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Literacy and Health Outcomes

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-Based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. This report on literacy and health outcomes was requested by the American Medical Association and funded by AHRQ. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new health care technologies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

To bring the broadest range of experts into the development of evidence reports and health technology assessments, AHRQ encourages the EPCs to form partnerships and enter into collaborations with other medical and research organizations. The EPCs work with these partner organizations to ensure that the evidence reports and technology assessments they produce will become building blocks for health care quality improvement projects throughout the Nation. The reports undergo peer review prior to their release.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the health care system as a whole by providing important information to help improve health care quality.

We welcome written comments on this evidence report. They may be sent to: Director, Center for Outcomes and Evidence, Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850.

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Structured Abstract

Context: More than 90 million adults in the United States have poor literacy, which would cause them to have trouble finding pieces of information or numbers in a lengthy text, integrating multiple pieces of information in a document, or finding two or more numbers in a chart and performing a calculation. Those with poorer reading skills are believed to have greater difficulty navigating the health care system and to be at risk of experiencing poorer health outcomes.

Objectives: Research has examined the effect of low literacy on a wide variety of health outcomes, but we are unaware of any published systematic reviews that have analyzed these relationships or examined interventions to mitigate the health effects of low literacy. To evaluate the existing research, we performed a systematic review to address two four-part key questions based on questions initially posed by the American Medical Association and the Agency for Healthcare Research and Quality and put into final form in cooperation with our Technical Expert Advisory Group. The questions are as follows:

- **Key Question 1:** Are literacy skills related to: (a) Use of health care services? (b) Health outcomes? (c) Costs of health care? (d) Disparities in health outcomes or health care service use according to race, ethnicity, culture, or age?
- **Key Question 2:** For individuals with low literacy skills, what are effective interventions to: (a) Improve use of health care services? (b) Improve health outcomes? (c) Affect the costs of health care? (d) Improve health outcomes and/or health care service use among different racial, ethnic, cultural, or age groups?

Data Sources: We searched a variety of data sources for studies published between 1980 and 2003, including MEDLINE®, PsycINFO®, the Cumulative Index to Nursing and Allied Health (CINAHL®), the Cochrane Library, the Educational Resources Information Center (ERIC) or Public Affairs Information Service (PAIS), and the Industrial and Labor Relations Review (ILRR) database. In MEDLINE, our primary database, we had to rely on key word searches because no MeSH headings specifically identify literacy-related articles. Similarly, the terms "literacy" or "health literacy" were searched in different databases with the choice based on the scope of the database. We also sought additional articles through Web-based bibliographies and experts.

Study Selection: For Key Question (KQ) 1, we included observational studies that reported original data, measured literacy with any valid instrument, and evaluated one or more health outcomes. We included studies that measured change in knowledge; we excluded studies that measured only readability or satisfaction with educational materials or that used Cloze-method questions as the only outcome. For KQ 2, we included uncontrolled before-and-after studies and nonrandomized and randomized controlled trials. Intervention studies either measured literacy or were conducted in populations that were known to have a high proportion of patients with low literacy. We excluded studies in which the primary language of the participant was not the same as that of the health care provider and studies conducted in developing countries.

Data Extraction: One investigator extracted information from each article directly into evidence tables. A second investigator checked these entries by re-extraction of the information. Disagreements were resolved by consensus of the two extractors. Both data extractors independently completed an 11-item quality scale for each article; scores were averaged to give a final measure of article quality.

Data Synthesis: We identified 3,015 unique abstracts from our literature searches. We excluded 2,330 that clearly did not meet our inclusion criteria after abstract review. Of the 684 remaining articles subjected to full review, 611 were rejected and 73 retained. Of those retained, 44 articles addressed KQ 1 and 29 articles addressed KQ 2.

Studies examining the relationship between low literacy and adverse health outcomes generally found that patients with low literacy had poorer health outcomes, including knowledge, intermediate disease markers, measures of morbidity, general health status, and use of health resources. Most studies were cross-sectional in design, and many failed to adequately address confounding and the use of multiple comparisons in their analyses. For KQ 2, most interventions led to improved outcomes, particularly for outcomes of understanding or knowledge. Fewer studies examined the effect of interventions for patients with low health literacy on morbidity and mortality.

Based on our 11-item quality scale, we found that the average quality of the individual articles addressing KQs 1a and 1b was good to fair. The quality of the one article addressing KQ 2a was good; the average quality of the articles addressing KQ 2b was fair. We did not find literature that discussed the portion of the key questions addressing costs or disparities, so an average grade is not available.

We also graded the strength of the evidence for this body of literature on a scale from I (strongest design) to IV (no published literature). We concluded that the literature addressing KQ 1a and 1b should receive a grade of II; it generally includes studies of strong design, but some uncertainty remains because of concerns about generalizability, bias, research design flaws, and adequate sample size. The literature addressing KQ 1c and 1d was rated III since the evidence is from a limited number of studies of weaker design and studies with strong designs have not been done. The literature addressing KQ 2a and 2b also received a grade of III, while the literature addressing KQ 2c and 2d received a grade of IV, indicating that there was no published literature.

Conclusions: Low literacy is associated with several adverse health outcomes, including low health knowledge, increased incidence of chronic illness, poorer intermediate disease markers, and less than optimal use of preventive health services. Interventions to mitigate the effects of low literacy have been studied, and some have shown promise for improving patient health and receipt of health care services. Future research, using more rigorous methods, is required to better define these relationships and to guide development of new interventions.

Contents

Chapter 1. Introduction....3
Burden of the Problem....3
Literacy and Health Literacy....4
Literacy and Vulnerable Populations....5
Analyzing the Relationship Between Reading Ability and Health Outcomes....6
Readability....7
Production of This Evidence Report....7
Organization....7
Technical Expert Advisory Group....8
Uses of This Report....8
Chapter 2. Methods....11
Key Questions and Analytic Framework....11
Literature Review Methods....12
Inclusion and Exclusion Criteria....12
Literature Search and Retrieval Process....13
Literature Synthesis....14
Development of Evidence Tables and Data Abstraction Process....14
Quality and Strength of Evidence Evaluation....15
Peer Review Process....16
Chapter 3. Results....21
Results of Literature Search....21
Key Question 1: Relationship of Literacy to Various Outcomes and Disparities....21
Literature Search and Included Studies....21
Use of Health Care Services....22
Health Outcomes....24
Costs of Health Care....30
Disparities in Health Outcomes or Health Care Service Use....30
Summary....30
Key Question 2: Interventions for People With Low Literacy....31
Literature Search and Included Studies....31
Use of Health Care Services....32
Health Outcomes....32
Costs of Health Care....34
Disparities in Health Outcomes or Health Care Service Use....35
Summary....35
Chapter 4. Discussion....59
Overview....59
Principal Findings....59
Limitations of This Review and the Literature....61
Deficiencies in This Body of Literature....61
Analyzing the Relationship Between Reading Ability and Health Outcomes....62
Limitations to Our Review Procedures....63
Future Research....63

Conclusion 65
References and Included Studies 67
Listing of Excluded Studies 73
Quality Rating Form 105

List of Tables and Figures

Table 1. Instruments commonly used to assess the relationship between literacy and health ..9
Table 2. Correlations between common health literacy assessment tools 10
Table 3. Health literacy literature searches: inclusion and exclusion criteria 19
Table 4. Health literacy search strategy, yield, and final count of articles 20
Table 5. Summary of studies of relationship between health services, outcomes, costs, or disparities and literacy (KQ1) 37
Table 6. Summary of studies of interventions to improve health-related outcomes in low literacy populations (KQ2) 45
Table 7. Measurement tools and criteria used to measure literacy in KQ 1 articles 51
Table 8. Studies of knowledge or comprehension of health service use (KQ 1a) 53
Table 9. Studies of knowledge or comprehension of health outcomes (KQ 1b) 54
Table 10. Studies of the relationship between literacy and depression (KQ1b) 55
Table 11. Studies of the relationship between literacy and global health status (KQ1b) 56
Table 12. Measurement tools and criteria used to measure literacy in KQ 2 articles 57

Figure 1. Analytic framework 18
Figure 2. Cumulative number of articles addressing KQ 1 and KQ 2 by year of publication 36

Appendixes and Evidence Tables are provided electronically at http://www.ahrq.gov/clinic/epcindex.htm