The Test of Functional Health Literacy in Adults: A New Instrument for Measuring Patients' Literacy Skills

Ruth M. Parker, MD, David W. Baker, MD, MPH, Mark V. Williams, MD, Joanne R. Nurss, PhD

OBJECTIVE: To develop a valid, reliable instrument to measure the functional health literacy of patients.

DESIGN: The Test of Functional Health Literacy in Adults (TOFHLA) was developed using actual hospital materials. The TOFHLA consists of a 50-item reading comprehension and 17-item numerical ability test, taking up to 22 minutes to administer. The TOFHLA, the Wide Range Achievement Test—Revised (WRAT-R), and the Rapid Estimate of Adult Literacy in Medicine (REALM) were administered for comparison. A Spanish version was also developed (TOFHLA-S).

SETTING: Outpatient settings in two public teaching hospitals.

PATIENTS: 256 English- and 249 Spanish-speaking patients were approached. 78% of the English- and 82% of the Spanish-speaking patients gave informed consent, completed a demographic survey, and took the TOFHLA or TOFHLA-S.

RESULTS: The TOFHLA showed good correlation with the WRAT-R and the REALM (correlation coefficients 0.74 and 0.84, respectively). Only 52% of the English speakers completed more than 80% of the questions correctly. 15% of the patients could not read and interpret a prescription bottle with instructions to take one pill by mouth four times daily, 37% did not understand instructions to take a medication on an empty stomach, and 48% could not determine whether they were eligible for free care.

CONCLUSIONS: The TOFHLA is a valid, reliable indicator of patient ability to read health-related materials. Data suggest that a high proportion of patients cannot perform basic reading tasks. Additional work is needed to determine the prevalence of functional health illiteracy and its effect on the health care experience.

KEY WORDS: functional health literacy; literacy and health; health literacy measurement.


Iliteracy is a well-recognized national crisis. Results from the National Adult Literacy Survey, which became available September 1993, provide the most detailed portrait ever available of the condition of literacy in our country. The survey of 13,600 individuals found that 22% of adult Americans, some 40 to 44 million people, perform at the lowest skill level. One of four of these people reported physical, mental, or health conditions that keep them from participating fully in work, school, or housework. One fourth of those in the lowest reading level are immigrants whose native language is not English. The prevalence of low literacy is supported by data from the U.S. Census, which defines illiteracy as those having an eighth-grade education or less. Using that definition of illiteracy, 27 million Americans are illiterate; another 45 million are only marginally literate, meaning up to one of every three adult Americans is functionally illiterate. Functional literacy is the ability to use reading, writing, and computational skills at a level adequate to meet the needs of everyday life situations.

Basic skills in reading, writing, and “numeracy” are especially important in the health care setting, where patient participation in planning and implementing therapeutic regimens is critical for success. Patients need to be able to understand oral and written information about their medical conditions, follow written and numerical directions regarding their therapeutic regimens and diagnostic tests, ask pertinent questions of medical personnel, report prior conditions and treatment, and solve problems that arise during the course of their care. Adequate functional health literacy means being able to apply literacy skills to health-related materials such as prescriptions, appointment cards, medicine labels, and directions for home health care.

Little has been done to explore the impact of illit-
cracy on health care. Published studies indicate that the last grade completed in school is not a good indicator of reading ability4 and that a significant number of patients have difficulty reading discharge instructions.5-7 One study has shown illiteracy and poor health status to be independently associated.6 Studies of functional health literacy have been limited by the lack of an appropriate testing instrument. Literacy assessment tools such as the Wide Range Achievement Test—Revised (WRAT-R)9 can be used to assign a grade level, but interpreting results is problematic because grade level does not necessarily give an estimate of functional health literacy. The Rapid Estimate of Adult Literacy in Medicine (REALM), which uses only health-related words, has been used to identify a high proportion of indigent outpatients who had poor reading ability.10 The WRAT-R is not available in Spanish and the REALM is not valid in Spanish.11 Neither of these instruments tests the ability to read and understand numbers, referred to by literacy experts as numeracy, or quantitative literacy. Numeracy skills may be the most important element for functional health literacy. To better understand functional health literacy, we developed the Test of Functional Health Literacy in Adults (TOFHLA). The TOFHLA tests a patient's ability to read passages (TOFHLA: Reading Comprehension) and phrases containing numbers (TOFHLA: Numeracy) using real materials from the health care setting. This paper describes how the TOFHLA was developed and the results of initial tests.*

**METHODS**

For test development, a literacy expert reviewed more than 30 examples of commonly used hospital texts, including patient education materials, instructions for diagnostic tests, prescription bottle labels and instructions, and patient registration forms. The TOFHLA was developed from a sample of these items that were believed to be widely used and of varying difficulties. The test consists of two parts: Reading Comprehension and Numeracy. The Reading Comprehension section is a 50-item test using the modified Cloze procedure12; that is, every fifth to seventh word in a passage is omitted. The reader selects from four possible choices, one of which is correct and three of which are similar but grammatically or contextually incorrect. Passages were selected from instructions for preparation for an upper gastrointestinal series, the patient rights and responsibilities section of a Medicaid application form, and a standard hospital informed consent form. The readability levels of the passages on the Gunning Fog index13 are grades 4.3, 10.4, and 19.5, respectively.

The Numeracy section is a 17-item test using actual hospital forms and labeled prescription vials. It tests a patient's ability to comprehend directions for taking medicines, monitoring blood glucose, keeping clinic appointments, and obtaining financial assistance. Patients are presented with cue cards or labeled prescription bottles and asked to respond to oral questions regarding information about the cards or bottles. The overall readability level of the numeracy prompts on the Gunning Fog index is grade 9.4. The numeracy score is multiplied by 2.941 to create a score from 0 to 50, the same range as that for the reading comprehension scores. The sum of the reading comprehension and the weighted numeracy scores yields the TOFHLA score, which ranges from 0 to 100 and has equal contributions from the two sections.

Item difficulties (p-values and biserial correlations) for each TOFHLA response were calculated based on the responses from the test population. Items were selected to obtain a median difficulty of 72% for reading comprehension and 64% for numeracy. One distractor (an option that is an incorrect answer) was changed for three reading comprehension items and six numeracy items were dropped for the final edition. One numeracy item asked the respondent to choose which of four spoons represented a tablespoon, needed for proper dosing of antacids. Eighty-eight percent of the patients could not correctly answer this question, which was then omitted in the final version of TOFHLA.

To develop a Spanish version of TOFHLA, or TOFHLA-S, the reading comprehension passages and numeracy questions were translated into Spanish and backtranslated into English. Discrepancies were corrected using the consensus of several bilingual staff members and a Spanish literacy expert. The Cloze procedure was then performed on each reading passage to achieve difficulty comparable to that of the English passage instead of using the same word deletions and response options as the English version had.

For test development, pilot studies were conducted at Grady Memorial Hospital and Harbor—UCLA Medical Center in early 1993. Grady Memorial Hospital is an approximately 1,000-bed public hospital in Atlanta, Georgia. The vast majority of patients are African American indigent residents of Dekalb and Fulton Counties. The nonappointment acute care clinics are the site of more than 320,000 patient visits yearly. A convenience sample of 256 patients presenting for acute care to the medical walk-in clinic and emergency care center were asked by two trained research assistants to participate in the test development study. Eleven percent were excluded due to preestablished criteria, which included age less than 18 years, smell of alcohol on the breath, unintelligible speech, English as a second language, overt psychiatric illness, police custody, illness so severe

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*The TOFHLA is copyrighted and is available upon request from: Joanne R. Nurss, PhD, Director, Center for the Study of Adult Literacy, Georgia State University, 1 University Plaza, Atlanta, GA, 30303-3083.