INTRODUCTION

As defined by the American Medical Association Foundation, health literacy is a “patient’s ability to obtain, process, and understand basic health information and services needed to make appropriate health decisions and follow instructions for treatment” [1]. The 2003 National Assessment of Adult Literacy (NAAL) has identified three types of literacy: prose, document, and quantitative [2]. Prose literacy—the ability to read and comprehend uninterrupted or parenthetical text (patient instructions)—and document literacy—the ability to search, read, and comprehend noncontinuous text (food and drug labels)—both come into play when decoding health information [3]. NAAL research found that approximately 14% of adults in the United States read at the “below basic” prose literacy level and 12% of adults read at the “below basic” document literacy level [4]. The NAAL also added a health literacy section to the 2003 assessment that measured adults’ ability to perform health-related reading tasks, such as following doctors’ instructions or reading medicine labels. The assessment found that 37% of adults had “basic” or “below basic” health literacy levels and that these scores generally tended to increase with educational levels attained [3].

Low health literacy skills can lead not only to poor self-care, but inadequate care from physicians if patients cannot describe their symptoms or recall medications accurately. These problems can be decreased with more sensitivity to a patient’s literacy level, more abundant and easier to understand health education, and outreach by the medical community. The inability to read and process health information is a matter of grave importance, not only to the patient, but to the state of public health.

The medical community has recognized health literacy as a pressing concern and has published the bulk of the scholarly literature on this topic; however, the study of health literacy can include research from disciplines such as adult literacy, nursing, social science, and education. Retrieving comprehensive information covering all aspects of health literacy can present a challenge. A search of the scholarly literature produced one previous bibliometric study of health literacy, but it was limited to PubMed and its purpose was to indicate possible gaps in health literacy scholarship in the European Union [5]. Alpi’s 2005 bibliometric analysis examined the publication patterns of health literacy journal articles in public health from nine databases from a variety of disciplines to document the increase in scholarship on the subject, its core or most productive journals, and relevant databases where literature could be found. The analysis also supported the need for a greater awareness of a wider variety of available databases for information retrieval on multidisciplinary topics [6].

METHODS

For this bibliometric analysis, nine databases were selected due to their relevance to the different disciplines contributing to the study of health literacy: CINAHL, HealthSource: Nursing/Academic Version, PubMed, SOCIndex, PsycINFO, Academic Search Premiere, Education Full-Text, Educational Resources Information Center (ERIC), and Library and Information Science Technology Abstracts (LISTA). Because “health literacy” is not presently a recognized Medical Subject Heading and the searches should be consistent, each database was queried using the natural language term “health literacy” for the most accurate and efficient retrieval of pertinent items. An exploratory search of PubMed using the “Special Queries” string produced more than 1,100 results [7]. This strategy is ideal for a database composed of health- and medicine-
related resources; however, an attempt to use the same string produced more than one million hits from multidisciplinary databases such as Academic Search Premier, so only the “health literacy” keyword search was used. Individual article abstracts were examined to determine their relevance to health literacy. Articles regarding mental health literacy were excluded, as that concept entails a more specialized type of health knowledge. Only feature-length (more than 2 pages) articles were counted. Excluded from article counts were shorter news items, editorials and letters to the editor, reviews, opinion pieces, book chapters, and dissertations, as well as the gray literature. Tallies of articles from each database were determined by cross-referencing the results of each keyword search with those in PubMed as well as amongst themselves. These results were compiled into an Excel spreadsheet for ease of manipulation and analyses.

RESULTS

Growth of the literature

During the years 1997 to 2007, 643 total articles were published on the subject of health literacy in the queried databases (Figure 1). Data from Figure 1 show an upward trend in number of articles from 2003 (37 articles) to 2007 (181 articles). Reasons for the sudden upswing in published articles from 2000 to 2001 (from 20 to 34 articles) could not be traced to any concrete occurrence or published study. In 2002, the Medical Library Association (MLA) instituted the MLA Health Information Literacy Task Force to define the organization’s role in health literacy, and in 2003, MLA sponsored a health literacy teleconference as well as other ongoing activities around the promotion of health literacy awareness among health sciences librarians. Other possible reasons for the dramatic leap in articles published from 2003 (37) to 2004 (68) could be attributed to the 2003 NAAL that contained a health literacy component and the publication of the American Medical Association Foundation’s toolkit for medical practitioners, Health Literacy: A Manual for Clinicians, in the same year [8]. Article counts from 2006 to 2007 also saw a measurable increase (from 108 to 181), indicating health literacy is a topic of wider and more immediate importance in many academic and practice-based fields.

Core journals

Table 1 (online) itemizes the most productive, or core, journals on the subject of health literacy between 1997 and 2007. Journal of General Internal Medicine (JGIM) published the most articles on health literacy during this time period, with 32 publications, or 21% of the 152 identified articles from the core journals. AIDS Education and Prevention published the second highest number of articles on health literacy, 24 (16%), closely followed by the Journal of School Health, at 23 articles (15%). Patient Education and Counseling was fourth, with 14 articles, and the Journal of Health Communication fifth, with 13 articles, approximately 9% each. A literacy journal, Adult Learning, published 11 articles in the 10-year period studied. Three journals—American Journal of Health Education, College Student Journal, and Health Promotion International—each published 9 articles, and the American Journal of Health Behavior completed the top ten with 8 health literacy articles published. During the studied time period, 5 articles from the Journal of the Medical Library Association were identified: 1 in 2005, 1 in 2006, and 3 in 2007. While it is no surprise that a medical journal such as JGIM would publish the most articles on health literacy, the presence of education-related journals such as Journal of School Health and Adult Learning in the list of core journals denotes that health literacy is being explored in a variety of contexts, especially from an educational standpoint.

Results by database

As expected, PubMed (Table 2, online) indexed the vast majority of journal articles on health literacy, with 418 articles retrieved. Combined results from the other 8 databases netted 225 additional unique articles. Of the remaining databases, Education Full-Text contained the most literature, at 82 articles that specifically addressed
the educational and reading-related aspects of health literacy. A keyword search in the multidisciplinary database Academic Search Premier produced 48 items, and CINAHL produced the third most non-duplicated articles (30 articles). A search of LISTA produced 23 articles. Searches in HealthSource: Nursing/Academic Version, PsycINFO, SOCIndex, and ERIC resulted in fewer than 20 unique articles each.

**DISCUSSION**

The ultimate purpose of this bibliometric analysis is to enable interested researchers and health sciences librarians to more efficiently search for and retrieve scholarly literature on the topic of health literacy. Data analyses show a clear upward growth pattern in the numbers of articles published about health literacy from 1997 to 2007. In 2007 alone, 181 articles were published on this topic, almost 10 times more than were published in 1997 (19). This dramatic increase indicates a growing recognition of health literacy as a legitimate research topic and denotes a better understanding of the subject as well as its implications for medical and educational practice.

This introductory study was limited in scope to nine article databases, and only feature-length articles from scholarly and professional journals were counted. Other useful analyses of this topic could include citation analysis to determine core journals’ impact factors and studies of degree of collaboration among authors. Analyzing possible additional health literacy indexing terms apart from those utilized in this study and removing length, time period, and publication type limitations would also retrieve a larger number of articles for a more in-depth study.

This study does underline the need for researchers and health sciences librarians to seek information about health literacy in a wider variety of databases. The topic’s multidisciplinary nature often requires that users gain knowledge of many academic fields’ vocabularies, concepts, and subject-specific databases. Depending on their field of study, users seeking information on health literacy will require information on different aspects of the subject. Medical professionals may request studies of health literacy assessments in the clinical environment or wish to learn different methods for effectively communicating with patients who may have not only lower health literacy skills, but also lower general literacy levels. For this purpose, they will find adult literacy and educational journals useful. To more efficiently serve their populations, literacy providers and educators can research medical literature to justify the need for more comprehensive health literacy education throughout the lifespan. All users can gain a more comprehensive view of the whole issue with a greater breadth of research on the topic.

**CONCLUSION**

Health literacy is becoming a subject of increased importance in many disciplines, as supported by the results of this bibliometric analysis. This study can assist researchers and librarians in developing a more comprehensive picture of the concept of health literacy and produce more efficient searches for and retrieval of information on the topic. Pertinent information was found not only in a health database such as PubMed, but in education, library science, and sociology databases as well. Health literacy is a multidisciplinary topic, and its study may encourage more collaborative scholarship on its causes, consequences, and implications, not only for an individual’s health, but also for entire health policies and systems. Both medical providers and adult literacy professionals can work in concert to research causes and various strategies to combat low health literacy levels, fulfill a growing need for easy-to-read health materials, and have a greater awareness of those who need health information the most to enable them to become more informed health consumers.

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**REFERENCES**

1. American Medical Association Foundation. Health literacy [Internet]. Boston, MA: The Foundation; 2008 [rev. 14 Oct 2008; cited 24 Oct 2008]. <http://www.ama-assn.org/ama/pub/category/8115.html>.

2. Speros C. Health literacy: concept analysis. J Adv Nurs. 2005 Jun;50(6):633–40. DOI: 10.1111/j.1365-2648.2005.03448.x.

3. Kutner M, Greenberg E, Jin Y, Paulsen C. The health literacy of America’s adults: results from the 2003 National Assessment of Adult Literacy (NCES 2006-483) [Internet]. Washington, DC: National Center for Education Statistics; 2006 Sep [cited 24 Oct 2008]. <http://www.nces.ed.gov/pubs2006/2006483.pdf>.

4. Marcus EN. The silent epidemic—the health effects of illiteracy. N Engl J Med. 2006 Jul;355(4):339–41.

5. Kondilis BK, Kiriaze IJ, Athanasoula AP, Falagas ME. Mapping health literacy research in the European Union: a bibliometric analysis. PLoS ONE 2008 Jun;3(6):e2519. DOI: 10.1371/journal.pone.0002519.

6. Alpi KM. Expert searching in public health. J Med Libr Assoc. 2005 Jan;93(1):97–103.

7. National Library of Medicine. MEDLINE/PubMed Search and health literacy information resources [Internet]. Bethesda, MD: The Library; 2006 [rev. 30 Apr 2008; cited 1 Nov 2008]. <http://www.nlm.nih.gov/services/health_literacy.html>.

8. Weiss BD. Health literacy: a manual for clinicians. Chicago, IL: American Medical Association Foundation; 2003.

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