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# Health literacy among adults: a study from Turkey

H. Ozdemir, Z. Alper, Y. Uncu and N. Bilgel\*

Department of Family Medicine, Uludag University Faculty of Medicine, 16059 Bursa, Turkey

\*Correspondence to: N. Bilgel. E-mail: nazan@uludag.edu.tr

Received on May 22, 2009; revised for publication November 5, 2009; accepted on December 7, 2009

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## Abstract

Patients' health literacy is increasingly recognized as a critical factor affecting health communication and outcomes. We performed this study to assess the levels of health literacy by using Rapid Estimate of Adult Literacy in Medicine (REALM) and Newest Vital Sign (NVS) instruments. Patients ( $n = 456$ ) at a family medicine clinic completed in-person interviews, REALM and NVS tests which were translated into the Turkish language by translation-back translation process. Additional questions regarding demographic characteristics were also collected. The mean scores (mean  $\pm$  standard error) for REALM and NVS were  $60.29 \pm 0.32$  and  $2.60 \pm 0.08$ , respectively. The REALM test scores showed that 2.7% had inadequate (less than or equal to 6th grade), 38.6% marginal (7th to 8th grade) and 58.7% (greater than or equal to 9th grade) adequate health literacy. The NVS test score revealed a proportion of 28.1% had adequate health literacy. Educational attainment was the most important demographic characteristic found to be related to the health literacy. Reading and vocabulary skills were better than numerical capabilities. Female, primary school educated and poor economic condition participants and those who were older had the lowest scores in both the tests.

## Introduction

Health literacy is a concept that is both new and old. The term of health literacy has been used in health literature for at least 30 years [1]. There are various definitions of health literacy in the literature, all with similarities. One of them is: 'The degree to which the individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions is called health literacy' [2–4]. This short and succinct approach follows the definition of literacy as used in the 1992 National Adult Literacy Survey in the United States, which defined literacy as 'using printed and written information to function in society' [5]. The authors defined functional health literacy as the ability to apply reading and numerical skills in a health care setting. These skills include the ability to

- (i) Read consent forms, medicine labels, inserts and other health care information;
- (ii) Understand written and oral information given by health care personnel;
- (iii) Act upon necessary procedures and directions such as medication and appointment schedules.

In the World Health Organization (WHO) [6] health promotion glossary, health literacy is defined as 'the cognitive and social skills which determine the motivation ability of individuals to gain access to understand and use information in ways which promote and maintain good health'. According to the WHO, health literacy implies the achievement of a level of knowledge, personal skills and

confidence to take action to improve personal and community health by changing personal lifestyles and living conditions. Thus, health literacy means more than being able to read pamphlets and make appointments. According to the Committee on Health Literacy of the Institute of Medicine: 'Health literacy is of concern to everyone involved in health promotion and protection, disease prevention and early screening, health care maintenance, and policy making. Health literacy skills are needed for dialogue and discussion, reading health information, interpreting charts, making decisions about participating in research studies, using medical tools for personal or family health care, calculating timing or dosage of medicine, or voting on health or environment issues' [4]. By improving people's access to health information, and their capacity to use it effectively, health literacy is critical to empowerment. Health literacy is itself dependent upon more general levels of literacy. Poor literacy can affect people's health directly by limiting their personal, social and cultural development, as well as hindering the development of health literacy itself.

In the United States, this term is used particularly to describe and explain the relationship between the patient's literacy levels and their ability to comply with prescriptions, appointment cards, drug labels and directions for health care [7].

These definitions present health literacy as a set of individual capacities that allow the person to acquire and use new information. Literacy may improve with educational programs or decline with aging or cognitive impairment [7]. Some researchers argue that if health literacy is the ability to function in the health care environment, it must be related to characteristics of both the individual and the health care system. From this perspective, health literacy is a dynamic state and may vary depending upon the health problem, the health care provider and the health system [8]. Some other researchers accept health knowledge as a part of health literacy. The Institute of Medicine expert panel divided the domain of health literacy into four categories [4]. They are listed below:

(i) Cultural and conceptual knowledge

- (ii) Oral literacy, including speaking and listening skills
- (iii) Print literacy, including writing and reading skills
- (iv) Numeracy

As is seen from the literature, there is no common definition for the term health literacy, and this fact raises a problem for measuring it because no one refers to the same underlying construct. If health literacy is accepted as only an individual's capacity, measuring a person's reading ability and vocabulary are appropriate. On the other hand, if health literacy is accepted as a relationship between an individual's communication capacities, the health care system and society, measuring only the individual capacities may not be adequate. If knowledge is a part of health literacy, this too must be measured.

However, today, health literacy is something that has a broader meaning and researchers are still debating on this issue and searching for new, appropriate, reliable and practical instruments for measuring and classifying health literacy in an objective manner.

Although health literacy is a complex and multifaceted construct, researchers have developed several instruments to assess health literacy [9–12]. Existing health literacy assessment tools and their relevance to examine health literacy onto the four categories of the Institute of Medicine's classification are listed below [4]:

- (i) Test of Functional Health Literacy in Adults (TOFHLA)—print literacy and numeracy
- (ii) Rapid Estimate of Adult Literacy in Medicine (REALM)—print literacy
- (iii) Health Activities Literacy Scale (HALS)—print literacy and numeracy
- (iv) Newest Vital Sign (NVS)—print literacy and numeracy

TOFHLA is a two-part test available in English and Spanish [9]. The first part provides participants

with medical information, instructions on a prescription label or instructions for a diagnostic procedure. Participants review the scenarios and then answer the questions. In the second part of the test, participants read the given text passages about medical topics with selected words deleted and replaced with blank spaces. Participants must fill in the blank spaces using words from a multiple-choice list. TOFHLA scores range from 0 to 100 with higher scores indicating better literacy. Scores <60 represent inadequate literacy. A short version of TOFHLA (S-TOFHLA) is also available. TOFHLA is the instrument most often used for the assessment of health literacy and has good psychometric properties, but the length of time for administration (18–22 min for full and 7–10 min for short version) precludes its use in busy primary care settings.

The REALM can be administered quickly (<5 min) and is available in English and Spanish [10]. It is a word recognition and pronunciation test composed of 66 medical terms arranged in order of pronunciation difficulty, starting with simple one-syllable words (e.g. pill and eye) and ending with multi-syllable words (e.g. antibiotics and potassium). While the participant reads down the list, the examiner scores the number of words that are pronounced correctly. For every correct word, one point is given. The sum of the points correspond to four categories of grade equivalent reading levels: 0–18 being less than or equal to 3rd grade; 19–44 being equal to 4th to 6th grade; 45–60 being equal to 7th to 8th grade and 61–66 being greater than or equal to 9th grade. Although the REALM and the TOFHLA are useful tools for the assessment of health literacy both in clinical and in community settings neither the REALM nor the TOFHLA is eligible for capturing the full complexity of the construct of health literacy. Both of them are measures of basic print literacy using health-related terms, some degree health-related texts, and TOFHLA also includes a measure of numeracy. However, health literacy includes more than word recognition, text comprehension and numeracy skills. A full set of skills and knowledge associated with health literacy, tasks that are not limited to the health care system and comprise a broad spectrum

of activities in a variety of contexts that are defined by the Institute of Medicine could not be assessed by measures of basic print literacy. Therefore, the results of REALM and TOFHLA must be interpreted cautiously [4].

The HALS test includes prose, quantitative and document items in five health-related areas [11]: health promotion, health protection, disease prevention, health care and maintenance and systems navigation. The full length of HALS yields a score from 0 to 500 in a five-point Likert scale and takes ~1 hour to complete. Despite its potential value for assessing health literacy in a broader term, the length of the HALS will prohibit its use in most research studies.

The NVS is a quick screening tool capable of reliably testing individuals for low health literacy [12]. It is available in English and Spanish. Participants extract information from an ice cream nutritional label and then are required to answer six questions interpreting the information from the label. For each correct answer, one point is given, and the sum of the points indicates the level of health literacy. A score of <4 indicates limited health literacy. The quantitative questions on the NVS require both reading comprehension and mathematical ability, and these abilities are directly correlated with understanding and managing basic health information.

There are several studies in Western literature that assessed health literacy by using REALM and NVS. An observational study involving face-to-face interviews with 1796 veterans who received primary care services at one of four large VA medical centers in the United States revealed that 4.2% of the participants had inadequate (less than or equal to 6th grade), 17.0% marginal (7th to 8th grade) and 78.4% adequate (greater than or equal to 9th grade) health literacy regarding REALM test scores [13]. Another survey among 992 adults aged 18–45 years showed 5% had a level of Grade 3 or below, 6.6% in the 4th through 6th grade range, 16.3% in the 7th through 8th grade range and 72.1% at the level of Grade 9 or higher [14]. In a study for measuring the preventability of hospital admission among 400 veterans, the health literacy levels were found to 6.8% in the

Grade 3 or below, 17.7% in the 4th through 6th grade range, 33.2% in the 7th through 8th grade range and 42.3% at the level of Grade 9 or higher [15]. A cross-sectional study involved 98 adults who identified themselves as the primary caregiver of preschool children found health literacy levels as follows: 0–3rd grade = 9.2%, 4–6th grade = 26.5%, 7–8th grade = 32.7% and  $\geq$ 9th grade = 31.6%) [16].

None of the existing measures of health literacy examines oral literacy and cultural and conceptual knowledge. Current assessment tools cannot differentiate among lack of background knowledge in health-related domains, lack of language and types of materials familiarity with cultural differences in approach to health and health care [4].

In their daily lives, adults are likely to face a broad range of health literacy tasks from reading an article about preventive health practices to selecting and buying an over-the-counter medication. As parents, they must manage their children's health care. Older adults must make decisions about prescription drug benefits. All these activities require the ability to read and understand written and printed information. Many studies have revealed that low health literacy is associated with poor health communication, health outcomes, increased hospitalization rates, less frequent screening for early detectable diseases such as cancer and disproportionately high morbidity and mortality rates [17–25].

From this perspective, health literacy is the ability to function in the health care environment; health literacy must apply not only to the individual characteristics but also to the health care system. It would therefore be useful to summarize the health delivery system and challenges to health faced in Turkey. The Ministry of Health (MoH) is the main government body responsible for policy making in the health sector and implementing national health strategies through programs and direct provision of health services [26, 27]. MoH is the unique provider of primary health care through an extensive network of health facilities (~5700 health centers and 26 000 health posts) [26]. Primary health care is universal and free of charge for everyone. With regard to the universal preventive care services, great achievements have been made in controlling com-

municable diseases and reducing infant and maternal deaths. Besides routine health educational activities, which are part of the primary health care system, many public health educational programs have been implemented through several campaigns, which were organized with the collaboration of international organizations. In summary, primary preventive health services in Turkey are well organized, accessible to everyone and effective. The public sector accounts for 92% of the hospital capacity in Turkey. MoH and the universities are the major public providers of inpatient hospital care [27].

In the year 2003, MoH launched the Health Transformation Program, which is aimed at developing universal health insurance coverage, implementation of family medicine at the primary level and giving more autonomy to hospitals [27]. Patients' rights, informing patients at every stage of their treatment and obtaining informed consent from patients, all these are new issues that have gained importance within the Health Transformation Program. Traditionally in Turkey, physicians are accepted as persons to whom the patients should obey; however, with the changes in the health system, with improvements in social, economic and cultural areas and with globalization, this traditional view has been changing, and patients now want to be part of the decisions regarding their health. Furthermore, within the health system patients become obligated to read, understand, fill out and sign many forms that they were not used to completing. Therefore, health literacy has become an important issue that was not previously in the agenda of health care providers.

Assessment of health literacy is a neglected area in Turkey, and research concerning this matter is very rare. Most of the published literature depends on knowledge about special health issues and health literacy is accepted as the equivalent of general literacy level. Our study may be the first one that has used the specific health literacy measures for the assessment.

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## Materials and methods

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This cross-sectional study was conducted in a suburban area of a metropolitan city in Turkey.

According to the last census, the total population of this area is ~41 373 (19 695 female).

The Family Medicine Clinic where the study was conducted serves as a primary health care unit and as a training facility for medical students and provides a wide range of protective and therapeutic primary health care services free of charge. Participants of the study were chosen among the 579 adult patients who had visited the clinic from 1 February 2008 to 1 April 2008. Patients who were illiterate (could not read and write) ( $N = 57$ ), those with previously known cognitive impairments ( $N = 23$ ) and who did not want to participate ( $N = 43$ ) were excluded. All the participants gave their consent for participation, and assessment of health literacy was performed after the examination in a different room with respect to the participant's privacy and anonymity.

### Study instruments

We used two different tests for assessment of health literacy: REALM and NVS. These tests were not available in Turkish; therefore, first we performed the translation and back translation process. A panel of two English teachers, one native Turkish and a native British with a knowledge of the Turkish language, translated both instruments from English into Turkish and then reversed the process and formed the Turkish version of the instrument. We used the same 66 medical terms in the original REALM instrument, but they were rearranged in order of pronunciation difficulty in the Turkish language, starting with simple one-syllable words (e.g. pill, dose, eye and flu) and ending with multisyllabic words (e.g. osteoporosis, antibiotics, potassium, obesity and depression). Both the study tests were administered by the same person (author H.O.) after giving the necessary directions. The directions for the REALM test were as follows: 'I want to learn what medical words you are familiar with. You should look at this list of words, beginning here with the first word on the list. Say all the words you know. If you come to a word you don't know or you cannot read, skip it and try the next one.' Words pronounced correctly and without any

deletions or additions to the beginning or ending of the word were counted. Dictionary pronunciation was accepted as the scoring standard if a doubt occurred. The scoring was performed by the examiner at the same time of the reading process. After the REALM test, the NVS test was administered. A laminated copy of the nutrition label of an ice cream container was given to the patient, and he or she was asked to read it carefully. Then, a series of six questions were asked about it. During this process, patients were allowed to retain the laminated copy of the label so they could refer to it while answering the questions. The questions were asked orally, and the responses recorded on a special score sheet that contained the correct answers. The number of correct answers gave the health literacy level. We used the same scoring grades of the original REALM and NVS as follows: REALM: 0–18, less than or equal to 3rd grade; 19–44, equal to 4th to 6th grade; 45–60, equal to 7th to 8th grade and 61–66, greater than or equal to 9th grade. NVS: 0–1 suggests high likelihood ( $\geq 50\%$ ) of limited literacy; 2–3 indicates the possibility of limited literacy and 4–6 indicates adequate literacy.

We also collected some demographic data of the participants such as age, gender, educational attainment, occupation and economic situation. Regarding health literacy, three additional questions were asked. These were:

- (i) If the health care provider gives me forms to fill out ...
  - (a) I always read them and fill out by myself.
  - (b) I ask for my accompanying person's help to read and fill them out.
  - (c) I ask for the health personnel's help to read and fill them out.
  - (d) Other ...
- (ii) I understand the printed material which is given to me by the health care provider ...
  - (a) Always
  - (b) Sometimes
  - (c) Never
- (iii) If the health care provider gives you some printed material ...
  - (a) I read it.

- (b) I ask for someone's help to read it.  
 (c) I put it into trash without reading.  
 (d) Other ...

## Data analysis

We used mean, standard deviation (SD), standard error (SE) of the means and variance analysis to summarize the participants' demographic characteristics and their performance on the tests. Reliability was assessed in terms of internal consistency (Cronbach  $\alpha$ ). We calculated the correlation (Pearson's  $r$ ) between scores on REALM and NVS. Sensitivities, specificities, likelihood ratios and cutoff points of the tests were calculated by obtaining two dummy variables from the responses given to the statement: 'I understand the printed material given to me by the health care provider' and accepting the 'always' response as adequate and 'sometimes or never' responses as inadequate health literacy.

## Results

### Sociodemographic characteristics of the study group

A total of 456 patients participated in the study. The mean age of the participants was  $36.21 \pm 12.61$  years (mean  $\pm$  SD). Female participants consisted 60.5% of the study group. Most of the participants were primary school educated. Economic situation was reported as middle by 57.9% of the participants. Types of occupation vary among male participants but most of the female participants (76.8%) were housewives. Table I shows the demographic characteristics and scores of the participants on the Turkish language versions of REALM and NVS.

### The REALM test

The mean score (mean  $\pm$  SE) for REALM was  $60.29 \pm 0.32$  and the mean completing time of the REALM test was  $2.59 \pm 0.05$  min. Eight terms of the REALM test were pronounced correctly by all the participants and they were: eye, prescription, nutrition, nausea, medica-

**Table I.** Demographic characteristics and test scores

Characteristics and scores	
Age (years)	
Mean (SD)	36.2 $\pm$ 12.6
Range	17–72
Gender, <i>n</i> (%)	
Male	180 (39.5)
Female	276 (60.5)
Education, <i>n</i> (%)	
Primary school	188 (41.2)
Secondary school	84 (18.4)
High school	132 (28.9)
University	52 (11.4)
Reported economic situation, <i>n</i> (%)	
Good	180 (39.5)
Middle	264 (57.9)
Poor	12 (2.6)
Occupation, <i>n</i> (%)	
Housewife	216 (47.4)
Labor worker	48 (10.5)
Self-employed	48 (10.5)
Student	48 (10.5)
Salesman	44 (9.7)
Employee	32 (7.0)
Retired	16 (3.5)
Civil servant	4 (0.9)
Test scores (mean $\pm$ SEM)	
REALM	60.2982 $\pm$ 0.32
NVS	2.6053 $\pm$ 0.08
Test scores (median)	
REALM	63
NVS	2
Test scores (minimum–maximum values)	
REALM	18–66
NVS	0–6

tion, occupation, sexually and obesity. The first 10 terms that were missed and the percent of participants who had not pronounced correctly were as follows: menstrual (49.1%), osteoporosis (39.5%), appendix (36.8%), arthritis (36.8%), inflammatory (27.2%), incest (26.3%), syphilis (23.7%), caffeine (22.8%), potassium (20.2%) and rectal (20.2%).

### The NVS test

The mean score (mean  $\pm$  SE) for NVS was  $2.60 \pm 0.08$  and the mean completing time of the NVS test was  $6.28 \pm 1.27$  min. The internal consistency of the NVS was good (Cronbach

$\alpha = 0.70$ ) as was the criterion validity ( $r = 0.52$ ;  $P < 0.01$ ). The most correctly answered question of the NVS test was the fifth question, which concerns the allergy to peanuts, and 73.7% of participants gave the right answer. The following sixth question was connected to the previous question and answered correctly by 71.1%. The third question, which was about the intake of saturated fat, was answered correctly only by 8.8% of the participants, and finally, the first and second questions of the NVS test were correctly answered by roughly one-third of the participants.

Distribution of the study group regarding their health literacy level is shown in Table II.

### Comparison of the REALM and NVS scores

According to the REALM test score, 58.7% of the study group had adequate health literacy, whereas the NVS test score revealed a proportion of 28.1%. Therefore, we can say that the medical word recognition and pronunciation capacity of the study group was better than the numerical and reasoning skills. Figure 1 shows the distribution and the scatter plot of REALM and NVS scores.

Test scores according to gender, age groups, education and economic situation are shown in Table III.

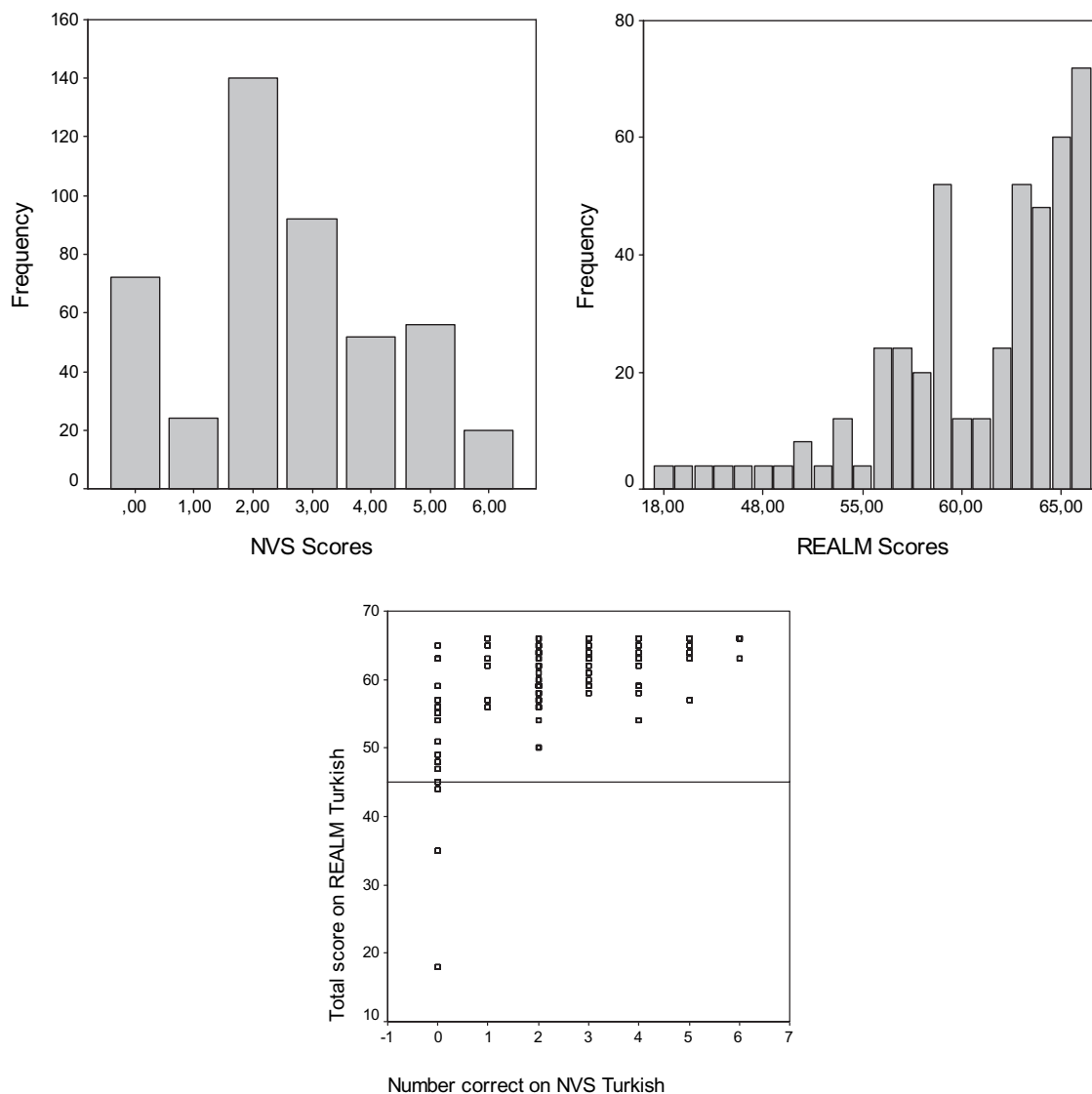
We found a statistically significant relationship between age, educational attainment, economic condition and gender and test scores of both REALM and NVS tests. Females, participants with primary education, participants who reported poor economic situations and older participants had lower scores for both the tests. The gap among male and female participants in terms of both test scores was due to the gap between educational attainment; hence, we found statistically significant differences among males and females according to their educational attainment (Pearson  $\chi^2 = 44.420$ ;  $df = 3$ ;  $P < 0.05$ ); female participants were less educated. Similar differences were found in terms of age and educational attainment (Pearson  $\chi^2 = 110.467$ ;  $df = 9$ ;  $P < 0.05$ ), and we accepted age and sex as cofounding factors.

### Responses to additional statements

The responses regarding three statements that are thought to be related to health literacy and their

**Table II.** Distribution of participants by REALM and NVS scores

		NVS score			Total	
		0–1 (high likelihood of limited literacy)	2–3 (possibility of limited literacy)	4–6 (adequate literacy)		
REALM score	0–18; Grade ≤3	<i>N</i>	4	—	4	
		% within REALM score	100.0	—	100.0	
		% within NVS score	4.2	—	0.9	
	19–44; Grade 4–6	<i>N</i>	8	—	8	
		% within REALM score	100.0	—	100.0	
		% within NVS score	8.3	—	1.8	
	45–60; Grade 7–8	<i>N</i>	52	96	28	176
		% within REALM score	29.5	54.6	15.9	100.0
		% within NVS score	54.2	41.4	21.9	38.6
61–66; Grade ≥9	<i>N</i>	32	136	100	268	
	% within REALM score	11.9	50.7	37.4	100.0	
	% within NVS score	33.3	58.6	78.1	58.7	
Total	<i>N</i>	96	232	128	456	
	%	21.0	50.9	28.1	100.0	



**Fig. 1.** Distribution of the scores and scatter plot of REALM and NVS.

relationship with the scores of both tests are shown in Table IV.

Participants who reported that they always read and filled out the forms by themselves, that always understand the printed material and that they read the given printed material got the highest scores in both tests.

### Receiver operating characteristic analysis

Area under the receiver operating characteristic curve for predicting adequate health literacy was 0.74 [95% confidence interval (CI), 0.65–0.75;  $P < 0.001$ ] for the REALM Turkish version and 0.67 (95% CI, 0.63–0.73;  $P < 0.001$ ) for the NVS Turkish version. The cutoff points for the



**Table III.** Test scores by education, gender, economic situation and age groups

TEST	N	Mean	SD	SE	95% CI for mean		ANOVA		
					Lower	Upper	F	Significance	
REALM	Gender								
	Male	180	61.711	5.023	0.374	60.972	62.450	13.208	0.000
REALM	Female	276	59.376	7.601	0.457	58.476	60.277		
	Male	180	3.000	1.743	0.129	2.743	3.256	17.207	0.000
NVS	Female	276	2.347	1.570	0.094	2.161	2.534		
	Education								
REALM	Primary	188	56.021	8.279	0.603	54.830	57.212	65.129	0.000
	Secondary	84	61.619	3.350	0.365	60.891	62.346		
	High	132	63.515	2.545	0.221	63.076	63.953		
	University	52	65.461	1.092	0.151	65.157	65.765		
NVS	Primary	188	1.595	1.382	0.100	1.396	1.794	83.008	0.000
	Secondary	84	2.333	1.175	0.128	2.078	2.588		
	High	132	3.636	1.458	0.126	3.385	3.887		
	University	52	4.076	1.152	0.159	3.756	4.397		
REALM	Economic situation								
	Good	180	63.022	3.743	0.278	62.471	63.572	29.595	0.000
	Middle	264	58.712	7.791	0.479	57.767	59.656		
NVS	Poor	12	54.333	2.994	0.864	52.430	56.236		
	Good	180	3.422	1.644	0.122	3.180	3.664	42.014	0.000
	Middle	264	2.075	1.452	0.089	1.899	2.251		
NVS	Poor	12	2.000	1.705	0.492	0.916	3.083		
	Age groups (years)								
	15–24	84	62.190	3.129	0.341	61.511	62.869	13.088	0.000
REALM	25–34	136	62.235	4.382	0.375	61.492	62.978		
	35–44	124	59.161	8.948	0.803	57.570	60.751		
	45+	112	57.785	7.392	0.698	56.401	59.170		
	15–24	84	3.809	1.540	0.168	3.475	4.143	25.071	0.000
NVS	25–34	136	2.705	1.205	0.103	2.501	2.910		
	35–44	124	2.032	1.775	0.159	1.716	2.347		
	45+	112	2.214	1.662	0.157	1.903	2.525		

ANOVA, analysis of variance.

REALM and NVS were found as 59.0 and 2.0, respectively (Table V and Fig. 2).

### Discussion

In Turkey, health literacy is seen as equal to general literacy, and most of the studies used the general literacy level of their participants to make explanations. Researches whose object is to specifically measure the levels of health literacy are rare [28, 29]. Some other studies tend to measure specific

knowledge about specific health conditions and addressed knowledge as health literacy [30–38]. Therefore, we were not able to compare our results with the findings of other Turkish studies.

According to the REALM scores, 41.3% of our study group had limited health literacy. A review regarding health literacy said that there are ~37 studies that used only the REALM test for assessing health literacy levels and a rate of low literacy was found to be 22%, where age, educational level, ethnicity, geographic location and income were found to be associated with health literacy

**Table IV.** Answers to some statements and test scores

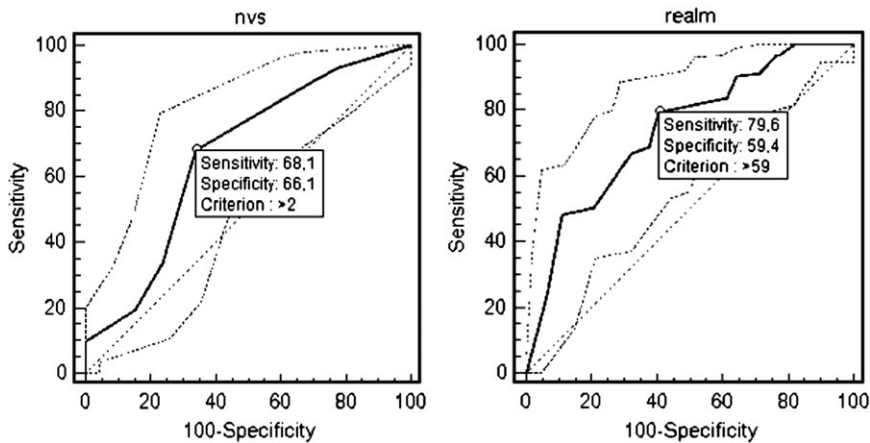
Test	Statement 1: If the health care provider gives me forms to fill out					95% CI		ANOVA	
	Answers	N	Mean	SD	SE	Lower	Upper	F	Significance
REALM	I always read and fill out by myself	368	61.760	3.912	0.203	61.359	62.162	124.524	0.000
	My accompany will read and fill out	36	56.222	5.319	0.886	54.422	58.021		
	Health personnel will read and fill out	24	42.000	12.880	2.629	36.560	47.439		
NVS	I always read and fill out by myself	368	2.858	1.538	0.080	2.701	3.016	25.394	0.000
	My accompany will read and fill out	36	1.222	1.045	0.174	0.868	1.575		
	Health personnel will read and fill out	24	0.666	0.963	0.196	0.260	1.073		
Test	Statement 2: I understand the printed material which is given to me by the health care provider					95% CI		ANOVA	
	Answers	N	Mean	SD	SE	Lower	Upper	F	Significance
REALM	Always	200	62.780	3.344	0.236	62.313	63.246	30.487	0.000
	Sometimes	228	58.736	8.108	0.536	57.678	59.795		
	Never	28	55.285	7.091	10.340	52.536	58.035		
NVS	Always	200	3.160	1.531	0.108	2.946	3.373	25.190	0.000
	Sometimes	228	2.263	1.620	0.107	2.051	2.474		
	Never	28	1.428	1.708	0.322	0.765	2.091		
Test	Statement 3: If health care provider gives me some printed material					95% CI		ANOVA	
	Answers	N	Mean	SD	SE	Lower	Upper	F	Significance
REALM	I read it	380	61.821	3.706	0.190	61.447	62.195	132.086	0.000
	I ask someone's help to read it	40	47.300	12.412	1.962	43.330	51.269		
	I put it into trash without reading	36	58.666	7.649	1.274	56.078	61.254		
NVS	I read it	380	2.873	1.504	0.077	2.721	3.025	42.733	0.000
	I ask someone's help to read it	40	0.600	0.928	0.146	0.303	0.896		
	I put it into trash without reading	36	2.000	2.242	0.373	1.241	2.758		

[39]. We also found that female, primary school educated, >45 years of age and economically poor participants had the lowest REALM scores. The low scores of REALM test were in fact due to low educational attainment among females and older participants.

The second test that we have used for assessing health literacy was the NVS test. Participants who score  $\geq 4$  on the NVS had literacy level of greater than or equal to 7th grade when measured with the REALM test. On the other hand, 84.1% of participants who got a health literacy level of 7th to 8th grade on the REALM test scored  $< 4$  on the NVS test and were assessed as those with limited literacy. Similarly, 62.6% of participants with an adequate health literacy level according to the REALM test were classified as those with limited literacy

according to the NVS test (see Table II and Fig. 1). In a study among 250 English- and 250 Spanish-speaking participants, the mean (SEM) scores for the NVS test were found to be 3.4 (1.9) and 1.6 (1.5), respectively [12]. Another study among 271 participants showed that 19.9% of the study group had likely low, 26.2% possibly low and 53.9% adequate health literacy levels [40]. In our study, 21.0% of participants had likely low, 50.9% possibly low and 28.1% adequate health literacy levels. Female, primary school educated and poor economic condition participants and those with older ages had the lowest NVS scores, which was similar to the REALM scores.

Our study group got better scores on the REALM test when compared with the NVS test. This may be due to the complex math abilities the NVS test



**Fig. 2.** ROC curve for NVS and REALM.

**Table V.** Cutoff points and coordinates of the ROC curve for NVS and REALM

Cutoff point	Sensitivity	Specificity	+LR	-LR
<b>NVS</b>				
>0	93.41	22.02	1.20	0.30
>1	90.11	28.44	1.26	0.35
>2 <sup>a</sup>	<b>68.13</b>	<b>66.06</b>	<b>2.01</b>	<b>0.48</b>
>3	34.07	76.15	1.43	0.87
>4	19.78	84.40	1.27	0.95
>5	9.89	100.00		0.90
>6	0.00	100.00		1.00
<b>REALM</b>				
>54	96.77	22.64	1.25	0.14
>55	96.77	23.58	1.27	0.14
>56	91.40	28.30	1.27	0.30
>57	90.32	35.85	1.41	0.27
>58	83.87	38.68	1.37	0.42
>59 <sup>a</sup>	<b>79.57</b>	<b>59.43</b>	<b>1.96</b>	<b>0.34</b>
>60	75.27	60.38	1.90	0.41
>61	68.82	62.26	1.82	0.50
>62	66.67	67.92	2.08	0.49
>63	50.54	79.25	2.43	0.62
>64	48.39	88.68	4.27	0.58
>65	23.66	93.40	3.58	0.82
>66	0.00	100.00		1.00

Bold indicates sensitivity, specificity +LR and -LR of the cutoff points, +LR, positive likelihood ratio; -LR, negative likelihood ratio.

<sup>a</sup>Cutoff points of the Turkish versions of the NVS and REALM.

requires, but it could also be due to the participants who are not familiar with reading nutritional labels. This fact must be kept in mind when prescriptions are given. Reliance on the drug labels should be avoided because it is highly possible that patients will not be able to understand their content. On the other hand, the reasoning capability of our study group was relatively better than their math skills because the last two questions of the NVS test, which measure reasoning, were correctly answered nearly by the three-fourths of the participants. The educational level found to be the most important factor related to the health literacy.

If we include in the health literacy concept the information and decision-making skills that we make for health in our daily lives, the measurement of health literacy with the existing assessment tools would not be appropriate because these tools only assess basic reading and writing skills to understand and follow simple health messages, which is the functional concept of health literacy. The functional concept of health literacy lacks the much deeper meaning and purpose of literacy, which is what it is literacy enables us to do [41]. Health literacy becomes more informed by the fields of psychology, sociology, cognition and cultural studies, and it is clear that to describe the health literacy abilities of people, addressing understanding and behavioral change is needed. Obtaining, processing and

understanding basic health information, connecting this information with appropriate health decisions and making decisions that are consistent with promoting or maintaining good health should be the definition of health literacy [42]. Therefore, the assessment tools should be able to distinguish between the possession of information, the understanding of it and the inclination and ability to act on it consistent with promoting health. None of the existing health literacy assessment tools is capable of doing this. Measuring the ability of reading, understanding, reasoning and numeracy is the first step in assessing health literacy. Hence, without these basic skills other dimensions of health literacy could not be realized. Furthermore, the rapid changes in the medical environment, quality and ethical issues, human rights, confidentiality and the necessity of keeping records make these basic skills more important and issues worthy of measuring.

In conclusion, this may be the first study in Turkey that measures health literacy by using specific health literacy measures developed and validated in Western countries. Because of the nature of the measurement tools, we were only able to measure the print literacy and to some extent numerical skills. However, these basic literacy skills should be gained in childhood through a proper formal education and should not be a matter of testing in adulthood but because of many reasons this could not be achieved. Our findings should be taken into account in the changing health care environment of Turkey, an environment that has become more dependent on printed forms and materials. Health care providers should know not to rely only on printed forms. To communicate with patients, to fully inform them and to obtain patient feedback in order to control patients' understanding and reasoning seem to be essential actions. Traditional or 'old-fashioned' health communication is needed even in this globalized, standardized, computerized and automated medical world.

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. Secondly,

we were not able to validate the Turkish version of the instruments we used because there was not any reliable test in Turkish, which is still being used for this purpose. A third 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. A fourth 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 participants in this study were making first visits or if they have a long-term relationship. Finally, we did not collect data about the reason for the patients' visit. All these factors can influence patients' satisfaction and their willingness to undergo literacy assessment.

Finally, we want to point out the need for addressing the broader definition of health literacy and hope that this initial study will contribute to putting health literacy on the agenda in Turkey.

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### Acknowledgements

The authors would like to thank Scribendi, Inc. for their valuable contribution in editing the language of this manuscript and Associate Professor Nuran Bayram, PhD, for her assistance in performing the receiver operating characteristic analysis.

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### Conflict of interest statement

None declared.

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- Received on May 22, 2009; revised on November 5, 2009; accepted on December 7, 2009*