Research Article

THE QUALITY AND READABILITY OF INTERNET INFORMATION RELATING TO ORAL SUBMUCOUS FIBROSIS

Bharati Patil., Shrijana Shrestha* and Binika Laishram

Department of Oral Medicine and Radiology, The Oxford Dental College, Bangalore, India

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ABSTRACT

Context: Oral submucous fibrosis is a potentially malignant disorder and internet has become a popular source of health information in this 21st century.

Aims: To assess the quality and readability of the information on internet relating to oral submucous fibrosis.

Materials and Methods: Google, Yahoo and MSN search engines were used to perform electronic search with the search term "Oral Submucous Fibrosis". The first 50 consecutives sites in each search engine were visited, classified and assessed for quality using DISCERN rating instrument and Journal of American Medical Association (JAMA) benchmarks. Readability was assessed using Flesh Reading Ease Score (FRES). The presence of Health on the Net (HON) seal was also recorded.

Statistical analysis used: Software SPSS 14.0 was used for statistical analysis and p value of less than 0.05 was considered significant.

Results: 15 sites were assessed after filtering of the sites. The mean value for DISCERN score, FRES was found to be 36.6 and 29.21 respectively. Most of the assessed sites failed to meet the two JAMA benchmarks criteria out of four. Only 2 out of 15 sites presented HON seal.

Conclusion: The quality of the information on internet relating to oral submucous fibrosis is moderate to good with some shortcomings. It is difficult to be comprehended by the general population without higher education qualification.

INTRODUCTION

Oral submucous fibrosis (OSMF) is a chronic, resistant disease characterized by the juxta-epithelial inflammatory reaction and progressive fibrosis of the oral submucosal tissues. It is a potentially malignant disorder with a high malignant transformation rate of 7-30%. It is most commonly seen in 25-35 years age group people with gutka chewing habit, usually confined to Indians and Southeast Asians. Reports have shown rapid increase in the prevalence rate of OSMF from 0.03% to 6.42% in India over past four decades.[1,2]

In this 21st century, internet has become a popular source of health information among its users because of the fact that people these days are quite curious and desire to be more informed and with the use of internet everything is now easily available with the click of the button. According to Online Consumer Panel Report, 2011, 72% of Indians accessed internet for healthcare-related information.[3] Internet is the ocean of information including all types of information ranging from scientific evidence-based data to home remedies in health care. The concern today is not the difficulty of finding the information, but rather it is about its quality. Inaccurate, non-evidence based and biased information can lead to more harm than welfare. And another matter of concern is the ease of the readability of those information by the general population.[4,5] Hence, the present study was conducted to assess the quality and readability of information on internet relating to oral submucous fibrosis.

MATERIALS AND METHODS

Search study

Google (www.google.com), Yahoo (www.yahoo.com) and MSN (www.msn.com) search engines were used to perform electronic search with the search term "Oral Submucous Fibrosis" on 11th Feb 2018. The first 50 consecutive sites in each search engine were visited and the content was downloaded and saved for further evaluation. No ethical approval was taken since this study does not involve human participation.

Inclusion / exclusion criteria

The search was not restricted in terms of file format or domain. The search was limited to the English language. Duplicate sites, non-operative sites or sites with denied direct access through password requirement, book review sites, sites linked

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Corresponding author: **Shrijana Shrestha**
Department of Oral Medicine and Radiology, The Oxford Dental College, Bangalore, India

to scientific articles, sites that did not offer information on oral submucous fibrosis, online medical dictionaries, non-English language domains, slide shares, videos and repeated sites were excluded.[4]

Classification

After the filtering of the sites, the remaining relevant sites were classified in terms of affiliation (commercial, non-profit organization, university or medical center and government), and specialization (exclusively related or partially related to oral sub mucous fibrosis). The type of content was classified as corresponding to medical facts, clinical trials, questions and answers and human experiences of interest.

Quality and readability assessment

The quality and readability of the information on the sites were assessed independently by two investigators and when any difference in opinion occurred, the final decision was decided by consensus after discussion.

The quality of information of the selected sites was assessed using the DISCERN rating instrument and JAMA benchmarks. Readability was assessed using the Flesh Reading Ease Score (FRES). The existence of the Health on the Net (HON) seal was also recorded.

Discern instrument: The Discern instrument is a validated rating tool that is freely available online and can be used by health consumers or professionals alike. This tool is a compilation of 16 questions, each representing different quality criteria. The DISCERN questions are organized into three sections as follows:

- Questions 1-8 = address the reliability, dependability and trustworthiness of the sites.
- Questions 9-15 = address the quality of information related to treatment choices.
- Question 16 = corresponds to the overall quality assessment at the end of the instrument.

Each question is scored on a scale of 1-5 (where 1 indicates low quality; and 5 indicates high quality).[6]

Questions of the DISCERN instrument:

1. Are the aims clear?
2. Does it achieve its aims?
3. Is it relevant?
4. What sources of information were used?
5. When was the information produced?
6. Is it balanced and unbiased?
7. Provision of alternative sources of information?
8. Does it refer to areas of uncertainty?
9. Does it describe how each treatment works?
10. Does it describe the benefits of each treatment?
11. Does it describe the risks of each treatment?
12. Does it describe what could happen if no treatment is used?
13. Does it describe how treatment choices can affect quality of life?
14. Is it clear there is more than one treatment choice?
15. Does it support for shared decision-making?
16. Overall score

JAMA Benchmarks: These comprise four criteria established by the Journal of American Medical Association, that is to be looked for in the sites. They are display of authorship of medical content, attribution or references, currency (date of update), and disclosure of ownership, sponsorship, advertising policies or conflicts ofinterest.[4]

FRES tool: The Flesch Reading Ease (FRE) Score, was used to calculate the readability of the analyzed sites. Readability is defined as the determination by systematic formulae of the reading comprehension level a person must possess to understand written texts.[7] The formula for FRES is as follow,

$$FRES = 206.835 - (1.015 \times ASL) - (84.6 \times ASW), \text{ where}$$

- ASL = average sentence length (number of words divided by number of sentences), and
- ASW = average syllables per word (number of syllables divided by number of words).[8]
- The output ranges from 0 to 100 scores, with high scores indicating easier reading.
- 90 to 100 = easily understandable by an average fifth-grade student
- 60 to 70 = easily understandable by eighth- and ninth-grade students, and
- 0 to 30 = understandable by people with higher education level, that is, college or university graduates.

In the present study, the output score was obtained by using online FRES calculator program (http://www. readabilityformulas.com/free-readability-formula-tests.php). A piece of text of 200-500 words from each site were copied and pasted into the program which directly yielded the resultant score. The accuracy of the online method has been previously confirmed by comparison of automate and manual calculation modes.[8,9]

HON Seal: Health on the Net (HON) Foundation seal - this is a code of conduct for medical and healthcare sites. It defines a series of norms allowing users to know the source and the purpose of the medical information presented. The HON contemplates compliance with eight basic criteria about the information, that is, 1. authorship; 2. complementarity; 3. privacy;4. attribution, references and currency; 5. justifiability; 6. Author transparency; 7. sponsor transparency (financial disclosure); and 8. honesty in advertising policy.[4]

Statistical Analysis

Data entry and analysis were done using the software SPSS 14.0 and p value of less than 0.05 was considered significant.

RESULTS

Search results

Google, Yahoo and MSN yielded 1,29,000, 94,900 and 93,400 sites respectively with the search keyword Oral Submucous Fibrosis. The first 50 consecutive sites in each search engine were examined. Following data filtering, a sample of 9 Google sites, 13 Yahoo sites, and 13 MSN sites were selected based on selection and exclusion criteria. In particular, 6 non-operative sites, 1 site corresponding to slide share, 3 repeated sites, 25 sites linked to scientific articles, 1 video feed, and 50 sites irrelevant to oral sub mucous fibrosis were excluded from Google. Similarly, 2 sites with slide share, 5 repeated sites and 30 sites linked to scientific articles were excluded from Yahoo. 2 sites with slide share, 4 repeated sites and 31 sites linked to scientific articles were excluded from MSN.

When all the three search engines were considered, the repeated sites were eliminated and finally a total of 15 unique sites were assessed by the two investigators independently.

Categorization

The websites were assessed and classified according to affiliation, specialization, and type of content (Table 1). Most of the sites were found to be affiliated to non-profit organization, and had medical facts content. All of the sites were partly dedicated to oral submucous fibrosis.

Table 1 Categorization of assessed sites based on affiliation, specialization, and type of content

Categorization	Sites
Affiliation:	
Commercial	6
Non-profit organization	8
University / medical center	1
Government	0
Specialization:	
Exclusively related to oral submucous fibrosis	0
Part of the site dedicated to oral submucous fibrosis	15
Content type:	
Medical facts	12
Clinical trials	0
Question and answer	1
Human experiences of interest	2

Quality and Readability Assessment Results

Discern and FRES scores, HON seal, JAMA Benchmarks: The outcomes and the descriptive statistics of percentile scores of the assessed 15 sites are summarized in Table 2. DISCERN score ratings ranged between 18 and 54 with the mean value of 36.6. FRES ratings ranged between -1.8 and 49.3 with the mean value of 29.21. Only 2 out of 15 sites presented HON seal.

Table 2 Evaluation of the assessed sites in terms of DISCERN and FRES score and presence of HON seal

Sites	Discern Score [80]	Readability Score (FRES) [100]	HON Seal
https://en.wikipedia.org/wiki/Oral_submucous_fibrosis	45 (56.25)*	15.3	
https://emedicine.medscape.com/article/1077241-treatment	54 (67.5)	38.9	
https://emedicine.medscape.com/article/1077241-overview	54 (67.5)	23	
https://www.dermnetnz.org/topics/oral-submucous-fibrosis/	41 (51.25)	38.7	P
https://nirogam.com/ayurvedic-treatment-oral-submucous-fibrosis/	32 (40)	49.3	
https://www.hxbenefit.com/oral-submucous-fibrosis.html	41 (51.25)	35.7	
http://www.orpha.net/consor/cgi-bin/OC_Exp.php?lng=en&Expert=357154	19 (23.75)	-1.8	P
https://screening.iarc.fr/atlasoral_list.php?cat=A5&lang=1	32 (40)	25.4	
http://www.juniordentist.com/medical-and-surgical-treatment-options-for-oral-submucous-fibrosis.html	51 (63.75)	47.4	
http://www.rightdiagnosis.com/o/oral_submucous_fibrosis/intro.htm	22 (27.5)	36.4	
http://www.drmurugavel.in/Laser-Oral-submucous-fibrosis-Treatment	23 (28.75)	30.3	
http://wacky5.com/oral-submucous-fibrosis-treatment.html	32 (40)	38.5	
https://www.revolvy.com/main/index.php?s=Oral%20submucous%20fibrosis	41 (51.25)	15.7	
http://www.exodontia.info/Oral_Sub-Mucous_Fibrosis.html	44 (55)	10.6	
http://www.dentzzdental.com/submucous-fibrosis.html	18 (22.5)	34.8	
Mean	36.6	29.21	

Table 3 represents the result of the JAMA benchmarks. Most of the assessed sites failed to fulfill authorship and attribution criteria.

Table 3 Evaluation of the content of the assessed site based on JAMA Benchmarks criteria

Jama benchmarks	No. of sites (n=15)	Percentage (%)
Authorship	5	33.33
Attribution	5	33.33
Currency	10	66.67
Disclosure	12	80

Based on DISCERN score, the individual assessed sites were also rated as poor (1-15), marginal (16-30), good (31-45), very good (46-60) and excellent (61-80) in all three search engines used (Table 4).[10] Most of the assessed sites in all three search engines belonged to the good category.

Table 4 Frequency distribution of the sites based on DISCERN score in all three search engines

	Poor	Marginal	Good	V good	Excellent
No of sites (Google)	0	1	5	3	0
No of sites (Yahoo)	0	3	8	2	0
No of sites (MSN)	0	4	7	2	0

DISCERN score comparison among search engines

DISCERN scores of the assessed sites including the repeated ones in the three different engines were also compared among themselves using Kruskal Walli Anova Test (Table 5) which shows no significant difference between them.

Table 5 Comparison of DISCERN scores among the three search engines

SITE	Discern (Mean SD)	H	P
Google	41±11.7	0.9	0.6
Yahoo	36.9±11.3		
MSN	35.8±12.5		

DISCUSSION

Among various search engines available on the internet, Google, Yahoo, and MSN are the most popular ones among the internet users and hence were selected for the study to find information on oral submucous fibrosis. There have been studies conducted to assess the health-related information on internet on oral cancer, oral leukoplakia, xerostomia, head and neck cancer, oral ulcers, orthodontic practice, periodontal diseases and many other medical conditions.[4,11,9 12,13,14,15] However, to the best of our knowledge, till date, no studies have been conducted on oral submucous fibrosis. To the least of our knowledge, the present study is the first one conducted to assess the quality as well as readability of health information on internet on oral submucous fibrosis using the validated tools.

There are a wide variety of tools available to review health information sites like DISCERN, JAMA benchmarks, HON seal, LIDA, FRES, SMOG, personal percentile scores etc.[9] In the present study, DISCERN and JAMA benchmarks were used to assess the quality of the sites and FRES was used to assess the readability. HON seal was also recorded. These tools were selected as they are validated tools which enable health consumers to judge health information and also because of the fact that it is unreasonable to assume that a single set of criteria could apply to the quality of such diverse information types available on internet.[12]

Categorization

In the present study, it was found that most of the assessed sites were affiliated to non-profit organization which is in consistent with the study conducted by Pia López-Jornet on both oral cancer and oral leukoplakia.[4,11] However, it is inconsistent with the study conducted by Richeal Ni Riordain on head and neck cancer where most of the sites were found to be commercial.[12] In this study, all the sites were partly dedicated to oral submucous fibrosis whereas in other studies conducted by Pia López-Jornet, Richeal Ni Riordain, there were few sites exclusively related to the respective health-related topic also. Similarly, the majority of the sites in the present study consisted of medical facts, as in the study conducted by Richeal Ni Riordain whereas, in studies conducted by Pia López-Jornet, sites with clinical trials content were the majority.

Quality and Readability Assessment

Discern Score: The mean DISCERN score for the assessed 15 unique sites was found to be 36.6 out of total 80 scores which signify moderate quality sites with significant shortcomings. Studies conducted by Kaicker J also showed similar results.[5,6]

JAMA benchmarks: In this study, the majority of the sites assessed failed to meet authorship and attribution criteria. The similar results were found in the study conducted by Riordain Ni.[13] In a study conducted by Kaicker J, along with authorship and attribution, the majority of sites failed to meet the disclosure criteria as well.[5]

Hon Seal: Only 2 out of 15 sites presented HON seal. Similar results have also been shown in other studies. This could be attributed to the fact that some of the sites though may be suitable for certification may not have been registered because it requires voluntary application and many site managers may not be aware of this certification.[3]

FRES: The mean FRES score for the 15 uniques sites was 29.21 out of 100. This signifies the only people with the higher education level of college or university graduates can comprehend these sites. This result is in consistent with other studies conducted by Raj S, Delli K.[3,9] If the health information on the internet is written in a difficult mode that cannot be comprehended easily by general population, there is a risk of misinterpretation of crucial information on healthcare decisions by them. McInnes and Haglund have suggested the sentences to be kept short, use of uniform and plain language throughout the text, preferably avoiding long lists and bulletpoints, as well as graphics, to be used with caution.[9]

When each individual assessed sites in all the three search engines were considered and compared among themselves using DISCERN score, most of the sites were found to be good and no significant difference was found between them by using Kruskal Walli Anova Test. This indicates all the three search engines offer same level of health care information concerning its quality.

There are a few limitations to this study which should be addressed. The study involved only few sites out of innumerable sites available on internet offering health-related information. Hence, a general conclusion cannot be drawn for all. The search was carried out only on one date, but it should be considered that the sites on the internet have dynamic character and might keep changing its content, design within certain period of time. Moreover, only English language sites were included which has narrowed down search results. FRES tool used determines the difficulty of a word/sentence based only on the length of characters and cannot distinguish common words from unusual ones.[9]

CONCLUSION

In the light of our study, we can conclude that the quality of the health information on internet relating to oral submucous fibrosis is moderate to good with some shortcomings that need to be addressed. In terms of readability, it is difficult to be comprehended by the general population without higher education qualification of college or graduation level. It is the matter of fact that there are no universally accepted reference or standard quality criteria and consequently, the results of the study depend on the criteria selected.[4] However, it is prudent to develop good quality and easily comprehensible health information sites which can help general population in informed decision making regarding their health concern.

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