REVISTA BRASILEIRA DE ANESTESIOLOGIA

Publicação Oficial da Sociedade Brasileira de Anestesiologia
www.sba.com.br

SCIENTIFIC ARTICLE

What does the Internet teach the obstetric patient about labor analgesia?

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Abstract

Background and objectives: It has been observed a general public increased search on the Internet for health information, including Anesthesiology. The objective of this study was to evaluate the information available to the lay person in Portuguese on the Internet about labor analgesia for the Brazilian population.

Method: Using the term ''labor anesthesia'', the first 20 sites found on Google in November 2014 were evaluated by two resident physicians and classified as medical and non-medical. Legibility and Design – accessibility, reliability and navigability-were compared using Flesch Reading Ease Score (FRESH) and Minervation validation tool for healthcare websites (LIDA) tools. The websites' content was confronted with that of the medical literature.

Results: Medical and non-medical websites were considered difficult to read according to FRESH. Regarding the design, there was no difference between groups regarding navigability, however, accessibility was considered superior in non-medical websites ($p = 0.042$); while reliability was higher in medical websites ($p = 0.019$).

Conclusions: With the increased search for health information on the Internet and concern about improving the quality of childbirth care, it is fundamental that the content available to the layperson about labor analgesia is of quality and well understood. This study demonstrated that both medical and non-medical websites are difficult to read and that non-medical websites are more accessible while the medical ones are more accurate.

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PALAVRAS-CHAVE
Internet;
Informação ao
paciente;
Analgesia obstétrica

O que a internet ensina à paciente obstétrica sobre a analgesia de parto?

Resumo
Justificativa e objetivos: Observa-se um crescimento da busca de informação no público geral sobre temas médicos na internet, inclusive em anestesiologia. O objetivo deste estudo foi avaliar a informação existente ao leigo na internet em língua portuguesa sobre analgesia de parto para a população brasileira.
Método: Com o uso do termo ''anestesia de parto'', os 20 primeiros *sites* encontrados no Google em novembro de 2014 foram avaliados por dois médicos residentes e classificados como médicos e não médicos. Legibilidade e desenho – acessibilidade, confiabilidade e navegabilidade – foram comparados por meio das ferramentas Fresh (*Flesch Reading Ease Score*) e Lida (*Minervation Validation Tool for Healthcare Websites*). O conteúdo dos *sites* foi confrontado em relação à literatura médica.
Resultados: *Sites* médicos e não médicos foram considerados de difícil leitura de acordo com o Fresh. Em relação ao desenho, não houve diferença entre os grupos quanto à navegabilidade. Entretanto, a acessibilidade foi considerada superior em *sites* não médicos ($p = 0,042$); enquanto que a confiabilidade foi maior em *sites* médicos ($p = 0,019$).
Conclusões: Com aumento da busca de informações em saúde na internet e aumento da preocupação de melhorar a qualidade de assistência ao parto, é fundamental que o conteúdo disponível ao leigo sobre analgesia de parto seja de qualidade e compreendido. Este estudo demonstrou que tanto *sites* médicos como não médicos são de difícil leitura; e que os *sites* não médicos são mais acessíveis, enquanto os médicos são mais precisos.
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Introduction

Currently, obstetric violence is a controversial issue in society. This is a legal term introduced in Venezuela in 2010 regarding violence against women in the hospital setting, meaning ''the loss of autonomy and the ability to freely decide about their bodies and sexuality''.[1] In this context, there is an increased interest in seeking the humanization of maternal and child care and clarification on issues such as labor analgesia.[2]

The Internet is often used as a source of information on these topics. However, such information requires evaluation by objective criteria of content and form.

The objective of this study was to evaluate the information available on the Internet in Portuguese about labor analgesia for the Brazilian population and compare the readability, design, and content of medical and non-medical sites (Fig. 1).

Method

Search strategy

A study of independent searches was conducted on the Internet by two anesthesia resident physicians in computers of general use outside the hospital environment. The term ''normal childbirth anesthesia'', arbitrarily pre-defined by the authors, was inserted in the ''google.com'' citation search site. The first 20 sites found were selected for evaluation.

Exclusion criteria

Information contained on sites, such as YouTube, Google Images, medical journal articles, medical equipment for sale, and websites requesting password for access.

Assessment

During November 2014, two anesthesia resident physicians defined a list of 20 websites; each site was assessed regarding its authorship (medical and non-medical), readability, design, and content.

Definitions

Medical site definition
When it was possible to determine that information on childbirth analgesia on the website was produced by a physician.

Non-medical site definition
When it was possible to determine that the information on childbirth analgesia on the website was not produced by a physician, or when its authorship was undetermined. Non-medical websites were classified into subgroups: produced by doulas, nurses, lay people, institutions, others, and unidentified.

Readability
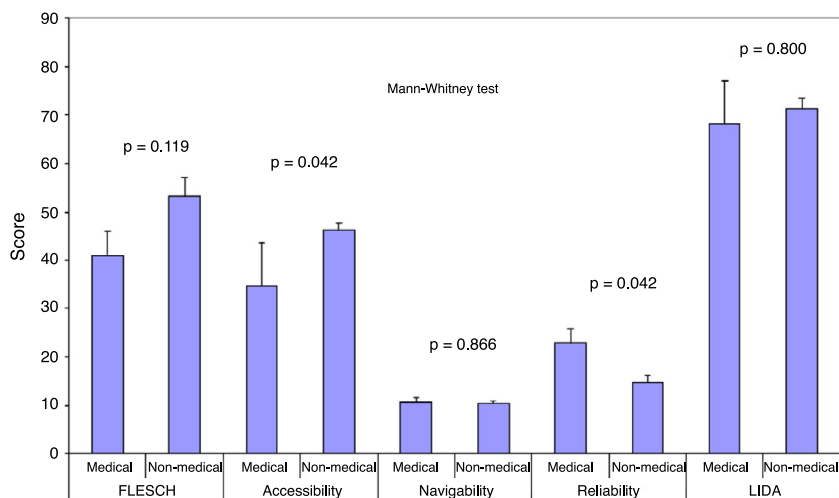The term readability translated into Portuguese is, according to Descriptors in Health Science, ''the act or fact of

Figure 1 Parameters measured in medical and non-medical websites.

capturing the meaning, nature or importance of (something); understanding''.[3] By this definition, it would include a patient's understanding of the information provided orally or in writing.

This item was evaluated using the Flesch Reading Ease Score (FRESH), adapted for Portuguese.[4] Each website was assigned a score of 0–100 (75–100: very easy; 50–75: easy; 25–50: slightly difficult; below 25: very difficult). The main text of each website was exported to Microsoft Office Word and readability was quantified through Fresh, which uses a formula containing an average sentence length (ASL – number of words divided by number of sentences) and the average number of syllables per words (ASW – number of syllables divided by number of words). The formula: Fresh = $206.835 - (1015 \times ASL) - (84.6 \times ASW)$.

Design

The Minervation Validation Tool for Healthcare Websites (LIDA),[5] available in English, was used to rate the pages for accessibility, navigability and reliability, with a score of 0–96. The questions were translated into and adapted to Portuguese by the researchers who were proficient in both languages (FB, CBM). Each item evaluated was rated from 0 to 3 (0 = never, 1 = sometimes, 2 = most times, 3 = always).

- *Accessibility*: The structure, page formatting, and access restrictions of each website were evaluated. A score between 0 and 54 was automatically calculated by the program.
- *Navigability*: For each website, each resident (MAW and LDSJ) answered the four questions below. Each item evaluated was rated from 0 to 3 (0 = never, 1 = sometimes, 2 = most times, 3 = always). In case of divergence, two reviewers (FB and CBM) answered the same questions and responded to them.
  1. Is the site design clear and transparent?
  2. Is the site design coherent between one page and another?
  3. Can users find what they need on the site?

4. Is the information format clear and appropriate to the public?
- *Reliability*: For each website, residents (MAW and LDSJ) answered the four questions below. In case of divergence, two reviewers (FB and CBM) answered the same questions and responded to them. For the first three questions, each evaluated item received a score of 0–6 (0 = never, 1 = sometimes, 4 = most times, 6 = always). For the last question (update), each item evaluated were assigned a score from 0 to 6 (0 = no reference, 2 = reference with year of publication equal or previous to 2009, 4 = reference with year of publication between 2010 and 2013, 6 = reference with year of publication in 2014). The questions analyzed were:
  1. Is it clear who developed the site and what are the objectives?
  2. Does the site have good quality control?
  3. Was the content checked by an expert?
  4. Is this page updated regularly?

Content

Based on data available in the medical literature,[6–8] the content was assessed for its accuracy regarding obstetric analgesia, and the following were taken into consideration:

1. Risk of increased incidence of cesarean delivery after labor analgesia – the statement that labor analgesia increases the chance of cesarean delivery was considered incorrect.
2. The need for minimal cervical dilation to indicate labor analgesia – the statement that minimum dilation was necessary to initiate analgesia was considered incorrect.
3. The existence of deleterious effects of labor analgesia on the newborn – the statement of deleterious effects to the newborn caused by labor analgesia was considered incorrect.

Statistics

Readability, design, and content published by medical and non-medical websites were compared using Student's or Fisher's *t*-test in SPSS version 2.0, with *p*-value < 0.05 considered statistically significant.

Results

In all 20 sites analyzed, 25% (*n* = 5) were medical and 75% (*n* = 15) non-medical sites, there were two replicates (Table 1). On medical sites, three authors were anesthesiologists; one was a gynecologist; and one of an unidentified specialty. On non-medical sites, many authors were patients (*n* = 4), magazines, newspapers and televisions (*n* = 6), and others (*n* = 3). In this sample there were no sites of doulas or nurses.

Regarding legibility, which was assessed by the Flesch Reading Ease Score method, although there was no statistical difference in the results (*p* = 0.132), the medical sites had a mean score of 41, which corresponds to a readability level rated as difficult, while the non-medical sites had a mean score of 53.1, readability level rated as reasonably difficult.

LIDA tool was used to evaluate the website design regarding accessibility, navigability, reliability, and in whole. Among them, there was difference between groups only regarding accessibility and reliability. As for accessibility, the sites of the non-medical group (mean = 46.33) were more accessible than those of the medical group (mean = 34.80), with statistical difference between them (*p* = 0.042). As for reliability, the medical group score (mean = 22.8) was higher than the non-medical group (mean = 14.67), with *p* = 0.019. The other items evaluated showed no differences between groups.

Regarding content, there was no difference between the groups. The issue of a minimal cervical dilation being necessary for epidural analgesia was found in 8 (40%) of the 20 sites analyzed, in the same proportion between medical and non-medical sites. However, the information was correct in 100% of the medical sites, while for non-medical sites it was only 50%.

The deleterious effects on the newborn and the risk of cesarean delivery were also evaluated. They were cited only by three (15%) sites, one medical and two non-medical sites. The information was correct on 100% of the medical sites addressing this issue, whereas on non-medical sites it was correct in only 50% of cases.

Discussion

A study in English showed that most websites have low quality information on labor analgesia.[2] In the present study, no difference in accuracy was found for content on obstetric analgesia between medical and non-medical sites. However, it was possible to identify that the information on medical sites was correct, which was not verified in all non-medical sites. The accuracy of the information analyzed was based on data from the literature.[6–8]

For labor analgesia, this study demonstrated that websites in Portuguese, whether medical or not, are not easy to read, as measured by the Flesch Reading Ease Score readability test. In the study performed at the University of Toronto, which also analyzed information on labor analgesia, showed that medical sites are more difficult to read than the non-medical ones.[2] Another study, performed at the University of Chicago, evaluated 90 sites with educational material for patients on anesthesia and showed that a high level of education (approximately 13 years) is required for a lay person to read and understand the information about anesthesia on the Internet.[9]

This phenomenon, which shows a tendency toward greater difficulty to understand the subject for the layperson, is not exclusive for anesthesiology. Some studies of health information on the Internet in different specialties, such as otolaryngology,[10] dentistry,[11] vascular surgery,[12] and colorectal surgery,[13] found a FRESH score of 32.9–58, similar to the results of the present study (FRESH = 41). As previously noted,[14] the medical information available online is difficult to understand and this difficulty is common to several medical areas. This indicates a failure in the production of easily understandable health information for the lay public.

According to recommendations from institutions such as the US Department of Health and Human Services (HHS) and the National Institute of Health (NIH), the readability level of educational material for patients should be determined below the sixth-grade of elementary school in order to be understood by the American lay public.[15,16] There are no equivalent recommendations for the Brazilian population yet.

In a recently published study, Wong et al. assessed the teaching material for patients in 122 websites of academic medical centers with anesthesia division, in English and Spanish. They concluded that the mean level of readability presented in these sites was higher than the recommended (above sixth-grade), in addition to having poor content and quality.[17]

Due to the growing number of websites addressing medical topics, the LIDA instrument,[5] which evaluates medical websites, was created by the University of Oxford, but has not yet been validated for the Portuguese language. The questions were translated and adapted by the researchers proficient in both languages (FB and CBM) for application in this study. A lower accessibility on medical sites, which was automatically calculated by LIDA, may indicate these sites tendency of not giving much relevance to the formatting of their pages, intended to prioritize the content rather than site design. The reliability, also assessed using LIDA, was higher in medical sites. This means that on these pages there was more evident information about their sources, frequency of updating their content, and better quality of information provided.

Currently, strategies to improve the quality of health information on the Internet are increasing. In 1995, the Health on the Net Foundation was created, which establishes a ''code of conduct'' as an ethical standard that must be followed in medical sites. If these principles are followed, websites earn a seal that can help the user identify pages with reliable information.[18] In Brazil, some initiatives have been taken as a way to qualify health information available on the Internet. Among them, the Internet, Health and Society Laboratory (LaISS: *Laboratório Internet, Saúde e Sociedade*) of Fiocruz (*Fundação Instituto Oswaldo Cruz,*

Table 1 A total of 20 websites assessed.

Medical	Magazines, newspapers, TV, Internet	Patient	Others
sma.com.br	bebeabril.com.br	relatosdeparto.blogspot.com.br	gineco.com.br
tuasaude.com	guiadobebe.uol.com.br	forum.saude.doutissima.com.br	demaeparamae.pt
blogelsevier.elsevier.com.br	gnt.globo.com	br.answers.yahoo.com.br	partocomprazer.com.br
blog.criobanco.com.br	folha.uol.com.br	macetesdemae.com	
brasil.babycenter.com	mulher.uol.com.br		
	jmonline.com.br		

Brazil) and Cremesp (*São Paulo Estate Medical Board*) and the Internet Management Committee created by the Ministry of Communications, Science and Technology. LaISS seeks to create mechanisms capable of evaluating the reliability of medical websites and health information.[19] In 2001, Cremesp created a resolution that contains a manual with guidelines and criteria to guarantee the quality of medical content to the general public. Finally, the Internet Management Committee, created in 1995, is responsible for proposing norms regulating Internet activities.[20]

Our study has some limitations. The search keywords were chosen arbitrarily by the researchers, there was the risk of not being the same ones chosen by the lay public. However, the goal was to simulate a scenario of a layman consulting the Internet. It is worth mentioning that Google personalizes the search result, taking into account previous research done by the user,[21] in this case, residents of anesthesiology. In this regard, we opted for the arbitrary number of 20 websites because they were the first available, which could limit the results of this study. However, a lay searcher rarely goes beyond the first page of search results, which makes this number, although arbitrary, consistent with the intention to simulate this scenario. The number of issues addressed for content evaluation was also limited. This results in the impossibility of addressing all issues relevant to the topic. In any case, the issues addressed were those in which the literature is consensual regarding its positioning, that is, a previous cervical dilation is not necessary to indicate some form of labor analgesia, the rate of cesarean delivery does not increase when labor analgesia is performed and its effects on the newborn.

Another limitation was the small number of studies available in the literature regarding health information on the Internet[22]; none in Portuguese. The LIDA tool was only available in English, which required translation and adaptation. Finally, most of the time, update data and information sources were rarely found explicitly on the websites.

For the future, it is necessary to improve the quality and comprehensibility of information, increase the interaction of regulatory agencies, and invest on improving medical communication, including visual ones.

Conclusion

With the increase in the search for information on health through the Internet and the increasing concern to improve the quality of delivery care, it is essential that the content available to the layman on labor analgesia be of good quality and understandable. Our study has shown that both medical and non-medical websites are difficult to read and that medical websites show a tendency to be more accurate in informing the public about this subject.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Perez D'Gregorio R. Obstetric violence: a new legal term introduced in Venezuela. Int J Gynaecol Obstet. 2010;111:201–2.
2. Murphy C, Margarido C. How is the Internet educating our obstetric anesthesia patients? Anual CAS Meeting. Quebec: Canadian Anesthesiologists's Society; 2012. Available from: https://cas.ca/English/Page/Files/657_1344484.pdf [cited 2012].
3. Biblioteca Virtual em Saúde. Descritores em Ciência de Saúde; 2015. Available from: http://decs.bsv.br/
4. Martins TBF, Ghiraldelo CM, Nunes MGV, et al. Readability formulas applied to textbooks in Brazilian Portuguese. São Carlos, Brazil: Instituto de Ciências Matemáticas de São Carlos-USP, PDF Version; 1996. Available from: http://www.nilc.icmc.usp.br/nilc/download/Reltec28.pdf [accessed 09.07.13].
5. Minervation-evidence based healthcare consultancy; August 2014. Available from: http://www.minervation.com/
6. Wong C. Neuraxial labor analgesia and pregnancy outcome: fact and fiction. In: Rosenblatt MA, editor. ASA Refresher Courses in anesthesiology. Philadelphia: Lippincott Williams & Wilkins; 2011. p. 156–61.
7. Segal S. Anesthesic effect on the fetal and new born. ASA Refresher Course in Anesthesiology. Philadelphia: Williams & Wilkins; 2009. p. 189–98.
8. Reynolds F. The effects of maternal labour analgesia on the fetus. Best Pract Res Clin Obstet Gynaecol. 2010;24:289–302.
9. De Oliveira GS Jr, Jung M, McCaffery KJ, et al. Readability evaluation of Internet-based patient education materials related to the anesthesiology field. J Clin Anesth. 2015;27:401–5.
10. Roshan A, Agarwal S, England RJ. Role of information available over the Internet: what are the parents of children undergoing tonsillectomy likely to find? Ann R Coll Surg Engl. 2008;90:601–5.
11. Patel U, Cobourne MT. Orthodontic extractions and the Internet: quality of online information available to the public. Am J Orthod Dentofac Orthop. 2011;139:e103–9.
12. San Norberto EM, Taylor J, Salvador R, et al. The quality of information available on the Internet about aortic aneurysm and its endovascular treatment. Rev Esp Cardiol. 2011;64:869–75.
13. Soobrah R, Clark SK. Your patient information website: how good is it? Colorectal Dis. 2012;14:e90–4.

14. Tavare AN, Alsafi A, Hamady MS. Analysis of the quality of information obtained about uterine artery embolization from the Internet. Cardiovasc Interv Radiol. 2012;35:1355–62.

15. Health literacy online: a guide to writing and designing easy-to-use health Web sites; November 2015. Available from: http://www.health.gov/healthliteracyonline

16. How to write easy-to read health materials; November 2015. Available from: http://www.nlm.nih.gov/medlineplus/etr.html

17. Patel SK, Gordon EJ, Wong CA, et al. Readability, content, and quality assessment of web-based patient education materials addressing neuraxial labor analgesia. Anesth Analg. 2015;121:1295–300.

18. Silva EV, Castro LLC. Infodemiologia: uma abordagem epidemiológica da informação. Rev Esp Saúde. 2007;8:39–43.

19. Moretti FA, Oliveira VE, Silva EM. Access to health information on the Internet: a public health issue? Rev Assoc Med Bras. 2012;58:650–8.

20. Comitê Gestor da Internet no Brasil; June 2015. Available from: http://www.cgi.br/

21. Pimenta RP. Métodos de avaliação da qualidade da informação em sites de saúde: revisão sistemática (2001–2014). Rio de Janeiro: Fiocruz; 2015. Dissertação de mestrado.

22. Eysenbach G, Powell J, Kuss O, et al. Empirical studies assessing the quality of health information for consumers on the world wide Web: a systematic review. JAMA. 2002;287:2691–700.