

# Evaluation of Health Literacy Status Among Patients in a Tertiary Care Hospital in Coastal Karnataka, India

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## ABSTRACT

**Introduction:** People with limited health literacy are more likely to make medication errors, and they have less health knowledge, worse health status, more hospitalizations, and higher healthcare costs than people with adequate literacy. The objective of this study is to assess the health literacy status among patients who are able to read and understand English attending a tertiary care hospital by using Rapid Estimate of Adult Literacy in Medicine [REALM] technique and to compare the health literacy levels to educational status and other baseline characteristics.

**Material and Methods:** A widely used word recognition method [REALM] was used to assess the HL status of 200 patients attending a tertiary care hospital in Southern India. The number of correctly pronounced words was used to assign a grade-equivalent reading level. Scores 0 to 44 indicate reading skills at or below the 6<sup>th</sup> grade level, scores from 45 to 60 represent skills

at the 7<sup>th</sup> or 8<sup>th</sup> grade level, and scores above 60 indicate skills at the high-school level or higher.

**Results:** HL status was found below adequate level in more than 50% of the patients. Younger age group showed better HL scores compared to those aged more than 25 years. General education level or the medium of education does not truly reflect HL levels as brought out in the study. Even those with postgraduate qualification had poor HL skills.

**Conclusion:** The study was carried out to find out the HL levels among patients attending a tertiary care hospital. It was assumed that the general education levels may not reflect true HL status. In view of the results of this study it can be concluded that patient's HL skills should not be taken for granted and adequate attention should be paid in educating and briefing patients whenever patients are required to interpret and understand health care related documents.

**Keywords:** Health Literacy, education, REALM, India

## INTRODUCTION

Health literacy is defined as the ability to obtain, process, and understand basic information and services needed to make appropriate health decisions [1]. Low levels of literacy is very common and under recognized even in developed countries. Many aspects of health like health knowledge, health status, use of health facilities and cost have been found to be closely related to literacy levels by many studies [2].

Health literacy, along with general literacy, is an important determinant of health [3]. Thus, health literacy means more than being able to read pamphlets and make appointments. 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 [4]. Even people with adequate literacy skills may find understanding healthcare information a challenge. They may not understand medical vocabulary and the basic concepts in health and medicine [5].

Health literacy is very important as one has to frequently fill various forms in the hospital, sign consent forms, read medicine labels and package inserts and understand physician's instructions and various healthcare messages which often are text based. Forms can even be difficult for those with good literacy skills [6]. People with limited health literacy are more likely to make medication errors, and they have less health knowledge, worse health status, more hospitalisations, and higher healthcare costs than people with adequate literacy [7].

Patient's educational status may not always indicate his/her reading ability. Patients are often found to conceal their inabilities out of embarrassment [2]. To overcome these problems many tools are

developed to measure health literacy status. One of the most popular tests is the Rapid Estimate of Adult Literacy in Medicine (REALM) [8]. REALM tests the patient's ability to pronounce 66 common medical words and lay terms for body parts and illnesses and can be administered in less than two minutes. Other tests include the Newest Vital Sign (NVS) or Test of Functional Health Literacy (TOFHLA). Using these tools clinicians can determine the health literacy of patients in their practice and adjust their communication style to meet the needs of all of their patients [9].

National Assessment of Adult Literacy [NAAL] data indicates that only 12% of the American adult population has proficient health literacy skills. These individuals can deal with complex and challenging health literacy tasks. An additional 53% have intermediate skills, meaning they can deal with most health literacy tasks they encounter. Among the rest, 22% process basic skills and 14% less than basic [10]. Extensive literature search did not yield any studies of HL status carried out in India. The objectives of the current study are:

1. To assess the health literacy status among patients who are able to read and understand English attending a tertiary care hospital by using Rapid Estimate of Adult Literacy in Medicine [REALM] technique.
2. To compare the health literacy levels to educational status and other baseline characteristics.

## MATERIAL AND METHODS

The REALM is one of the oldest and most widely used health literacy assessment instruments. This screening test is used to assess the patient's ability to read words related to health and disease. It estimates patient's health literacy levels so that appropriate language can be used to instruct and educate the patients. It has been used not only among English speaking patients but also among patients to whom English is a second language [11].

The number of correctly pronounced words is used to assign a grade-equivalent reading level. The scores and grade equivalents for the REALM questionnaire are shown in [Table/Fig-1]. Because so many patient handouts and forms are written at the high-school level or higher, patients with scores  $\leq 60$  are considered at risk for misunderstanding written information provided to them [12]. Most health care materials are written at a 10<sup>th</sup>-grade level or higher. However, most adults read between the eighth and ninth grade level [13].

**[Table/Fig-1]:** Scores and Grade Equivalents for the REALM Questionnaire [14].

**Scores can also be collapsed into two groups:**

0 – 44 = Low health literacy.

45 – 66 = Higher health literacy.

The study was carried out in a tertiary care hospital of a medical college in Mangalore, Southern India. Since no health literacy data is available in Indian patients, the National Assessment of Adult Literacy data based on American adult population was used to determine the sample size [10]. For absolute precision of 5%, power of 80%, confidence interval of 95% and a non-response error of 20% the required sample was determined to be 200 subjects. The subjects were assessed [inpatient or outpatient] by the investigator over a period of two months. Only those aged 18 years or above and those who claimed to be able to read English words were included in the study. Permission was obtained from the institutional ethics committee prior to initiation of the study. The study was done after individual written consent was obtained from each study subject. After taking informed consent, baseline characteristics were recorded. Then patients were given a laminated copy of the REALM word list. Patients were then given following instructions- "It would help me to get an idea of what medical words you are familiar with. What I'd like you to do is look at this list of words, beginning here [pointing to first word with pencil]. Say all the words you know. If you come to a word you don't know, you can sound it out or just skip it and go on". If the patient took more than five seconds on a word, he/she was told to "Try the next one" and next word was pointed. If the patient began to miss every word, he/she was asked, "Look at the rest of the list and say any words that you know." Any word not attempted or mispronounced was counted as an error. It is not required to know the comprehension of words by the patient. Even if the patient claimed he/she knew the meaning but cannot read, credit is not given. Generally accepted pronunciation will be accepted as correct with no regard for accent. Patient should not make any additions or deletions. Eg. "Alcoholism" should not be read as "Alcohol" or "Nerves" and "Nerve" or "Nervous" [2].

Raw scores were tabulated and grade range equivalent was assessed for each patient and compared to his education level.

## STATISTICAL ANALYSIS

This was done using SPSS version 11.5. Scores were analyzed according to grade equivalents and also according to low or high literacy levels and various demographic characteristics. The Chi-square test was used to compare levels of health literacy for gender, educational level, age, and perceived health status. A value less than 0.05 was considered as statistically significant.

Raw score	Grade range
0-18	Third grade and below; will not be able to read most low-literacy materials; will need repeated oral instructions
19-44	Fourth to sixth grade; will need low-literacy materials, may not be able to read prescription labels
45-60	Seventh to eighth grade; will struggle with most patient education materials; will not be offended by low-literacy materials
61-66	High school; will be able to read most patient education materials

**[Table/Fig-1]:** Scores and Grade Equivalents for the REALM Questionnaire [14]

## RESULTS

**Demographic profile:** Two hundred patients attending a tertiary care hospital were administered REALM word list. Details of demographic profile and educational status of study subjects are shown in [Table/Fig-2].

**[Table/Fig-2]:** Demographic characteristics and literacy levels of the study participants (n=200).

**Health literacy score:** A mean literacy score of 48.13 was elicited among study subjects [SD=14.46, minimum score=6 & maximum=66]. Details are shown in [Table/Fig-3]. REALM protocol suggests that those with scores of less than 61 cannot read / comprehend routine literacy material; results of HL score were collapsed into two groups of those with scores of 0-60 and those with score 61-66, for analysis. Only 46 (23%) were in the highest literacy group [Table/Fig-1].

**Health literacy (HL) score and gender:** Though higher percentage (27%) of female subjects were in the higher HL score group (scores 61-66) as compared to males (20%), the difference was not statistically significant ( $p < 0.05$ ) [Table/Fig-2].

**HL score and age:** Among those who were 25 years of age or below, 25(41%) could score 61- 66 whereas 16.3% in 26-45 years group and 12.2% among those aged 26 or more, could score 61-66. This difference was found to be statistically significant [Table/Fig-2].

**HL score and educational status:** [Table/Fig-2 & 3] show educational status of study subjects and the HL score. Those with post graduate qualifications or those who were science graduates showed higher health literacy levels of 42.5% and 32.5% respectively. Large number of non-science graduates 56.5% could score only 46-60. Those with lower levels of education had lower levels of health literacy. HL scores of subjects with PG qualifications or were science graduates were compared to HL score of others.

Demographic characteristics	Literacy scores		Total
	Lower literacy (%) (Scores 0-60)	Higher literacy (%) (Scores 61-66)	
<b>Gender</b>			
Male	92(80)	23(20)	115
Female	62(72.9)	23(27.1)	85
<b>Religion</b>			
Hindu	118(75.6)	38(24.4)	156
Muslim	15(93.8)	1(6.3)	16
Christian	21(75)	7(25)	28
<b>Age</b>			
25 or less	36(59)	25(41)*	61
26-45	82(83.7)	16(16.3)	98
46 or more	36(87.8)	5(12.2)	41
<b>Medium of education</b>			
Kannada	71(93.4)	5(6.6)	76
English	47(56.6)	36(43.4)*	83
Malayalam	25(92.6)	2(7.4)	27
Others	11(78.6)	3(21.4)	14
<b>Education level</b>			
PG & Science graduates	62(63.3)	36(36.7)*	98
Others#	92(90.2)	10(9.8)	102
<b>Family physician</b>			
Present	60(65.9)	31(34.1)	91
Not present	94(86.2)	15(13.8)	109

**[Table/Fig-2]:** Demographic characteristics and literacy levels of the study participants [n=200]

\* $p < 0.001$

#Others include non-science graduates, studied up to P.U.C and ten or less than ten years of schooling

Education level	HL score(Grade equivalent)				Total
	0-18 (3 <sup>rd</sup> grade) (%)	19-44 (4 <sup>th</sup> -6 <sup>th</sup> grade) (%)	45-60 (7 <sup>th</sup> -8 <sup>th</sup> grade) (%)	61-66 (High school) (%)	
Post graduate	0	8(20)	15(37.5)	17(42.5)	40
Science graduate	0	5(8.6)	34(58.6)	19(32.8)	58
Non-science graduate	0	14(30.5)	26(56.5)	6(13)	46
Pre University College	2(10)	11(55)	3(15)	4(20)	20
8-10 years of schooling	4(12.1)	20(60.6)	9(27.3)	0	33
7 years or less of schooling	1(33.3)	2(66.7)	0	0	3
<b>Total</b>	<b>7</b>	<b>60</b>	<b>87</b>	<b>46</b>	<b>200</b>

**[Table/Fig-3]:** Grade equivalent health literacy scores and education levels of the study participants (n=200)

Among those with PG or science graduate qualifications 36.7% could score high (score 61-66) as against 9.8% among others. This difference was found to be statistically significant.

**HL score and medium of education:** [Table/Fig-2] shows medium of education during initial ten years of schooling among study subjects. Higher scores among those who studied in English medium as compared to others were found to be statistically significant.

**HL score and availability of family physician:** Among those who indicated that they had a family physician (98/200), 31 (34.1%) scored 61-66 whereas only 13.8% (15/109) of those who did not have a family physician scored 61-66. This difference was found to be significant [Table/Fig-2].

**[Table/Fig-3]:** Grade equivalent health literacy scores and education levels of the study participants (n=200).

## DISCUSSION

General literacy status of a patient may not always indicate his/her Health Literacy (HL) skills. They often try to mask their ignorance out of shame or embarrassment [2]. REALM which is a word recognition test was used in this study to assess the HL status of patients in a tertiary care hospital. Number of correctly pronounced words in a list of 66 drugs was used to indicate different grade levels. In this study, for analysis, scores are collapsed into levels 0-60 and 61-66. A score of 61-66 is required if patients have to properly understand these HL forms and material as most of the patient handouts and forms are usually written at high school level or higher [13]. The Newest Vital Sign is a tool that presents patients with a nutrition label (from a container of ice cream) specifically designed and tested. Answering the questions correctly requires the ability both to read and understand the content on the nutrition label and also to perform computations [7]. The TOFHLA is a more complex health literacy tool that requires about 20 minutes for administration. A shorter version is also available. The TOFHLA tests that ability of the patient to interpret documents and numbers and also assesses the reading comprehension [9]. The REALM questionnaire was chosen for our study as it was easily accessible, convenient to be administered to the patients in the outpatient setting, requiring only a few minutes for administration.

Among the 200 study subjects who participated in the study, HL scores were very low in 154 (77%). These subjects scored less than 61 which mean these patients are likely to struggle to understand patient information or HL materials provided in the hospitals.

Irrespective of the gender, HL status was low in the study group. However it was significantly higher among females 27.1% compared to males 20%. Reason for this difference could not be identified. There was no consistent difference in educational status

between the two sexes. It may be important as males also may need special attention to meet the health teaching need. Similar sex difference was observed in a study carried out among rural population in United States of America [15].

Higher percentage of Hindu subjects showed adequate HL rates (24.4%) compared to subjects belonging to other religions. However number of subjects in other religions was very small.

Age showed significant impact on HL scores. Younger age group showed better HL scores compared to those aged more than 25 years.

Self-declared education status of subjects was compared to their HL scores. In spite of having good educational qualification results of HL score were very poor across all educational levels. Only those with post-graduate qualification (42.5%) or science graduates 32.8% showed adequate HL scores of 61- 66. Lower HL scores in those with other education levels were statistically significant compared to those with PG or science degrees. Medium of education also showed distinct differences in HL scores. Those who were educated in English up to tenth standard scored higher. But within the English medium group only 43.4% could score 61 points or more. This shows that education level or medium of education need not necessarily indicate adequate literacy skills.

Higher HL scores were observed among subjects who had a family physician for their day to day health care need. Those who admitted to be having the services of a family physician scored higher as compared to those without one. This difference was statistically significant. Probably availability of a family physician allows for more frequent and fruitful doctor patient interaction which may improve the HL skills.

Our study has drawbacks. In the absence of previous research, the most convenient and accessible research tool was used to determine the health literacy. Unlike NVS or TOFHLA, in the REALM questionnaire no attempt is made to assess if patients actually understand the meaning of the words. While the effectiveness of the tool has been validated in other studies, the utility of other health literacy tools such as TOFHLA, NVS needs to be determined in the Indian population. The study sample was limited to patients attending a tertiary care hospital and hence the findings have a limited generalisability. Also, knowledge of health related terms with regard to the geography of the study participants need to be explored.

## CONCLUSION

Health literacy scores observed among patients attending a tertiary care hospital in this study was very poor. It means that most patients would struggle to understand various health care information he/she has to comprehend in a hospital like, informed consent form, dietary advice, pre-investigation instruction etc. Physicians and nurses should take extra care in educating patients and health care literature should be prepared with less complex medical terminologies. Patients with higher education levels or those who had English as medium of instruction need not be assumed to have adequate HL skill as seen in this study. In view of the poor HL skills one may anticipate among the patients, hospitals and physicians should suitably modify the HL materials given to the patients and make sure it is understood by the patients. Though REALM as a HL measurement tool is also used in developing countries it is developed for populations in western countries. Hence further studies may be required to confirm the findings of this study.

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