Health literacy weakly but consistently predicts primary care patient dissatisfaction

JUDY A. SHEA1,2, CARMEN E. GUERRA2, KARIMA L. RAVENELL1,2, VANESSA J. MCDONALD1,2, CAMILLE A. N. HENRY1,2 AND DAVID A. ASCH1,2

1Center for Health Equity Research and Promotion, Philadelphia Veterans Affairs Medical Center, and 2University of Pennsylvania, Philadelphia, PA, USA

Abstract

Objectives. To study relationships between health literacy and multiple satisfaction domains. Health literacy is related to some domains of patient satisfaction such as communication and understanding, but little is known about relationships of health literacy with other satisfaction domains. Moreover, the importance of health literacy in predicting satisfaction compared with other patient sociodemographics is underexplored.


Setting. Primary care waiting areas with a Veterans Administration Medical Center and a university health system.

Participants. One thousand five hundred and twenty-eight primary care patients.

Main outcome measures. A brief demographics questionnaire, the Rapid Estimate of Adult Literacy in Medicine, the Veterans Affairs ambulatory care patient satisfaction survey, and an adaptation of the Charlson Comorbidity Index.

Results. In unadjusted regression analyses, lower health literacy level was a significant predictor of worse satisfaction in 7 of 10 domains ($P < 0.01$). When adjusting for patient sociodemographics, predicted relationships remained significant in six of the seven domains ($P < 0.05$), with each unit change in the 4-stage literacy classification associated with a 3–6 point decrease in dissatisfaction scores (0–100 scale). Health literacy did not predict overall dissatisfaction ($P = 0.55$).

Conclusions. These results suggest that health literacy, as assessed through a pronunciation exercise that is closely related to more comprehensive measures of literacy, has a consistent, albeit weak relationship with patient satisfaction. Future work is needed to clarify if patients with lower literacy are really receiving different care than those with higher literacy and to pinpoint the sources of their more negative responses.

Keywords: health literacy, patient satisfaction, Veterans Health Administration

Patient satisfaction is an important indicator of processes of care [1–3]. An enlarging literature confirms associations between patient satisfaction and various sociodemographic characteristics. One patient attribute that has not been well studied in regard to patient satisfaction is health literacy. In the conceptual framework put forth in the recent Institute of Medicine report [4], health literacy is seen as ‘the bridge between the literacy (and other) skills and abilities of the individual and the health context’ (p. 32). Moreover, as discussed in the Institute of Medicine report as well as other venues [5,6], health literacy is comprised of many components including reading, listening, talking, writing, and numeracy. This full complement of skills is what enables (or limits) an individual’s interactions with a health system and thus may be a direct contributor to health as well as other health-related outcomes and mediators such as satisfaction.

Empirically, literacy is often linked to patients’ health needs and health care experiences [4]. For example, low literacy is associated with difficulty understanding information provided in health care settings [7], and individuals with low literacy are more satisfied when material is presented in an easy-to-understand manner [8]. It has also been observed that lower literacy is associated with limited health vocabulary, less basic knowledge of anatomy and poorer understanding of the concepts of screening and early detection [9] as well as difficulties with oral communication [10]. Given findings such as these, it is plausible to suggest that individuals with lower literacy may be less satisfied with their care, especially when definitions of satisfaction are broad and include reference to printed materials.
and negotiation of appointments among multiple providers in complex health systems.

It would be helpful for health care providers to have a clearer understanding of how health literacy is related to the multiple domains of patient satisfaction—indeed many practices and even individuals are being judged with such process markers [1–3]. More importantly, knowing whether health literacy is associated with satisfaction, in light of other sociodemographic variables, could help focus clinician–patient interactions and increase the attention given to patients’ understanding. Finally, in theory, health literacy is mutable, whereas other, more often studied predictors (e.g. sex, race) are not. The primary objective of this study was to examine the relationship between health literacy and multiple domains of patient satisfaction. We expected that lower health literacy would be associated with lower satisfaction in multiple satisfaction domains.

Methods

Participants

Patients were recruited in primary care waiting areas at the Philadelphia Veterans’ Affairs Medical Center and the University of Pennsylvania Health System between May 2001 and April 2002. Eligible patients were 18 years or older and English speaking. This study was part of a larger study assessing multiple methods of assessing patient satisfaction among low-literate patient populations [VAHSR&D PCC-98-071-1]. Physician identity was not recorded. Recruitment occurred on rotating half-day schedules among four clinic sites to minimize physician effects. Trained research assistants approached patients in the waiting area and invited them to participate. Demographic data were gathered on the spot. Those who agreed to participate joined the research assistant at a table set up adjacent to the waiting area to complete the remaining instruments administered by the assistant or self-administered under supervision. There was no daily sampling plan, but assistants were instructed to vary the apparent gender, race, and age of the patients they approached. Approximately 85% of the patients approached at each site agreed to participate. This study was approved by the institutional review boards at both health systems.

Measures

All participants completed a brief demographic form. Those who agreed to participate were administered the Rapid Estimate of Adult Literacy in Medicine (REALM) and Veterans Affairs (VA) National Performance Data Feedback Center (NPDFC) ambulatory care survey. In the last 7 months of the enrollment, patients were also given an adaptation of the Charlson Index to assess comorbidities.

The REALM is a 66-item word pronunciation task that compares favorably to other reading assessments and to assessments testing other skills (i.e. comprehension) with correlation coefficients ranging from 0.80 to the high 0.90s [11–13]. The 66 medical words are ordered by difficulty. Subjects read as many words as they are able to, skipping over the ones they do not know. Standard dictionary pronunciation is the scoring standard. The number of words read correctly is translated into one of four grade level literacy estimates.

The NPDFC is a patient satisfaction instrument used by the Veterans Health Administration as one measure of quality. It was modeled after the widely used survey developed by the Picker/Commonwealth Program for patient-centered care [2]. It is administered annually since 1995 to samples of patients selected from a centralized computer system. Small revisions are made annually in item content. There are multiple usually ~60 items in the survey; some of the items are targeted to assess prespecified service areas. The 1999 version of the VA NPDFC ambulatory care survey assesses patient satisfaction with the most recent ambulatory care encounters within the previous 2 months along 10 domains (number of items): access (7), continuity of care (1), courtesy (2), emotional support (4), overall coordination of care (6), patient education (7), patient preferences (5), pharmacy (2), specialist care (4), and visit coordination of care (5) [14]. Overall satisfaction is comprised of four items. Items use various item-response formats, for example, some use a 5-point rating scale, from poor to excellent, whereas others ask for yes/no or yes, completely/yes, somewhat/no categorical responses. The items within each domain and their response options are shown in the online Appendix (Supplementary material). As per the standard scoring procedures, item-level responses are converted to 0/1 scores, with a score of 1 indicating a problem or dissatisfaction with a particular facet of care. The conversion of item-level scores to 0/1 scores followed VA standard scoring procedures. Within a subscale, scores are reported as the percentage of items within the domain for which a problem was indicated (corrected for the number of items answered). High scores mean worse satisfaction. Cronbach’s alpha coefficients for multi-item domains ranged from the mid-0.50s to the mid-0.80s. The NPDFC instrument had a Flesch Reading Ease score of 76.6 (indicating ‘easy’ or grade-school level) and a Flesch-Kincaid Grade level of score of 6. Half of the participants were randomly assigned to receive an illustrated version of the NPDFC [15]. Psychometric analyses indicated that the illustrated and standard print forms were equivalent within high and low literacy group. Across the four illustrated and standard print high and low literacy subgroups the amount of missing/illogical data averaged just over 4 (of 62) items and Cronbach’s alpha coefficients for multi-item subscales were equivalent, as were domain scores within literacy level (P > 0.05).

The Charlson Index [16] is the most extensively studied comorbidity index [17]. It weights the presence or absence of 19 diseases and conditions. We used a version adapted for self-administration [18]. The questionnaire version was tested in both a self-administered and an interviewer-administered format. Both formats gave similar results and were very close to those obtained in the usual chart review process. Although the Charlson Index was initially derived as a prognostic measure to study comorbidity in in-patients, it has been used to evaluate chronic disease in outpatients [19].
Data were analyzed with SAS v8.2 (Copyright © 1999–2001 by SAS Institute Inc., Cary, NC, USA). Firstly, 11 ordinary least squares regression models modeled the relationship between the satisfaction domains and health literacy. Then, the models were rerun to examine the relative importance of health literacy in predicting each satisfaction scores, although adjusting for demographic characteristics (gender, age, race, and education) and clinic site. All independent variables were included in the model with the full observed score range. The adjusted regressions were rerun with the smaller sample of patients who had provided comorbidities (e.g. Charlson scores) to adjust for the potential confounding effect of health on satisfaction. The results in all sets of regressions with and without comorbidities were nearly identical. The regression results with comorbidity in the model are presented.

### Results

A total of 1709 patients participated in the study. We excluded the 181 patients (11%) who self-identified as other than African American or Caucasian (<1% American Indian, 1% Asian, 2% Hispanic, and 7% ‘Other’) to add clarity to our analyses regarding race. Two-thirds (67%) of the patients were African American. Four percent had less than an eighth grade education, 10% had some high school, 37% reported a high school diploma or GED, 31% had some post high school education, and 19% had graduated from college. The average age was 53 years (SD = 14.3 years). Nearly 7 in 10 (68%) were recruited from the VAMC, and 69% were men. Very few patients were at the lowest health literacy levels: 2% (n = 27) were at third grade or less, 7% (n = 109) were at the fourth to sixth grade level; 32% (n = 491) were at the seventh to eighth grade level, and 59% (n = 893) were at the high school level. The correlation between education and health literacy was 0.37. Of the 786 who completed the comorbidity scores by about 4 points on the 0–100 scale, 66% (n = 519) reported 0 comorbidities.

Table 1 reports means for each dissatisfaction domain by literacy level, combining the lowest two levels. In five domains, the differences were significant between the lowest and the highest literacy levels: access, courtesy, patient preferences, emotional support, and patient education. In specialist care and overall coordination, the means were in the expected order. Table 2 summarizes the unadjusted and adjusted regressions with the dissatisfaction subscale scores as the dependent variables. In the simple models, lower literacy was an independent predictor of worse scores in 7 of the 10 domains but not overall dissatisfaction. The exceptions were continuity of care (P = 0.52), pharmacy access (P = 0.36), and visit coordination (P = 0.84). In the adjusted models, each increase in literacy level remained a significant predictor of access, decreasing the scores by about 4 points on the 0–100 scale (P = 0.01), courtesy, decreasing the scores by about 3 points (P = 0.02), emotional support, decreasing the scores by about 6 points (P = <0.0001), overall coordination, decreasing the scores by about 4 points (P = 0.02), patient education, decreasing the scores by about 4 points (P = 0.02), and specialist care, decreasing the scores by about 3 points (P = 0.01). Health literacy did not predict overall dissatisfaction (P = 0.55).

### Discussion

It is well recognized that patient satisfaction is an important marker of quality of care [1,2]. Health literacy has emerged as a focal variable in models that seek to explain differences in

<table>
<thead>
<tr>
<th>Table 1 Mean dissatisfaction scores by literacy level1</th>
</tr>
</thead>
</table>
| REALM levels 1 and 2 
(n = 136) [mean (SD)] | REALM level 3 
(n = 491) [mean (SD)] | REALM level 4 
(n = 893) [mean (SD)] | P |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>38.0 (23.3)a</td>
<td>36.6 (28.1)a</td>
<td>29.9 (26.3)b</td>
</tr>
<tr>
<td>Continuity of care</td>
<td>18.9 (39.1)</td>
<td>21.4 (41.1)</td>
<td>22.1 (41.5)</td>
</tr>
<tr>
<td>Courtesy</td>
<td>17.2 (31.3)a</td>
<td>17.1 (32.5)a</td>
<td>11.9 (26.4)b</td>
</tr>
<tr>
<td>Emotional support</td>
<td>31.0 (31.0)a</td>
<td>27.6 (32.5)a</td>
<td>19.2 (29.1)b</td>
</tr>
<tr>
<td>Overall coordination</td>
<td>33.4 (30.7)a</td>
<td>28.0 (30.1)b</td>
<td>26.9 (30.7)b</td>
</tr>
<tr>
<td>Patient education</td>
<td>27.8 (31.9)</td>
<td>25.9 (33.2)</td>
<td>22.4 (29.8)</td>
</tr>
<tr>
<td>Patient preferences</td>
<td>21.6 (24.6)</td>
<td>21.4 (28.8)</td>
<td>17.9 (25.6)</td>
</tr>
<tr>
<td>Pharmacy access</td>
<td>17.5 (19.5)</td>
<td>18.1 (19.9)</td>
<td>16.5 (20.4)</td>
</tr>
<tr>
<td>Specialist care</td>
<td>26.5 (29.3)a</td>
<td>22.8 (26.0)</td>
<td>20.8 (27.2)b</td>
</tr>
<tr>
<td>Visit coordination</td>
<td>14.8 (23.2)</td>
<td>15.5 (24.2)</td>
<td>14.8 (23.2)</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>46.8 (38.9)</td>
<td>50.6 (40.6)</td>
<td>45.3 (40.9)</td>
</tr>
</tbody>
</table>

REALM, Rapid Estimate of Adult Literacy in Medicine.
REALM levels: 1, third grade or less; 2, fourth to sixth grade; 3, seventh to eighth grade; 4, high school level.

a,bIndicate group means that are significantly different from one another with the Duncan’s post hoc test.

1Higher scores on the National Performance Data Feedback Center (NPDFC) ambulatory care survey indicate worse satisfaction. Scores are on a scale from 0 to 100.
health care processes and outcomes [4]. The unique contribution of this study is that both constructs—health literacy and patient satisfaction—were studied in a large sample of primary care patients in two health systems. Two primary conclusions are apparent. Firstly, when looking at just literacy and satisfaction, health literacy appears to be associated with multiple domains of satisfaction. Secondly, when adjusting for patient demographic characteristics, health system and comorbidity, the relationships were maintained. Overall, low health literacy is a weak negative predictor of patient satisfaction in this urban, largely male sample drawn primarily from a Veterans Affairs Medical Center.

On one hand, this study offers a unique contribution to the literature in terms of being one of the only studies explicitly examining health literacy and multiple domains of satisfaction. On the other hand, the relatively weak magnitude of the coefficients raises questions regarding how/if health literacy is related to patient satisfaction. There were plenty of reasons to think that the two constructs would be strongly related. Literacy is related to communication and understanding [8,9], which are consistently included in definitions of satisfaction. Many studies have shown direct associations between literacy and various health markers (e.g. knowledge, prevention utilization, and hospitalizations) [4] and between literacy and demographics [20,21]. Moreover, demographics are related to satisfaction [22–27]. Why then were the observed relationships not stronger? Perhaps the conceptual model is in error. Maybe there is something about patient satisfaction as an outcome that is different than other health outcomes. Alternatives would be to question the methodology. Admittedly, we used the REALM which is a task of pronunciation/recognition more than comprehension. However, as noted earlier, many other studies have documented the strong psychometrics of this instrument [11–13]. Perhaps our sample was unusual. It was mainly men with very few scoring at the lowest levels of health literacy. The restriction of range may have played a role in the results. Alternatively, it may be that with our large sample and assessment of numerous demographics simultaneously, we were better able to capture those variables with the strongest relationships to satisfaction. However, the coefficients in the adjusted models were not too different from those in the simple models. Future studies are needed to better explore and explain the relationships between literacy and satisfaction.

Generalizability and causal inferences are limited. This was a cross-sectional sample from one urban area, albeit a large sample from two health systems. Because patients were waiting for an appointment, we may have excluded the least satisfied patients, those who do not attend clinic, as well as the presumably more satisfied patients, those who are taken quickly to an examination room. Moreover, the identity of the physicians was not captured precluding the ability to look at potential physician clustering effects. Most importantly, satisfaction data are based on patients’ perceptions of care processes, not metrics of actual quality of care. Despite these limitations, our results are among the first to explore whether health literacy predicts patient satisfaction. The results are mixed news for those who use patient satisfaction as a marker of quality. They suggest literacy does have a consistent though weak association with satisfaction scores. However, associations are in domains that are amenable to change on provider (e.g. courtesy and emotional support) and system levels (e.g. access and specialist care), opening the door for multiple intervention opportunities.

Acknowledgements

This research was supported by grant number PCC-98-071-1 from the Veterans Affairs Health Services Research and Development Office. An earlier version of this article was presented at the Fourth Annual National Minority Health Leadership Summit, Pittsburgh, January 2004.
Supplementary material

Supplementary data are available at http://intqhc.oxfordjournals.org/.

References


Accepted for publication 26 November 2006