



## Health literacy assessment and patient satisfaction in surgical practice<sup>☆</sup>

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### ABSTRACT

**Background:** Limited health literacy has been associated with poorer health outcomes and increased morbidity and mortality. Though caring for surgical patients requires communication about complex topics, there is limited literature on health literacy competency in this population. The objective of this study was to assess health literacy in an adult surgical outpatient clinic population, to explore potential determinants of adequate health literacy, and to assess patient satisfaction with physician-patient communication.

**Materials and methods:** A prospective cross-sectional study was performed and anonymous data including health literacy, demographics, and patient satisfaction with provider communication were collected. The study population included adult patients who visited an outpatient surgical practice over a one-month period. Health literacy was assessed using the Newest Vital Sign while the satisfaction questions came from the Outpatient Satisfaction Survey (Press-Ganey Associates, Chicago, IL).

**Results:** 148 patients participated in the study. The mean age was 49 years, 41% of those who gender identified were male, and 76% were White/Caucasian. 34 (27%) of those who answered the question had received a four-year undergraduate/university degree. 55 (37%) of the patients were identified as having low health literacy. More years of education was significantly associated with adequate health literacy and those patients who were more educated and had adequate health literacy were more satisfied with provider communication.

**Conclusion:** Patients on average were highly satisfied with provider communication in this outpatient surgical clinic. Higher education levels were associated with better health literacy and patients with both characteristics were more satisfied with provider communication.

## 1. Introduction

Health literacy refers to a person's ability to understand healthcare information and make appropriate clinical decisions. A critical report from the U.S. Department of Education National Center for Education Statistics in 2006 revealed that only about 12% of US adults had proficient health literacy to “obtain, process and understand the basic health information and services they need to make appropriate health decisions” while nearly half of US adults have difficulty interpreting and using health information [1]. Low health-literacy has been associated with inferior health outcomes, poorer use of health care services, and increased mortality [2–6]. Historically, physicians have been unsuccessful at recognizing their patients' health literacy status, which negatively impacts physician-patient communication. Problems with communication—which can involve all members of a health care team and patients—were cited as the most common cause of medical errors by the Agency for Healthcare Research and Quality (AHRQ) Patient

Safety Initiative Report, while patient-related issues, including patient education, was listed among the top five most common root causes of medical errors [7]. Studies have estimated that medical errors are the third most common cause of death in the United States, following heart disease and cancer [8]. There is a great need to reduce medical errors that may be attributed to poor physician-patient communication.

Though caring for surgical patients requires communication about complex topics, there is limited literature on health literacy competency in this population. The objective of this study was to assess health literacy in an adult surgical outpatient clinic population, to explore potential determinants of adequate health literacy, and to assess patient satisfaction with physician-patient communication.

## 2. Methods

This prospective cross-sectional study was approved by the Institutional Review Board of the Icahn School of Medicine at Mount

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**Table 1**  
Demographics.

	Overall (n = 148)	Inadequate Health Literacy (n = 55)	Adequate Health Literacy (n = 93)	p
<b>Age</b>				0.04
<b>Mean</b>	49.3	53.125	47.476	
18-64, No. (%)	103 (69.6)	31 (56.4)	72 (77.4)	
≥ 65, No. (%)	24 (16.2)	9 (16.4)	12 (12.9)	
Unanswered				
<b>Gender, No. (%)</b>				> 0.99
Male	61 (41.2)	15 (27.3)	46 (49.5)	
Unanswered				
<b>Race, No. (%)</b>				> 0.99
White/Caucasian	96 (64.9)	31 (56.4)	65 (69.9)	
Black/African American	22 (14.8)	11 (20.0)	11 (11.8)	
Asian/Pacific Islander	8 (5.4)	1 (1.8)	7 (7.5)	
Unanswered	21	11	10	
<b>Ethnicity, No. (%)</b>				> 0.99
Hispanic	32 (21.6)	18 (32.7)	14 (15.1)	
Unanswered	22	12	10	
<b>Education, No. (%)</b>				> 0.99
Did not complete high school	10 (6.8)	9 (16.4)	1 (1.1)	
High school diploma (or equivalent)	24 (16.2)	11 (20.0)	13 (14.0)	
Community college/two-year associate degree	29 (19.6)	14 (25.5)	15 (16.1)	
Four-year undergraduate college/university degree	34 (23.0)	7 (12.7)	27 (29.0)	
Graduate school degree	28 (18.9)	1 (1.8)	27 (29.0)	
Unanswered	23	13	10	

Sinai (IRB 17-0847) and determined to be exempt from federal human subjects research regulations. The study population included adult patients who visited Mount Sinai Beth Israel Surgical Associates over a one-month period in 2017. The most common conditions treated in this outpatient center include breast cancer, colon cancer, chronic cholecystitis, and abdominal wall hernia. Patients were excluded if they were younger than 18 years old or if they could not read or write English. Data were prospectively collected and analyzed through anonymous paper questionnaires that were included with the registration intake forms for every patient seen at the clinic site during the study period. Questionnaires included a health literacy assessment, Outpatient Satisfaction Survey (Press-Ganey Associates, Chicago, IL), and demographics. Physicians participating in this study were encouraged to ask their patients participating in the study to ask questions during the encounter.

Health literacy was assessed using the Newest Vital Sign (NVS), a six-question health literacy assessment tool based off reading a nutrition label [9]. Instructions for scoring the NVS categorize patients into three groups, depending on the total number of questions answered correctly. Scores of 0–1 indicate high likelihood of limited health literacy. Scores of 2–3 indicate possibility of limited health literacy. Scores of 4–6 indicate *adequate* health literacy. Original validation studies suggest that the sensitivity and specificity of a score of 0 or 1 for identifying individuals with limited literacy, using the Test of Functional Health Literacy in Adults (TOFHLA) as a reference standard, are 72% and 87%, respectively. The sensitivity and specificity of scores of 2 or 3 are 100% and 64%, respectively. Individuals with scores 4–6 likely have adequate health literacy skills [9].

Demographic data collected included patient age, gender, race, Hispanic/Latino ethnicity, and highest level of education achieved. Race was recorded as White/Caucasian, Black/African American, Asian/Pacific Islander, Native American/Alaskan, or other. Hispanic/Latino ethnicity included Puerto Rican, Dominican, Mexican/Chicano, or other. Highest level of education achieved was recorded as follows: did not complete high school, high school diploma or GED, community college or two-year associate degree, four-year undergraduate college or university degree, and graduate school degree (masters, MD, JD, PhD, etc.). Responses were recorded using a 5-point Likert scale [1–5].

Patient satisfaction focused on four specific questions derived from the Press-Ganey survey:

- Explanations the care provider gave you about your problem or condition
- Information the care provider gave you about medications (if any)
- Instructions the care provider gave you about follow-up care (if any)
- Degree to which care provider talked with you using words you could understand

Patient satisfaction responses were recorded on a 5-point Likert scale (1–5, response options were *very poor*, *poor*, *fair*, *good*, *very good*).

All statistical analyses were conducted using IBM SPSS Statistics version 19 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were used to analyze the demographic factors of patients who participated. Two-sample t tests were used to compare mean differences of demographic characteristics and satisfaction scores between the two health literacy groups (inadequate and adequate), for continuous variables (age). For categorical variables (gender, race, ethnicity, and education), Chi-square tests were used to compare frequencies between the two health literacy groups. A binary logistic regression was performed to identify factors associated with adequate health literacy. All statistical tests were two-sided and significance levels were set at 5%.

### 3. Results

A total of 148 patients out of a possible 697 participated in the study (21%). Those that did not participate opted out from taking this survey. The mean age was 49 years, 41% of those who gender identified were male, and 76% were White/Caucasian. 34 (27%) of those who answered the question had received a four-year undergraduate/university degree (Table 1). 55 (37%) of the patients were identified as having low health literacy based on their scores of a 0, 1, 2 or 3 on the NVS. There was no statistically significant difference between patients in the two health literacy groups based upon gender, race, ethnicity, and education level. Patients in the adequate health literacy group were younger than patients in the inadequate health literacy group (48 years old vs. 53 years old,  $p = 0.04$ ).

Overall, the average health literacy score was 3.8 with a median of 4. Of the 148 total participants, 55 (37%) scored 0, 1, 2, or 3 on the NVS, which placed them in the inadequate health literacy group, and 93 (63%) of participants scored 4, 5, or 6 on the NVS, which placed them in the adequate health literacy group (Table 2). The difference in average health literacy scores of the inadequate and adequate groups

**Table 2**  
Health literacy and satisfaction scores.

	Overall (n = 148)	Inadequate Health Literacy (n = 55)	Adequate Health Literacy (n = 93)	p
Total Health Literacy Score				P < 0.001
Mean	3.8	1.45	5.25	
Explanations the care provider gave you about your problem or condition				0.0006
Mean	4.69	4.45	4.81	
Information the care provider gave you about medications (if any)				0.002
Mean	4.61	4.37	4.76	
Instructions the care provider gave you about follow-up care (if any)				0.003
Mean	4.65	4.40	4.78	
Degree to which care provider talked with you using words you could understand				0.002
Mean	4.77	4.58	4.88	

was statistically significant (1.45 in the inadequate group vs. 5.25 in the adequate group,  $p < 0.001$ ).

ANOVA analysis revealed no significant difference in total health literacy score when respondents were separated by age, race, or ethnicity. Binary logistic regression revealed that increasing education level was significantly associated with adequate health literacy, with those acquiring a graduate school degree 130 times more likely to have adequate health literacy  $p = 0.001$ . Age, gender, race, and ethnicity were not significantly associated with adequate health literacy.

The average satisfaction score was 4.69 for explanations the care provider gave about the problem or condition, 4.61 for information the care provider gave about medications (if any), 4.65 for instructions the care provider gave about follow-up care (if any), and 4.77 for degree to which care provider talked using understandable language. The median score for all four questions was 5. Patients in the adequate health literacy group gave higher satisfaction scores than patients in the inadequate health literacy group for each of the four survey questions, and the satisfaction score difference was statistically significant across all four questions (Table 2). There was also a statistically significant difference in satisfaction scores when patients were categorized by education level: patients who had received a four-year undergraduate college/university degree or more education gave higher satisfaction scores than patients who had received education up to the community college/two-year associate degree level for each of the four survey questions (Table 3).

There was no significant difference in level of satisfaction with the degree to which providers used words that they could understand or explanations the care provider gave about the problem or condition when responses were analyzed by age, race, and ethnicity. There was a significant difference in level of satisfaction with the information that the care provider gave about medications when responses were analyzed by race with Asian/Pacific Islanders giving higher satisfaction scores than White/Caucasians (average of 5 vs. average of 4.64, respectively,  $p < 0.001$ ).

**Table 3**  
Education level and satisfaction scores.

	Overall (n = 148)	Community college/ two-year associate degree and below (n = 63)	Four-year undergraduate college/ university degree or above (n = 62)	P
Explanations the care provider gave you about your problem or condition				0.007
Mean	4.69	4.56	4.80	
Information the care provider gave you about medications (if any)				0.002
Mean	4.61	4.44	4.80	
Instructions the care provider gave you about follow-up care (if any)				0.003
Mean	4.65	4.50	4.80	
Degree to which care provider talked with you using words you could understand				0.004
Mean	4.77	4.62	4.88	

#### 4. Discussion

Health literacy is the ability to read, comprehend, and use health information to make informed healthcare decisions [1,10]. The Newest Vital Sign (NVS) is a validated health literacy assessment tool that can be used to determine patient health literacy [9]. Several studies have used the NVS as a self-administered questionnaire (SAQ) in the primary care setting, but few have looked at using the NVS as a SAQ in an outpatient surgical setting. The present study demonstrates that it was possible to integrate a health-literacy screening questionnaire into the outpatient surgical setting if made a routine part of the patient check-in process. This is the first study to assess both patient health literacy in an objective manner as well as patient satisfaction with provider communication during a single visit. The 21% participation rate is notably lower than what was reported in another study that assessed health literacy via the NVS in a breast surgery clinic [11], and this may be partially explained by the fact that objective assessments can cause patients to feel stigmatized because they feel they are being tested thus discouraging participation [12].

The findings regarding sociodemographic predictors of adequate health literacy are similar to what has been reported elsewhere in the literature, with younger age and increasing level of education being highly associated with adequate health literacy [11]. Patients with adequate health literacy and those who had received at least a four-year undergraduate degree were more satisfied with provider communication. Though education and health literacy are interrelated, they are two distinct entities, and more years of education does not necessarily directly lead to increased health literacy [13]. These results support the findings of another study that found patients with subjective low health literacy were less satisfied with information provision [14]; however, this study assessed health literacy subjectively, using a questionnaire that asked patients about their perceived confidence in filling out medical forms versus objectively measuring patient skills in reading comprehension and arithmetic, both of which are encompassed in the NVS health literacy assessment. Overall, patient satisfaction scores were high, with half the patients reporting the maximum satisfaction score for all four post-visit satisfaction questions.

Certain limitations must be addressed in this study. The low participation rate at a single-institution in addition to participation bias limit the applicability of these results to a larger population. Additionally, though the NVS is available in Spanish, only the English version was used in this study. As such, the results do not include a large proportion of the population that is non-Native English speakers. Finally, the low number of patients of different races—only five Asian/Pacific Islanders participated—limited statistical power of analyses by race. This study was conducted at one of several outpatient surgery centers and future studies may address the low participation rate and single-institution nature of the study by surveying multiple outpatient surgery centers within the system located throughout a large urban center, which may offer a more representative population. The duration of physician/patient interactions was not recorded and this might have had an impact on the results.

There are a few simple ways physicians can improve their communication with patients of all health literacy levels. It is recommended that physicians assume all patients need and want easily comprehensible explanations, and this can be accomplished by using plain language alternatives to medical terms, focusing on communicating two or three key messages, speaking slowly, and using teach-back [15]. Additionally, any provided written materials should be easy to understand. Regardless of health literacy level, research has shown that patients prefer written materials in concise, simple language [16]. It is suggested that health materials for patients be written at the sixth-grade reading level [17]. Adopting just a few of these suggestions can enhance provider communication.

The study results suggest that it is feasible to assess health literacy in an outpatient surgical setting using the NVS as a SAQ. The findings on

patient satisfaction suggest that patients on average were highly satisfied with provider communication in this outpatient surgical clinic. Higher education levels were associated with better health literacy and patients with both characteristics were more satisfied with provider communication. Physicians are encouraged to modify their verbal and written communication to effectively communicate with patients of all health literacy levels.

#### Provenance and peer review

Not commissioned, peer reviewed.

#### Ethical approval

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#### Author contribution

Study design: Yim Leitman, Barnett.

Data Acquisition: Yim, Leitman.

Manuscript preparation: Yim, Leitman, Barnett, Shumate.

Critical revision of manuscript: Yim, Leitman, Barnett, Shumate.

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#### Conflicts of interest

None.

#### Trial registry number

N/A.

#### Guarantor

Michael Leitman, MD.

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