected to alter clinical management (38,46). To address the widespread demand for and performance of unnecessary imaging, the Choosing Wisely Campaign was developed in the United States and subsequently adopted by several other countries (49,50). Recently, a Choosing Wisely Leaflet was developed in Denmark to assist patients in understanding why imaging tests might not be needed (51). Hopefully, this tool will be adopted by other European countries, including Italy, and lead to fewer unnecessary tests.

From an educational standpoint, our findings reinforce that health literacy interventions must address more than just readability and credibility – they also need to correct for content gaps or inaccuracies regarding guideline-based advice. Clinical implications, while secondary to the educational focus here, are nonetheless significant. Patients may arrive with entrenched beliefs caused by web pages promoting outdated practices (e.g., routinary imaging tests, ultrasounds, belts) or downplaying guideline-endorsed interventions. Addressing these misconceptions early could help align patient expectations with more effective, guideline-adherent management strategies, therefore hoping for better clinical outcomes (18,23).

Limitations and future directions

While this study has strengths such as strong methods (e.g., QUEST, Gulpease index), it also presents some limitations: (i) searches were performed in Italian, thereby limiting the interpretation of results to Italy and its general population; (ii) these findings relate to the Italian general population and they are not a specific collection of what patients with SRLP search online, even though these are likely to be the people who contribute the most to the overall searches; (iii) findings pertain to the month before the search was run on SEMrush, possibly leading

to an unknown degree of variability as time goes by; (iv) the study focused solely on Google, overlooking emerging technologies such as chatbots and artificial intelligence, which are gaining increasing traction – it also neglected social media, which is now widely used across all age groups and where pages related to health and rehabilitation topics can easily be found; and (v) this study did not assess the strength of the recommendations in its content analysis, thereby potentially limiting the interpretation of results related to aligning and misaligning web pages.

Considering the findings and their limitations, future research should replicate this study in other languages and analyze other online technologies (e.g., artificial intelligence, social media) to provide a broader picture of the online information that patients with SRLP may come across. Furthermore, categorizing web pages based on their source type (e.g., institutional websites, commercial platforms, blogs, or forums) could be beneficial, as it would allow healthcare professionals to offer patients targeted recommendations regarding the reliability and readability of specific online resources. Finally, it would be insightful to explore the thoughts and feelings of actual patients confronting online information and how these impact the relationship with their clinicians' advice and management program.

In light of our findings, a further future direction involves enhancing the role of scientific associations, public health institutions, and universities through proactive efforts aimed at developing and disseminating high-quality, up-to-date information on SRLP. For instance, collaborating with trusted patient-centric platforms might help ensure that credible, evidence-based material reaches broader audiences. Moreover, partnerships between healthcare professionals and universities could foster the creation of tailored educational resources (e.g., leaflets, videos, and interactive modules) that meet patients' literacy needs and reduce the prevalence of misleading or incomplete content.

Conclusions

Healthcare professionals are now more aware of the questions that their patients could be asking Google and the answers it provides about SRLP. Moreover, low levels of credibility, readability, and alignment with evidence-based recommendations of the most clicked web pages highlighted the need for clinicians to support patients with their understanding of the condition and its treatment options. A further and crucial step forward would include the commitment of healthcare professionals to share evidence-based information on the Internet, thus contributing to a more helpful health literacy of patients with SRLP and improving the outcomes of a shared decision-making process.

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