
Will patients agree to have their literacy skills assessed in clinical practice?

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Abstract

If health providers are aware of their patients' literacy skills, they can more appropriately tailor their communication with patients. Few providers, however, assess patient's literacy skills for fear of offending patients, but no research has ever determined if patients object to such assessments. Our objectives were to determine the percentage of patients seen for routine health care that would agree to undergo literacy assessment and if satisfaction of patients differs in practices that perform literacy assessments versus practices that do not. We randomized 20 private and public medical practices to an intervention group that implemented literacy assessments with the Newest Vital Sign and a control group that did not. For intervention practices, we noted the percentage of patients agreeing to undergo the assessment. For both intervention and control practices, we assessed patient satisfaction. Of 289 patients asked to undergo literacy assessment in the intervention practices, 284 (98.3%) agreed to do so, including 125 (46.1%) with low or possibly low literacy skills. There was no difference in

satisfaction between the intervention group and the control group. We conclude that patients are willing to undergo literacy assessments during routine office visits and performing such assessments does not decrease patient satisfaction.

Introduction

In 2005, the National Center for Education Statistics released the results of The National Assessment of Adult Literacy (NAAL) [1]. The key finding of the NAAL report was that between 40 and 50% of the American adult population has limited literacy skills. These individuals have difficulty reading and interpreting text and documents, as well as difficulty applying mathematical concepts.

According to a report from the Institute of Medicine [2], individuals with limited literacy skills generally also have limited health literacy—defined as a limited capacity to 'obtain, process and understand basic health information and services needed to make appropriate health decisions'. Limited health literacy has important implications for health education as individuals with limited health literacy have less knowledge about health issues [3–8], worse health status [9–13], higher rates of hospitalization [14, 15] and higher health care costs [16, 17] than individuals with adequate literacy skills—even after controlling and adjusting for confounding sociodemographic variables.

Limited literacy skills are prevalent in all segments of the population, and research has shown that physicians have difficulty identifying which

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of their patients has limited literacy [18–21]. Indeed, physicians consistently overestimate their patients’ ability to understand medical information and they often provide this information to patients in a level of complexity and sophistication that patients do not understand [2].

Several instruments are available to assess the literacy skills of patients in clinical settings [22–26]. Important features of these instruments are listed in Table I. Routine use of these instruments in clinical practice would permit health care providers to identify patients who have limited literacy skills, thus permitting the health care provider to tailor health messages and provide information at an appropriate level of complexity.

However, few health care providers use these instruments to assess literacy skills in routine clinical practice. There are many possible reasons for this, including limited time and lack of awareness that low literacy is common. A frequently cited reason, however, is that ‘patients do not want undergo literacy testing’—a reason based on studies indicating that patients do not want to reveal low literacy because of embarrassment and shame [27, 28].

The notions that patients are unwilling to undergo literacy assessment, or that performing such assessments might lead to lower patient satisfaction, have never been tested. It is possible that most patients would, in fact, be willing to undergo such an assessment if it were incorporated into the

Table I. *Some instruments for assessing literacy skills in clinical settings*

Instrument	Description	Available in		Minutes ^a	Comments
		English	Spanish		
Newest Vital Sign (NVS)	Patients review a nutrition label and answer six questions about the label.	Yes	Yes	3	Relatively new; not as well studied as other instruments. Clinically relevant, quick and available in English and Spanish.
Rapid Estimate of Adult Literacy in Medicine (REALM)	Word recognition list. Patients read list of 66 words and are scored on correct pronunciation.	Yes	No	2	Easy and quick to administer, but does not assess comprehension and only available in English.
Rapid Estimate of Adult Literacy in Medicine 7-second Screen (REALM-7)	Word recognition list based on full version of REALM. Patients read a list of seven words and are scored on correct pronunciation.	Yes	No	<1	
Test of functional health literacy in adults (full version)	Patients review medical documents such as appointment slips, prescriptions and test results and answer questions about them. Patients also fill in words that have been omitted from text about medical issues.	Yes	Yes	20	Assesses comprehension and available in English and Spanish. Suitable for research but too long for clinical use.
Short test of functional health literacy in adults	Patients fill in words that have been omitted from text about medical issues.	Yes	Yes	8	

^aTime for administration based on published reports.

routine of medical office visits and that such assessments would not decrease satisfaction. Indeed, clinicians commonly ask many questions that patients might perceive as embarrassing as, or even more embarrassing than, questions about literacy. Thus, there is no clear reason to believe that patients would not accept an assessment of their literacy skills.

The objectives of our study were 2-fold. The first objective was to offer a literacy assessment to a series of patients and determine the percentage of patients that agree to undergo the assessment. The second objective was to determine if there is a difference between the satisfaction of patients seeing providers in practices that perform literacy assessment versus those in practices that do not.

Methods

Study design

This was a controlled trial in which medical practices were randomized to one of two groups. In intervention group practices, a literacy assessment was added to the routine check-in procedures for patients making an office visit to the practice. The control group practices did not implement a literacy assessment. In the intervention group, we measured the percentage of patients willing to undergo the literacy assessment. We also assessed patient satisfaction in both groups.

Participants

Participants in both the intervention and control groups were patients of 20 different health care providers in South Florida. Ten of the providers were family physicians in private practices, all of which were affiliated with the University of Miami's South Florida Primary Care Practice-Based Research Network. The other 10 providers practiced in clinics operated by the Miami-Dade County Health Department. These health department practices included a women's health clinic, a refugee health assessment clinic, a tuberculosis control and prevention clinic and a sexually transmitted disease clinic. Providers included physicians, advanced

practice nurses, registered nurses and physician assistants.

The practices of these 20 providers were randomized with a computerized random number generator into intervention and control groups. Patients making visits to the practices of intervention group providers were asked to undergo a literacy assessment, while patients seeing providers in the control group were not asked to undergo a literacy assessment.

Each practice was asked to recruit ~30 patients. Patients were selected sequentially, one after another, on the days during which the study took place. Eligibility for the study required the patients to be adults (18 or older), able to converse meaningfully with clinic staff in either English or Spanish and presenting to the clinic for something other than an acute life-threatening emergency.

No compensation was provided to the patients, and the research protocol was approved by the institutional review boards of the University of Miami and the Florida Department of Health. All participants gave informed consent.

Literacy assessment

For patients in the intervention group, upon placement in an examination room and before seeing their health care provider, a nurse or health aide measured standard vital signs (blood pressure, pulse, weight, etc). The nurse or health aide also asked patients to undergo assessment with the Newest Vital Sign (NVS) literacy instrument and performed the assessment if the patient agreed. The NVS was administered in English or Spanish, depending on the patient's stated preference. No vision assessment was performed prior to administering the NVS, but the instrument is printed in large (14 point) type.

The NVS is an instrument for assessing the literacy skills of patients in clinical settings. The instrument is available in English and Spanish, and it can be administered to patients in 3 min [25]. The procedure for administering the NVS involves having patients view the information on a nutrition information label and then answer six questions about the content and interpretation of the label. The

questions assess the patient's ability to read and interpret text and numerical information contained in the label.

Scores vary from 0 to 6, with higher scores indicating higher degree of literacy. Most individuals with a score of 0–1 have limited literacy skills (sensitivity 72%, specificity 87%). Those with scores of 2–3 have a possibility of limited literacy (sensitivity 100%, specificity 64%). Virtually all individuals with scores 4–6 have adequate literacy skills. The internal consistency of the NVS is good (Cronbach $\alpha = 0.76$), as is the criterion validity ($r = 0.59$), in comparison to more complex literacy assessments. [25]

Reporting of literacy assessment

Providers were told that patients' literacy score would be rated from 0 to 6, with 6 indicating a higher degree of literacy and 0 indicating lower literacy. Each patient's NVS score was entered into the medical record next to the patient's other vital signs. Providers did not receive any specific instructions about what to do in response to NVS scores.

Patients were aware that the results of the NVS assessment would be provided to their health care provider. Patients were not, however, provided with their actual scores nor were they told whether they performed well or poor. They were simply thanked for their participation.

Patient satisfaction assessment

Patients in both the intervention and control groups were asked to complete the Art of Medicine Survey questionnaire (AMSQ) [29]. AMSQ has been widely used to assess patient satisfaction and has been adapted for use in a variety of settings [30]. It is one of many patient satisfaction assessment instruments based on the American Board of Internal Medicine's Patient Satisfaction Project (ABIMPSP) [31], which measures patients' satisfaction with their health provider's communication at the health care visit just completed. The instrument contains eight items, each scored with a nine-point Likert scale. The items ask patients to report on whether their health provider was courteous to them, under-

stood their problem, explained things well, used easy-to-understand words, listened, spent enough time and made them feel confident in the provider, plus a final question about overall satisfaction with the visit. AMSQ results are reported as a composite score. Validation studies of satisfaction surveys derived from the ABIMPSP report high levels of reliability (Cronbach's $\alpha = 0.98$). [32]

The AMSQ was administered orally by a nurse or medical assistant during the patient education session that immediately follows the patients' session with their health care provider. Providers knew that patients would be undergoing a patient satisfaction assessment, but they were unaware of the specific questions used in the AMSQ.

Demographics

Demographic information was collected from each patient who agreed to undergo literacy assessment. This information included age, gender, ethnic group and the language chosen by the patient for administration of the NVS. These demographic variables were chosen as possible 'signals' that particular population subgroups might have higher or lower rates of satisfaction as a result of the literacy assessment.

Data analysis

We first computed descriptive statistics for demographic data and NVS scores. Chi-square tests and *t*-tests were then conducted to determine if the control and intervention groups differed on demographic variables including gender, ethnicity, language of assessment and age. The significance level was set at 0.05. We calculated effect sizes for significant differences found on χ^2 tests using the phi and Cramer's *V* statistics.

For the intervention group, the total number of patients asked to undergo assessment with the NVS was recorded, and the percentage who agreed to do so was computed along with 95% confidence limits. We also computed the mean and standard deviation for composite AMSQ satisfaction scores for patients in both groups and calculated the reliability of AMSQ scores using Cronbach's alpha statistic.

We used analysis of covariance (ANCOVA) to assess differences in satisfaction, as measured by the composite AMSQ score, between the control and intervention groups. Although there has been controversy surrounding the use of analysis of variance and ANCOVA to analyze ordinal data, several studies suggest that it is appropriate to do so [33, 34]. In this study, ANCOVA was chosen over its non-parametric counterpart due to our large sample size and the familiarity, simplicity and robustness of ANCOVA. Based on results of the aforementioned preliminary analyses, which showed differences between the control and intervention groups for ethnicity, language of assessment and age, we used these variables in the ANCOVA to control for demographic differences between the two groups.

groups showed that patients in the intervention group were slightly younger (40.1 years versus 43.1 years, $t(572) = 2.19, P < 0.05$), less likely to speak Spanish (41.0% versus 65.7%, $\chi^2(1) = 35.2, P < 0.001$; $\phi = 0.248$) and less likely to report that they belonged to an ethnic group other than White (Hispanic or non-Hispanic) or African-American (19.1% versus 5.5%, $\chi^2(1) = 29.09, P < 0.0011$; Cramer's $V = 0.227$). There was no significant gender difference between the groups ($\chi^2(1) = 0.23, P > 0.05$).

Results

Demographics

There were 289 patients randomized to the intervention group and 303 to the control group. Demographic characteristics of these patients are shown in Table II. A comparison of demographic characteristics between the intervention and control

Health literacy

All 289 patients in the intervention group were asked to undergo assessment with the NVS. A total of 284 (98.3%) agreed to do so (95% confidence limits: 96.8%–99.8%).

Nearly half (46.1%) of these individuals had literacy skills that scored low or possibly low on the NVS; the remaining had adequate literacy skills (Table III). The percentage of patients with adequate literacy skills was higher in the private practice setting than in the health department clinics (62.7% versus 46.2%, $\chi^2(2) = 7.11, P < 0.05$; Cramer's $V = 0.162$), and it was higher among

Table II. Demographic characteristics of study participants

Characteristic	Intervention group			Control group		
	Private practices	Health department clinics	Total	Private practices	Health department clinics	Total
<i>n</i>	126	145	271 ^a	165	138	303
Age: mean years (SD)	50.0 (15.2)	31.5 (11.7)	40.1 (16.3)	50.2 (18.0)	34.7 (10.7)	43.1 (17.0)
Gender: number (%)						
Male	59 (46.8)	49 (33.8)	108 (39.9)	50 (30.3)	56 (40.6)	106 (35.0)
Female	67 (53.2)	96 (66.2)	163 (60.1)	115 (69.7)	82 (59.4)	197 (65.0)
Ethnic group: number (%)						
White ^b	99 (78.5)	96 (66.2)	195 (72.0)	86 (52.1)	116 (84.1)	202 (66.7)
African-American	22 (17.5)	39 (26.9)	61 (22.5)	29 (17.6)	14 (10.1)	43 (14.2)
Other	5 (4.0)	10 (6.9)	15 (5.5)	49 (30.3)	8 (5.8)	58 (19.1)
Primary language (%) ^c						
English	88 (69.8)	72 (49.7)	160 (59.0)	85 (51.5)	19 (13.8)	104 (34.3)
Spanish	38 (30.2)	73 (50.3)	111 (41.0)	68(48.5)	119 (86.2)	199 (65.7)

^aThere were 289 patients randomized to the intervention group, of whom 284 (98.3%) agreed to undergo literacy assessment. Thirteen of the 284 patients were excluded from analysis due to incomplete measures. ^bIncludes both Hispanic and non-Hispanic Whites. ^cThe language in which the patient opted to undergo literacy assessment.

patients who spoke English than among those who spoke Spanish (61.9% versus 42.3%, $\chi^2(1) = 10.62$, $P < 0.01$; Cramer's $V = 0.198$).

Patient satisfaction

AMSQ scores showed high reliability (Cronbach's $\alpha = 0.86$). The mean composite satisfaction score for the health department patients was 8.93 (SD = 0.23) in the intervention group and 8.82 (SD = 0.43) in the control group ($F = 2.13$, $P > 0.05$). For the private practice patients, the composite scores were 8.89 (SD = 0.24) in the intervention group and 8.87 (SD = 0.39) in the control group ($F = 0.68$, $P > 0.05$). ANCOVA, controlling for ethnicity, language of assessment and age, showed

that these composite satisfaction scores did not differ between the control and intervention groups in either the private practice or the public settings (Table IV).

Discussion

The key finding of this research was that >98% of patients seen in a variety of public and private medical practices, and including a substantial proportion of patients with limited literacy skills, were willing to undergo a literacy assessment in the course of routine clinical care. Only 1.7% of the 289 patients approached for literacy assessment declined to undergo the assessment. Furthermore,

Table III. Participants' scores on the NVS

		Score on NVS ^a		
		0–1	2–3	4–6
		Low literacy likely	Low literacy possible	Adequate literacy
	Number	Number (%)	Number (%)	Number (%)
English speakers	88	10 (11.3)	15 (17.0)	63 (71.7)
Spanish speakers	38	10 (26.3)	12 (31.6)	16 (42.1)
Total private	126	20 (15.9)	27 (21.4)	79 (62.7)
English speakers	72	15 (20.8)	21 (29.2)	36 (50.0)
Spanish speakers	73	19 (26.1)	23 (31.5)	31 (42.4)
Total public	145	34 (23.5)	44 (30.4)	67 (45.1)
Total all participants	271	54 (19.9)	71 (26.2)	146 (53.9)

^aScores on the NVS range from 0 to 6, with higher scores indicating better literacy skills. Scores 0–1 indicate low literacy is likely; scores 2–3 indicate a possibility of low literacy and scores 4–6 indicate adequate literacy skills.

Table IV. Analysis of covariance^a of composite scores on the AMSQ

Setting	Control group		Intervention group	
	<i>n</i>	Mean score (SD) ^b	<i>n</i>	Mean score (SD) ^b
Public (Health Department Clinics)	138	8.82 (0.43)	145	8.93 (0.23)
Private practice clinics	165	8.87 (0.39)	126	8.89 (0.24)

^aANOCOVA using ethnicity, language and age to control for differences between the control and intervention groups. Effect sizes not reported because F is not significant. ^bScores on the AMSQ can range from 0 to 9, with higher scores indicating higher degrees of satisfaction.

patient satisfaction in the practices that performed literacy testing was no different from that in practices that did not perform the assessment, and the similarity in satisfaction scores was irrespective of patients' age, gender, race, practice setting or language.

These findings are important because they argue against the supposition that patients are unwilling to have their literacy skills assessed in clinical practice because of embarrassment or shame or that performing literacy assessment might decrease patient satisfaction. Based on participation rates and satisfaction scores in this study, it appears that literacy assessment does not adversely influence patient satisfaction.

The findings in prior studies [27, 28] indicating that many people with limited literacy have not told others about their limited skills simply may not apply when direct inquiry about literacy skills is made by a health care provider in the course of routine medical care. As noted earlier, clinicians often ask patients about highly sensitive personal matters, such as those related to sexual behaviors or illicit drug use, and patients generally accept and answer such questions. Further study is needed to determine if patients view questions about literacy as more or less 'invasive' than questions about those other topics.

Limitations

There are several limitations to our study methods that should be considered when interpreting the results. First, our study was conducted in a localized geographic area and, therefore, the results cannot necessarily be generalized to other locales.

Second, our results are only applicable to literacy assessments performed with the NVS instrument. Other literacy assessment instruments (Table I) involve tasks that differ from those in the NVS. While the NVS involves interpreting information on a nutrition label, various other instruments require patients to perform other tasks such as reading and pronouncing words, filling in blanks where words have been omitted from sentences or answering questions about administration of medications. These other instruments also differ from the NVS in

their complexity and length. Research is needed to determine if patients respond differently to these other instruments than they did to the NVS. Research is also needed to determine if patients would be willing to undergo repeat assessments, with the NVS or other instruments, on different occasions in the same or in different medical practices and if such repeat assessments might alter patient satisfaction.

A third limitation is that we did not collect demographic information about the five patients who declined to undergo a literacy assessment. This makes it impossible to know if these patients had unique or identifiable characteristics that differentiated them from the 98% of patients who agreed. With only five 'decliners', however, it is not likely that statistical analyses could have identified meaningful differences between those who agreed and those who declined, even if demographic data had been collected.

A fourth limitation is that satisfaction scores in both groups were near the high end of the AMSQ scale. This 'ceiling effect' could have masked subtle differences in satisfaction that might have occurred as a result of literacy assessment.

A fifth limitation is that we did not measure whether the communication style of health providers changed or improved when they found a patient to have limited literacy skills. Further research is needed to determine if this occurs and if such changes result in improved outcomes for patients.

Yet another limitation is that patients with a long-term patient-provider relationship may be more willing to undergo literacy assessments than patients seeing a provider for the first time. We did not, however, measure whether the patients in this study were making first visits to a provider or if they had a long-term patient-provider relationship. Nonetheless, all practices had a mixture of new and established patients, and with virtually all (98%) patients agreeing to the assessment, one must conclude that the presence or absence of a long-term relationship does not materially affect acceptance of literacy assessment.

Finally, we did not collect information about the reason for visit, the specific provider seen during

visits or the needs of the patients during the visits. These factors can all influence patients' satisfaction and their willingness to undergo a variety of assessments, including literacy assessment. But again, with virtually all patients agreeing to the NVS assessment, it does not appear that these factors influence patients' acceptance of the assessment.

Conclusions

Numerous aids and guidelines are available to help health providers communicate more effectively with patients who have limited literacy skills [35–37]. The first step in getting providers to use these aids, however, is having them understand the prevalence of limited literacy skills among their patients. This understanding can be achieved by using a rapid literacy assessment instrument in clinical practices.

Based on the results of our study, patients do not object to undergoing such literacy assessments during office visits with health care providers. Further study is necessary to determine if such assessments influence provider–patient communication or health outcomes.

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Conflict of interest statement

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