# BRIEF REPORT

# A Shortened Instrument for Literacy Screening

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The Rapid Estimate of Adult Literacy in Medicine (REALM-R), a new 8-item instrument designed to rapidly screen patients for potential health literacy problems, was administered to 157 patients. The REALM-R was correlated with Wide Range Achievement Test-Revised (WRAT-R) (.64) and demonstrated a Cronbach's α of 0.91. The REALM-R identified 26 of 30 persons scoring more than 1 standard deviation below the mean on the WRAT-R, corresponding to a sixth grade reading level. The REALM-R identified a substantial number of people who scored poorly on the WRAT-R, and depending on further studies of validity and reliability, may offer a practical approach to identify patients at risk for health literacy problems in a clinical setting.

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The 1992 National Adult Literacy Survey found that approximately 25% of Americans are functionally illiterate and another fourth of Americans have equivocal literacy skills.[1] Poor literacy skills have been associated with a lack of knowledge about a disease process and poor self-management skills in patients with chronic disease.[2,3] Furthermore, marginal functional literacy has been associated with poorer physical health, psychological health, and higher health care costs.[4–6] The implication for physicians is that at least one-fourth of our patients may not be able to discern prescription bottles, understand patient education materials, or use written directions to find a lab or get a mammogram.

Identifying patients with potential literacy problems is important if physicians are to attempt to combat the adverse effects literacy has on health care. Because many illiterate patients will attempt to hide this disability from their physicians and because people with more schooling may still be functionally illiterate, physicians cannot merely ask a patient if they can read or what their educational achievement is.[1,7–9] Multiple instruments have been developed to assess literacy based on word recognition[10–13] and comprehension,[14,15] but length of time to administer these tests to individual patients makes them impractical in busy clinical settings.

The Wide Range Achievement Test-Revised[13] (WRAT-R) and the Rapid Estimate of Adult Literacy in Medicine[12] (REALM) are the two most commonly used word recognition tests in the medical setting.[16] The WRAT-R is a 57-item test which requires the participant to pronounce both letters and words. While the response burden for the instrument is reported as 3 to 5 minutes,[17] we found that response time was greater than 8 minutes during pilot testing for this project. The REALM is a 66-item word recognition test of common medical terms assigning grade range estimates based on the total score.[12] While the response burden of the instrument has been reported as 2 to 3 minutes,[17] we found the response burden to be 5 to 6 minutes in a busy clinical practice setting. Both tests identify patients who may have difficulty reading patient education materials[17] and communicating orally with their provider.[16] A MEDLINE search attempting to identify a shorter literacy screening instrument was unsuccessful.

We designed the Rapid Estimate of Adult Literacy in Medicine-Revised (REALM-R), a shortened version of the REALM. The REALM-R was designed as a rapid-screening instrument to assess how well primary care patients read words that they commonly experience and are expected to understand in the course of interacting with their physician. This pilot study was conducted to determine whether the REALM-R could be used as a screening instrument to identify patients with potential literacy problems.

## METHODS

We set out to revise the REALM, a well-validated and reliable instrument, but one that is still too long to practically administer in busy clinical settings. The 66-item REALM was administered to 50 patients in the Internal Medicine Clinic at the University of Kentucky. We examined 2 item characteristics of the 66 words from the full scale REALM. First, we identified items with an item-whole correlation of greater than 0.40, and then selected those that maximized discrimination by being as close as possible to a 50/50 correct/incorrect split. The new 8-item REALM-R demonstrated a Cronbach's α of 0.91. The part whole correlation between the REALM-R and the REALM was 0.72.

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Based on interviewers' reports, we also decided to eliminate words with explicit sexual overtones, such as incest, even though they met the first 2 characteristics. The interviewers perceived that some respondents were reluctant to say these words aloud and felt this was a likely source of bias unrelated to literacy. We then discussed the applicability and face validity of the remaining words with 3 primary care physicians to make a final selection of 8 words that could be easily administered in less than a minute. "Fat," "flu," and "pill" were not scored as part of our test, but were left at the beginning of the REALM-R to decrease test anxiety and enhance patient confidence. The words chosen for the REALM-R were: "osteoporosis," "allergic," "jaundice," "anemia" "fatigue," "directed," "colitis," and "constipation." A correct response is given if the word is pronounced correctly.

For this pilot study, we wished to investigate how the reduced item REALM-R correlated with a well-studied word recognition test in health literacy, the WRAT-R. The WRAT-R is a dual form, nationally standardized test consisting of 57 items with extensive validity and reliability testing.[16] Scores on the WRAT-R have been correlated with the Total Reading score of the Stanford achievement test and the California Test of Basic Skills, 0.87 and 0.72, respectively.

Subjects recruited to participate in the study were a convenience sample of patients presenting to the group practice of the General Internal Medicine Clinic at the University of Kentucky over an 8-week period during June and July 2000. The University IRB approved this research.

The Statistical Analysis System was used for the data analysis. The raw scores for each of the 157 patients who completed both the REALM-R and the WRAT-R were computed and a Spearman rank coefficient was generated.

## RESULTS

Patients in our group practice come from a variety of backgrounds, ranging from the indigent to university professors. One hundred and fifty-seven patients agreed to complete both the REALM-R and WRAT-R and 3 patients refused to participate in the study. Patients ranged in age from 18 to 93 and 85% were white. Thirty-two percent of the respondents had not completed high school, 40.5% had received a high school degree, and 27.5% had received at least some college education. Fifty percent of patients had private insurance, 31% were Medicare patients, and 14% were Medicaid patients. The demographics of our convenience sample are similar to the demographics of patients in our clinic as a whole.

Scores on the REALM-R ranged from 0 to 8 with a mean and standard deviation (SD) of 6.8 and 2.1, respectively. Scores on the WRAT-R ranged from 14 to 56 with a mean and SD of 45.2 and 7.5. The average WRAT-R score corresponds to a 12th grade estimate of reading ability and 1 SD below the average corresponds to a 6th grade estimate. The Spearman rank correlation between the REALM-R and the WRAT-R was 0.64. Figure 1 graphically depicts
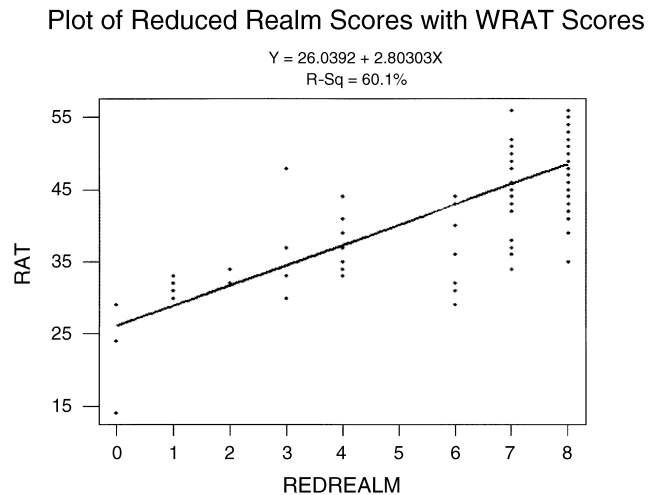


**Plot of Reduced Realm Scores with WRAT Scores**

$$Y = 26.0392 + 2.80303X$$
$$R\text{-Sq} = 60.1\%$$

**FIGURE 1.** Plot of reduced realm scores with WRAT scores.

the relationship of REALM-R and WRAT-R scores. A hypothetical score of 6 on the REALM-R identified 26 of 30 persons scoring more than 1 SD below the mean on the WRAT-R which, again, corresponded to a sixth grade reading level. People with a sixth grade reading level would have difficulty with comprehension of written and oral materials.[3,10] The REALM-R only identified 1 person scoring above the mean as having a potential literacy problem.

## DISCUSSION

The REALM-R substantially correlates with the WRAT-R in our clinic. Importantly, response burden for the new instrument, including explanation and delivery of the REALM-R, is less than 2 minutes. The REALM-R identified a significant number of people who scored poorly on the WRAT-R and only identified 1 person as having a literacy problem who actually scored above the mean on the WRAT-R, suggesting the ability to identify patients at risk for health literacy problems. Patients were very open to completing the survey with very little disruption in the flow of patient care. The improved efficiency of the REALM-R allows this instrument to be given easily in a busy clinic practice to screen for potential literacy problems, perhaps as a sixth vital sign.

While we chose 8 items for this instrument, additional words could be added and still keep administration time under 2 minutes. This would allow for the development of instruments with additions relevant to specific content areas, such as words used in diabetic education. This would be an efficient and useful development strategy for quick literacy screening relevant to a specific disease context.

Nevertheless, there are several limitations to our report. First, the convenience sample of patients from our clinic was fairly well educated (68% mean HS graduates and mean REALM-R 6.8), so the findings should be interpreted accordingly. Second, the methodology of this pilot study does not allow one to assess the validity of the

REALM-R and should be the subject of future studies. Third, poor literacy skills are thought to disproportionately affect the elderly and minority populations, 2 populations underrepresented in our study.

In summary, the REALM-R appears to be a promising tool for the rapid assessment of health literacy in a busy clinical setting. The REALM-R correlated with the WRAT-R and significantly identified persons scoring poorly on the WRAT-R. Further study establishing the validity and reliability of the REALM-R is needed.

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