Towards Quality of Health Science Information on the Internet

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ABSTRACT

With the advent of Internet and rapid development of other information technologies, there is a paradigm change in the quantity and quality of health information available to medical professionals. There is a plethora of information available on subjects such as medical conditions/disorders, treatments, drug and other therapies and research on the Internet. Though Internet has created new opportunities to improve decision-making to handle typical cases related to healthcare, it has also generated many unprecedented problems. The changing nature of information distribution has important implications for healthcare: issues like the quality of care and the validity and consistency of available information. The quality of health information available on the Internet is important, because it has the potential to benefit or harm a large number of people. The paper discusses the problems of aplenty of medical-related information available on the Internet, and how to sift the quality information from the available information. The paper recommends the development of technology-based tools that support the assessment and development of quality health information on the Internet.

Keywords: Internet, health information, information research, medical professionals

1. INTRODUCTION

Internet has evolved into a heavily trafficked reference resource in almost every field of public domain. It also provides access to unprecedented volume of health-related information directed toward medical professionals[1] by way of extensive medical databases, online journals, open access resources, e-books, medical websites, etc.

Internet is continuously evolving as a global communications network. Several hundred million people worldwide use the Internet, of whom 37 per cent use it as a source of health information[2]. Medical professionals are increasingly relying on the Internet to update their clinical knowledge. The speed with which new technologies and treatments are being developed means that many medical professionals are using the Internet to access health information to guide them in their practice.

There is an explosion in the amount of health information available on the Internet. For example, entering the word "health" in a generic search engine like Google currently yields over 60 million pages[3]. Numbers vary and none are very accurate, but it is estimated that there are over 100,000 health-related websites on the Internet today. These vary from highly-academic sites, online peer-reviewed journals, various databases and websites, governmental sites, and health-provider-institutions' sites to countless individual contributions from citizens, patients, and medical professionals[3].

2. INFORMATION QUALITY

Quality is defined as "the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs"[4]. Any measure of information quality is attended by a myriad of individual characteristics and contexts that affect perceptions of what quality means. In traditional publishing channels, the term quality has rarely been used to describe information. Information on the Internet challenges these traditional measures of quality. But in this mass of information, there is information relevant to a specific need, written or created by respected authors and organisations with credibility in their field. The ever-increasing amount of work on developing tools to assess the quality of information aims to assist people to identify this information. In health science, where information quality can mean the difference between an effective treatment of a health problem and a potentially dangerous and/or harmful outcome, criteria for information quality have been developed to act as a gold standard to which all health sites are encouraged to ascribe. The quality of medical information is particularly important because misinformation could be a matter of life or death[4].

3. THE PROBLEM

Health information can be posted by anyone with access and an interest in doing so. Many of these sources are authoritative and valid. Others can be well intentioned, but misinformed. The quality of the health-information on the Internet is extremely variable and difficult to assess. As the health-information proliferates on the Internet, there is a growing need for objective criterion that can be used to evaluate the quality of information. In the medical field, the profusion of available information of unknown provenance, often written by unidentifiable authors, with undisclosed agendas, brings problems to the medical profession and patients.

The greatest barrier to the Internet attaining its potential with regard to healthcare is not the difficulty in finding information, rather finding valid and reliable information. Many factors affect the quality of web-based information. Lack of governance is both a strength and weakness of the Internet as a communications system. Proprietors of healthcare websites are competing for sales and market share, which can often lead to selective disclosure of evidence, and the presentation of the inaccurate information.

Seeking useful and valid health information on the Internet can be difficult because of the speed and lack of control with which the information is accumulating. Filtering through information on the Internet may also be very time consuming. Tools such as Internet directories, indexes, search engines, databases assist medical professionals in their search for health-information on the Internet. However, searching for and locating information are only starting points, after which the medical professionals themselves must choose appropriate resources to take the crucial decisions. Judging whether the information is applicable and credible may present a greater challenge than just searching for information. To make this process more time efficient, medical professionals may rely on a number of Internet resources, open access resources, online databases, search engines, websites that review and rate the health-information.

The focus of this study is to assess the quality of health-information on the Internet for the medical professionals. Health-information includes preventing and managing disease and making other decisions related to health and healthcare. It may be in the form of data, text, audio, and/or video. It may involve enhancements through programming and interactivity. This paper focuses primarily on how to access quality health-information on the Internet.

4. OBJECTIVES

The main objectives of the study are:

Ä To know the strategies to be used to find quality health-information on the Internet effectively and quickly.

Ä To understand how medical professionals evaluate health-information on the Internet?

Ä To find out the minimum set of criteria for assessing the quality of health-information on the Internet.

5. METHODOLOGY

The study aims to provide models for accessing the quality health-information on the Internet for the medical professionals. Sixty-five among 488 medical professionals such as Professors, Associate Professors, and Assistant Professors of Kasturba Medical College (KMC), Manipal, Karnataka, who visited the Health Sciences Library of the college between June 2007 and December 2007 were interviewed to find quality health-information and minimum set of criteria for assessing the quality of health information on the Internet. They were asked the following questions.

Ä How to find the quality health-information on the Internet?

Ä What are the strategies to be used?

Ä How to evaluate health information on the Internet and what are the criteria to be followed for evaluation of the quality of health information?

Ä Which Internet resources are accessed to find the quality health-information in his/her subject and for patient care?

To facilitate the model for accessing quality health-information over the Internet, the opinion, thoughts, knowledge expressed by the medical professionals of KMC were compiled. Related work, on the quality of health-information on the Internet through a literature review and review of various databases, was also compiled in the form of strategies, guidelines, criteria, etc. to be followed for accessing the quality health-information on the Internet.

6. STRATEGIES FOR SEARCHING QUALITY HEALTH INFORMATION ON THE INTERNET

The medical professionals, who were interviewed for the study, were of the opinion that there are wide range of sources of health information on the Internet, which could help in finding information on subjects such as medical conditions, disorders, research, drugs, and other therapies. These sources include health agencies and institutes, universities, hospitals, laboratories, pharmaceutical industry sites, private companies, publishers, medical libraries, medical networks, online databases, support groups, individuals, etc. Some of the common and useful strategies or sources of information for locating quality health information[5] are:

Ä Consulting colleagues.

Ä E-mail discussion lists and newsgroups.

Ä Web rating evaluation sites.

Ä Meta search engines.

Ä Printed guides and directories published in the book form.

Ä Popular magazines and newspapers (print and electronic).

Ä Consulting-websites of professional organisations, library associations/organisations, medical libraries, search engines and directories, online databases, universities, hospitals, laboratories, pharmaceutical industry, publishers, medical networks, etc.

7. EVALUATING HEALTH INFORMATION ON INTERNET

Libraries procure books, journals, and other resources, evaluated by the scholars, publishers, and the librarians. But this does not apply for the information available on World Wide Web because there are no filters[6]. There is an abundance of health-information produced each day on the Internet. However, this can be variable in quality. But what does 'good quality' mean in the context of health information on the Internet? The 'good quality' in this context is some thing, which is accessible, usable, and reliable[7].

As there is lot of good information on the Internet, there are also misconceptions and inaccurate information. How do we judge the quality of Internet resources? Quality issues and the evaluation of health-information on the Internet have generated countless journal articles, studies and attempts at developing the ultimate appraisal tool. The core issues are well summarised by the British Medical Association library's criteria for its award for health care websites (www.bma.org.uk/ap.nsf/Content/LIBBMAPatientInformationAward#app2). In summary, the key things about when looking health-information on the Internet are:

Ä Where is the site based? Is it provided by a particular organisation? What type of organisation is it and is it credible? What is the nature of their work?

Ä When was the information provided? Is it dated? Is the information current? Has often is the site maintained and revised? Are links up to date?

Ä Who is the author of the site or web page? Do they provide contact details and information about themselves? What is their reputation or authority to produce this information?

Ä Why is the information being provided? What is the motivation? Is the information biased? Are the scope of the site and its intended audience clear?

Ä What makes us think that this information is accurate? Are references provided? Does the information seem balanced? Is the content likely to meet the needs of users?

Ä How is the site presented? Is it easy to find us way around it? Is there a link at the end of each page to take us back to the home page? Is the material presented logically? How accessible would the site be to someone with a visual or physical impairment? Is the language used clear and simple?

8. CRITERIA FOR EVALUATING QUALITY OF HEALTH INFORMATION ON INTERNET

The study revealed that the Internet technology provides access to an enormous volume and a variety of health information. It is increasingly difficult to screen which resources are accurate or appropriate for the medical professionals. The choice of appropriate evaluation criteria is both crucial and challenging. To help preserve the benefits of the Internet for health-care information, one must think about what actions they can take to improve quality while maintaining freedom of access. The quality criteria for evaluating health-information on the Internet fall into seven broad categories.

8.1 Credibility

To determine the credibility, one must consider its source, currency, relevance/utility and editorial review process.

8.2 Content

The content of health information on the Internet must be accurate and complete; an appropriate disclaimer should also be provided, describing the limitations, purpose, scope, authority, and currency of the information.

8.3 Disclosure

Websites should provide appropriate disclosures, including the purpose of the site, as well as any profiling/collecting of information associated with using the site, so medical professionals can understand the intent of the organisation or individual in providing the health information.

8.4 Links

Especially critical to the quality of Internet site, are its external links—connections to other internal pages or to external sites that form the web-like structure of information searches within and among sites. There are four criteria for evaluating the quality of links: selection, architecture, content, and back linkages.

8.5 Design

The design or layout of the website, including graphics and text, as well as links, is important for the effective delivery and use of any web-based information, even though it does not affect the quality of the information per se. The design of websites can be evaluated in terms of accessibility, logical organisation (navigability), and internal search capability.

8.6 Interactivity

Websites should include a feedback mechanism for users to offer their comments, corrections and criticisms, and raise questions about the information provided. This makes the website accountable to its users.

8.7 Caveats

Sites that market services and products have different agenda then those that are primary content providers.

9. CRITERIA FOR CONSULTING INTERNET RESOURCES

Internet is a vast resource of varying worth. When consulting Internet resources about health topics and for the purposes of determining whether health-information on the Internet can be trusted, the following criteria can help determine if information is "good" information[8]:

9.1 Authority

Probably the single most important criterion is authority. If we don't know *who* is writing the information, we cannot really trust it. The following points should be clarified when looking for health information on the Internet[9].

Ä   Who created this information and why?

Ä   Do we recognise this author or their work?

Ä   Is the author a physician or other health professional?

Ä   What are their credentials, affiliations, and professional experience?

Ä   What are their qualifications for writing on the topic?

Ä   Are they acknowledged experts in the field we are reading about?

Ä   What knowledge or skills do they have in the area?

Ä   Is he or she stating fact or opinion?

Ä   What else has this author written?

Ä   Does the author acknowledge other viewpoints and theories?

Ä   Where is the webpage located?

Ä   Is the page part of the website of an organisation whose name we can trust?

Ä   Does the address show that it is a personal home page?

9.2 Objectivity

Objectivity means all sides of issues are portrayed in a fair light. There is no propaganda or misinformation. The information is free from obvious errors or misleading omissions. However, this may not be easy to detect, if we don't know the subject matter well already. To see if the information is presented objectively, one should look for the following:

Ä   Is the information objective or subjective?

Ä   Is it to sell a product of some kind?

Ä   Is it to persuade us of the correctness of a certain opinion on a controversial issue?

Ä   Are all sides of the issue presented fairly?

Ä   Is it to present current information, as a public service?

Ä   What kind of organisation is responsible for the information?

Ä   Is it full of fact or opinion?

Ä   Is the information biased?

Ä   What type of language is used?

Ä   What tone does the page have?

Ä   How does the sponsorship impact the perspective of the information?

Ä   Is a balance of perspectives represented?

Ä   Could the information be meant as humorous, a parody or satire?

Ä   What about advertising? Is there any on the webpage?

9.3 Accuracy

Accuracy is important in judging information sources. Accuracy means the information presented is exact and correct. The accuracy of a source is more difficult to evaluate than authority and objectivity. If we do not already have a good understanding of the topic, it is hard to tell if the information presented is accurate or not. To find if information is accurate or not, one should look for the following:

Ä   Explanation of the methods used to obtain the information

Ä   Listing of reference sources used.

Ä   Evidence that content was reviewed by other authorities for accuracy.

Ä   Information on how studies were conducted and analysed.

Ä   Lack of obvious errors or omissions.

Ä   Lack of spelling, grammatical, and typographical errors.

9.4 Coverage

Coverage means the completeness of the information presented. It is also difficult to determine without a thorough understanding of the topic. The coverage of the topic is greatly influenced by the audience for whom the information was written. For example, information intended for use by medical professionals would probably have greater coverage than information intended for use by health care consumers. Coverage includes:

Ä   The depth (level of detail presented) and breadth (coverage of all aspects of the subject) of the information.

Ä   Look for obvious gaps or omissions in the coverage of the topic. Does the information presented leave us with unanswered questions?

Ä   Compare the information presented with print resources on the same topic. Is the information presented equivalent in breadth and depth?

9.5 Relevance

Relevance is defined as "relation to the matter at hand: practical and especially social applicability pertinence." This criterion is particularly important in the evaluation of health-related information. Is the information suited to our needs? Is it pertinent? It can be related to:

Ä   The purpose of the webpage.

Ä   The purpose we have in looking for the information.

Ä   The utility or usability of the information. Why are we looking for the information? Is the content related to our needs?

Ä   Are the information current and the coverage broad enough to meet our needs?

Ä   Is the information written in a form that is useable (i.e., reading level, technical level)?

Ä   Is the information in a form that is useful such as words, pictures, charts, sounds or video?

Ä   Do the facts contribute something new or add to our knowledge of the subject?

9.6 Time Aspects

The time aspects of a document are particularly important in fields which change rapidly, for example, science and medicine. It is important to get up-to-date health information. Even a few months can be crucial in a field in which drugs and treatments are evolving so rapidly. Time aspects of the document are shown below:

Ä   Is the information current?

Ä   When the document was created? Placed on the web? Copyrighted? Last revised or updated?

Ä   Does the page provide information about timeliness such as specific dates of information?

Ä   Does currency of information matter with our particular topic?

Ä   How current are the sources or links?

Ä   What edition of the work is presented?

Ä   When was the information in the document gathered?

9.7 Usability

Website should be "user-friendly", and navigating around the site should be easy. The site should be logically arranged, with the use of good graphic design. Multimedia should be used appropriately. Information should be concise, to reduce lengthy scrolling through the document. Hyperlinks should be intact and operable. Consideration must be taken of the varying levels of technology which may be used to access the site. The site should be accessible to most users. When possible, enhancements should be added to aid those with access problems (e.g., text versions of image and sound files for individuals with visual or hearing problems).

9.8 Authenticity

Authenticity of the information is most important while one accesses health information on the Internet. To access the right health information, one should check the following:

Ä   Is the information authentic?

Ä   Where does the information originate?

Ä   Is the information from an established organisation?

Ä   Has the information been reviewed by others to insure accuracy?

Ä   Is this a primary source or secondary source of information?

Ä   Are original sources clear and documented?

Ä   Is a bibliography provided citing the sources used?

9.9 Reliability

To know the reliability of the health information, one must consider the following:

Ä   Is the sources truth worthy? How do we know?

Ä   Who is sponsoring this publication?

Ä   What is the purpose of the information resource: to inform, instruct, persuade, or sell?

Ä   What is their motive?

9.10 Efficiency

One should think about the organisation, and speed of information access including table of contents, index, menu, and other easy-to-follow tools for navigation. One should also consider whether the information presented in a way that is easy to use (i.e., fonts, graphics and headings)?

9.11 Points of View or bias

Points of view or bias reminds us that information is rarely neutral. Because data is used in selective ways to form information, it generally represents a point of view. Every writer wants to prove his point and will use the data and information that assists him in doing so. When evaluating information found on the Internet, it is important to examine *who* is providing the "information" we are viewing and what might be their *point of view or bias.* The popularity of the Internet makes it the perfect venue for commercial and sociopolitical publishing. These areas in particular are open to highly "interpretative" uses of data.

9.12 Referral to and/or knowledge of the literature

Referral to and/or knowledge of the literature refers to the context in which the author situates his

or her work. This reveals what the author knows about his or her discipline and its practices. This allows us to evaluate the author's scholarship or knowledge of trends in the area under discussion. The following criteria serve as a filter for all formats of information.

Ä The document includes a bibliography.

Ä The author alludes to or displays knowledge of related sources, with proper attribution.

Ä The author displays knowledge of theories, schools of thought or techniques usually considered appropriate in the treatment of his or her subject.

Ä If the author is using a new theory or technique as a basis for research, he or she discusses the value and/or limitations of this new approach.

Ä If the author's treatment of the subject is controversial, and he/she knows and acknowledges this.

10. CONCLUSION

Medical professionals wishing to use an Internet resource must consider the source very carefully before deciding whether or not to use it. Any Internet source to be used must be cited fully in the bibliography or references section of the research paper in question and must be accompanied by a paragraph evaluating the source. It is also important to consider how current the author's analysis is; many webpages are put up and then forgotten by their authors, meaning that they quickly lose currency and are not changed in response to changing events.

Quality of health information on the Internet is important, because it has the potential to benefit or harm a large number of people. It has this potential because of the nature of the Internet and the Internet's rapid worldwide spread. The medical professionals of KMC, Manipal have recommended the development of technology-based tools that support the assessment and development of quality health information on the Internet. Authors agree on key criteria for evaluating health related websites, databases, etc. Efforts to develop consensus criteria may be helpful. The next step is to identify and assess a clear, simple set of consensus criteria that the medical professionals can understand and use. Also, instruments to evaluate health information on the Internet have to be developed. It is observed that Medline (PubMed) of National Library of Medicine, USA; ScienceDirect and MD Consult databases of Elsevier; Ovid SP and ProQuest Medical Library online databases; online journals of Blackwell, BMJ, Cambridge, Elsevier, JAMA & Archives, JBJS, John Wiley, Karger, Lancet, Lippincott, NEJM, Oxford University Press, Sage, Springer, Taylor & Francis, etc., publishers are some of the commonly used Internet resources by the medical professionals at KMC, Manipal to access quality health information.

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