Evaluation of Web-Based Resources: A Neurosurgical Perspective

Michelle J. Clarke MD
Mayo Clinic, Rochester, MN
Andrew B. Foy MD
Medical College of Wisconsin, Milwaukee, WI

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Introduction

Increasingly, patients and their families turn to the internet to learn more about their diagnosis and potential treatments. In 2008, it was estimated that 61% of adults in the United States used web-based resources for medical information. Even higher numbers are seen amongst care-givers, with 80% of the estimated 30 million Americans home caregivers seeking information about their care recipient's condition online. Web-sites often provided easily accessible overviews in a readable format, without the challenge of reading dry, focused, jargon-ridden medical papers. However, the ease of information retrieval is offset by the lack of vetted content. Anyone with an internet connection can create a web site, and the facts presented have not undergone the rigorous peer-reviewed process respectable medical literature requires. Regardless of the quality of facts presented, this is a common place for our patients, and often their referring physicians, to obtain information. It behooves physicians to be able to critically evaluate this virtual resource, and understand how to guide their patients to appropriate online sources.

Web sites offer easily accessible information. As with any other information source, a good web site will provide accurate information in a readable fashion. This paper seeks to provide simple criteria for critically evaluating internet resources, allowing a physician to understand what their patients see when they use the internet. Being able to critically evaluate web sites will allow doctors to direct their patients appropriately and correct misinformation in a knowledgeable fashion. The criteria were employed to evaluate the top 10 web sites (by page rank) for the five most common neurosurgical procedures in North America to provide an estimate of the quality of current online resources.

Methods

The top ten web sites (by Google page rank) were assessed for the five most common operative diagnoses in neurosurgery. Assessment includes Accuracy (factual correctness and appropriate context), Readability, Usability (ability to retrieve information) and Accessibility. Procedures studied included lumbar disc herniation, cervical disc herniation, glioma, ventriculo-peritoneal shunt, and lumbar stenosis. Accuracy was assessed using the surrogate Health Information on the Net (HON) criteria. Readability was assessed using the Flesh-Kinkead Grade Level Score (FK) and the Simplified Measure of Gobbledygook Score (SMOG).

Results

Accuracy was measured using the HON scale to asses surrogate markers including ownership, authorship, source, currency, interactivity, navigability and balance. Using this system, of the 50 web sites 13 (26%) were rated excellent, 24/50 (48%) were moderate, and 13/26 (26%) were poor. Direct correlation with an expert panel is needed.

The preferred FK score for patient education materials is 6, indicating the material can be understood by a sixth grade student. Of the 50 articles reviewed, 1 met this criterion (2%). Of the web sites reviewed, 23 (46%) had an FK score > 12 indicating the need of a college-level education for comprehension. SMOG scores were universally higher than FK scores. A SMOG score of 13-16 indicates the need for a college-level education. No web site scored below this threshold. Of the 12 web sites that had an FK score of <9, all had SMOG scores of <17. A SMOG score of >17 indicates the need for graduate level education. Of the 23 web sites with an FK score of >12, 22 had a SMOG score >19.

Conclusions

A general assessment criteria of web-based resources is useful to evaluate educational material encountered by patients and their families. Accuracy is not adequately assessed with surrogate markers but requires expert-level knowledge. In the vast majority of cases, readability is poor, requiring college-level education of higher to insure comprehension. In general, the most accessible web sites do not provide patients with verified information in a comprehensible manner.

Discussion

Obviously, the task of determining fact-based accuracy is onerous and requires an unbiased and qualified reviewer. Surrogate markers for accuracy have been developed which do not require medical knowledge to employ. Surrogate markers include Authorship Authority, Objectivity, Timeliness and Support.

Factually correct information is only useful if it is understandable to the reader. The National Literacy Study states that the average adult reads at the 7th grade level. Thus, it is generally accepted that medical information should be presented to the lay-person at a sixth grade reading level to ensure comprehension. In our survey of 50 web sites, only 1 web site was written at a sixth grade level, only 24% were written at an eighth grade level, and 46% required a post-secondary level of education to comprehend based on FK score. Worse, it has been demonstrated that FK score significantly underestimates reading difficulty; the SMOG grades for complete reading comprehension and should be considered the preferred method of calculating the readability of medical literature. In our study, the SMOG score directly correlated to the FK score, but was phase shifted by an entire level of education.