Health Literacy among Indian Dental Patients

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Abstract

Aim: To assess the health literacy levels based on age, gender and educational qualifications among dental patients visiting outpatient department of Panineeya Institute of Dental Sciences and Hospital, Hyderabad, India.

Method: A 16-item self-administered questionnaire developed by Chew and Colleagues was distributed in both English and local (Telugu) language to the patients seeking oral care at Panineeya Institute of Dental Sciences and Hospital. Data was collected and statistical analysis was done using SPSS software (version 21.0).

Results: A total of 2016 study subjects completed the questionnaire (response rate - 93.7%) with the mean age of 34.2 ± 12.8 years. The overall health literacy was 10.2 ± 4.2 and around 51% of the subjects reported marginal health literacy, while only 0.3% of inadequate health literacy was noticed among males aged 55+ years possessing university education. The overall health literacy and its domains presented a significantly negative correlation with the age and educational qualifications. Multivariate analysis revealed that age and educational qualifications had significant influence on health literacy.

Conclusion: Poor health literacy can impede one's ability to read, understand health information needed and make appropriate health care decisions.

Key Words: Literacy, Health Literacy, Dental Patients, Questionnaire

Introduction

Over the past several decades, researchers' understanding of the causes and treatment of diseases has grown exponentially. However, profound and consequential health disparities due to difference in literacy levels by race, income, education, cultural and social factors still persist globally. Although literacy has the most direct effect on reading ability, knowledge and positive health behaviors; patient's health literacy has received a little attention in dentistry. Attributing to this grasping concept, The National Literacy Act 1991 defined literacy as–" The ability to read, write, speak and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve ones goals and develop ones knowledge and potential" [1]. Also, literacy has evolved recently, as a major social determinant of health in the field of public health.

Literacy plays an important role in communication, which is essential for the effective delivery of healthcare and perhaps one of the most powerful tools in a clinician's arsenal. In fact, evidence shows that patients often misinterpret or do not understand medical information given to them by clinicians [2,3]. This lack of understanding can lead to medication errors, missed appointments, adverse medical outcomes, and even malpractice lawsuits.

To provide a new scale of information about the relationship between literacy and health, the World Health Organization (1998) has defined Health Literacy as- "cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health" [2]. Poor health literacy can impede one's ability to seek the needed health information, to process, understand and use to make appropriate health care decisions. Often low health literacy has been regarded as "silent epidemic" [4], a mismatch between a clinician's level of communication and a patient's level of comprehension. Also, enormous implications for health care delivery, has been increasingly described as the currency for improving the quality of life.

Concerns about low levels of health literacy have led to the search for methods and instruments to screen a patient's health literacy skills. Traditionally, researchers and clinicians use the patient's level of education as an indicator of health literacy. Although, education is highly correlated with reading levels, it alone cannot be used as a proxy for literacy.

Studies [3,5,6] have shown that patients are often ashamed of their low health literacy, due to potential apprehension regarding confidentiality, leads to patient embarrassment. Therefore, many adults attempt to conceal their reading impairments from others, which may weaken the assessment of potential health literacy problems.

Literature review [5-11] has revealed that a positive association exists between limited health literacy and had worse health outcomes, such as poorer knowledge about health conditions, lower use of preventive services, higher hospitalization rates and poorer self-reported health.

Hence as an important beginning step, the relative significant factors that influence health literacy should be determined. The current study was aimed to assess the health literacy among adult patients seeking oral health care at Panineeya Institute of Dental Sciences and Hospital, Hyderabad, India.

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Material and Methods

The present study was carried out during December 2013 to March 2014 among adult dental patients visiting the outpatient Department of Oral Medicine and Radiology at Panineeya Institute of Dental Sciences and Research Centre, Hyderabad, India.

A cross-sectional survey was conducted among 2150 dental patients visiting Out-patient Department of Paninneya Institute of Dental Sciences and Hospital. The survey tool comprised of 16-item self-administered questionnaire developed by Chew and colleagues [5]. The questionnaire was administered both in English and the local language (Telugu). It was initially pretested on 50 subjects for clarity and modifications were made according to the responses before the final questionnaires were administered to the subjects. The reliability of the questionnaire was analyzed using Cronbachs' alpha.

The health literacy levels were assessed based on five domains: navigating the health care system, completing the medical forms, following medication instructions, interacting with providers, and reading appointment slips. Additionally, socio-demographic details were collected which included Age, Gender and Educational qualification.

The questions were phrased to ask patients "how often" they had a problem or "how confident" they were rather than asking "if" they had a problem. The responses were scaled on a five point Likert scale ranging from 1(Always) to 5(Never). Items 5 -13 and 16 were negatively worded & therefore reversely scored. Based on the possible scores ranging from 16-90, participants were categorized into three groups: Adequate (16-32), Marginal (33-64) and Inadequate (65-90) Health Literacy.

Statistical Analysis

Statistical analysis was done utilizing Statistical Package for Social Sciences Software (SPSS Version 21.0). Descriptive analysis was done to calculate prevalence, range, mean and standard deviation for each. Inferential statistics was done using Kruskal-Wallis, Analysis Of Variance (ANOVA), Mann-Whitney U test and Student t- test. Correlation coefficient was calculated by Karl Pearson's Correlation. The relationship between the variables & health literacy was analysed by Multiple Logistic regression analysis. The predictive factors of health literacy were determined by Area under Receivers Operating Characteristic Curve (AUROC). The level of significance (p value) was set at 0.05.

Results

A total of 2016 participants completed the questionnaire and were analyzed, yielding a response rate of 93.7%. The study comprised of 1175 (58.3%) males and 841 (41.7%) females with the mean age of 34.2 ± 13.8 years. Majority of the study population, i.e., 962 (47.7%) belonged to the age group of 25-34 years, with most possessing university education (977; 48.4%).

Both males & females reported 51 % of marginal health literacy and only 0.3% males had inadequate health literacy which was statistically insignificant. Based on age groups, it was noted that only 3.2% of the population belonging to age group 55+ years had inadequate health literacy which was statistically significant (p=0.00001). To account, only 0.3% subjects possessing university education presented inadequate health literacy. Whereas, significant difference of marginal health literacy was observed among population with primary and high school education (p=0.0002) (Table 1).

The overall health literacy and individual domain scores were slightly lower in females as compared to males. However, which was not statistically significant. Across all the age groups, significant difference was noticed in the mean scores for overall health literacy and its individual domains, as highest among 18-24 years (35.2 ± 11.1) and lowest for 45-54 years (31.5 ± 11.8). With regard to educational qualifications, all mean scores (health literacy + individual domains) were higher among those with primary school education except for the domain "following medical instructions" (10.5 ± 3.8) (Table 2).

A significant negative correlation of age groups and educational qualifications with the overall health literacy and domains was observed. Though gender showed positive correlation with only two domains-"reading appointment slips" (r=0.0037) and "navigating health system"(r=0.0067); nonetheless, this correlation was not statistically significant (Table 3).

Logistic regression analysis was done to predict the impact of age groups and educational qualifications which were statistically significant (p=0.001) with health literacy (Table 4).

Graph 1 reveals that fair predictive value was depicted

Variable		Levels of Health Literacy n (%)				
		Adequate Health Literacy	Marginal Health Literacy	Inadequate Health Literacy	Total	p-value
Gender	Males	572 (48.6)	600 (51.0)	3 (0.3)	**1175 (58.2)**	0.341
	Females	411 (48.8)	430 (51.1)	0 (0)	**841 (41.8)**	
Age Groups	**18-24yrs**	245 (40.8)	355 (59.1)	0 (0)	**600 (29.7)**	**0.00001***
	25-34yrs	510 (53.0)	452 (46.9)	0 (0)	**962 (47.8)**	
	35-44yrs	113 (49.3)	116 (50.6)	0 (0)	**229 (11.3)**	
	45-54yrs	71 (53.7)	61 (46.2)	0 (0)	**132 (6.6)**	
	55+yrs	44 (47.3)	46 (49.4)	3 (3.2)	**93 (4.6)**	
Educational Qualifications	**Primary School**	129 (41.6)	181 (58.3)	0 (0)	**310 (15.3)**	**0.0002***
	High School	332 (45.5)	397 (54.4)	0 (0)	**729 (36.2)**	
	University	522 (53.4)	452 (46.2)	3 (0.3)	**977 (48.5)**	
Total		**983 (48.7)**	**1030 (51.1)**	**3 (0.2)**	**2016 (100)**	

*p ≤ 0.05 statistically significant

Table 1. Association between levels of health literacy (n%) with gender, age groups and educational qualifications.

Variables		Overall Health Literacy	Mean ± SD of Domains				
			Reading Appointment Slips	Following Medical Instructions	Completing Medical Forms	Interaction With Providers	Navigating Health System
Gender	Males	33.08 ± 11.50	7.65 ± 7.67	10.29 ± 3.88	6.11 ± 2.73	6.98 ± 2.99	2.05 ± 1.26
	Females	32.91 ± 11.25	7.67 ± 3.12	10.11 ± 3.77	6.11 ± 2.63	6.96 ± 2.97	2.06 ± 1.24
p-value		0.74	0.86	0.28	0.99	0.87	0.76
Age Groups	18-24yrs	35.2 ± 11.1	8.2 ± 3.1	10.9 ± 3.8	6.5 ± 2.7	7.3 ± 3.1	2.2 ± 1.3
	25-34yrs	31.9 ± 11.2	7.4 ± 3.1	9.8 ± 3.7	6.0 ± 2.7	6.7 ± 2.9	2.0 ± 1.2
	35-44yrs	32.8 ± 11.0	7.6 ± 3.3	10.3 ± 3.7	5.8 ± 2.6	7.1 ± 2.8	2.0 ± 1.1
	45-54yrs	31.5 ± 11.8	7.3 ± 2.9	9.5 ± 3.8	6.0 ± 2.7	6.9 ± 3.4	1.9 ± 1.2
	55+yrs	33.2 ± 13.5	7.8 ± 3.7	10.7 ± 4.7	5.8 ± 2.8	6.8 ± 3.2	2.2 ± 1.4
p-value		0.00001*	0.00001*	0.00001*	0.00021*	0.0023*	0.0004*
Educational Qualifications	Primary school	34.9 ± 10.4	8.2 ± 3.2	10.3 ± 3.4	6.5 ± 2.5	7.6 ± 2.8	2.2 ± 1.2
	High school	33.8 ± 11.1	7.9 ± 3.2	10.5 ± 3.8	6.2 ± 2.7	7.1 ± 2.9	2.0 ± 1.2
	University	31.9 ± 11.4	7.7 ± 3.2	10.2 ± 3.8	6.1 ± 2.7	7.0 ± 3.0	2.1 ± 1.3
p-value		0.00001*	0.00001*	0.0127*	0.0017*	0.00001*	0.0346*
Total		33.0 ± 11.4	7.7 ± 3.2	10.2 ± 3.8	6.1 ± 2.7	7.0 ± 3.0	2.1 ± 1.3

*$p<0.05$ statistically significant

Table 2. *Comparison of mean health literacy and its domain scores based on gender, age groups and educational qualifications.*

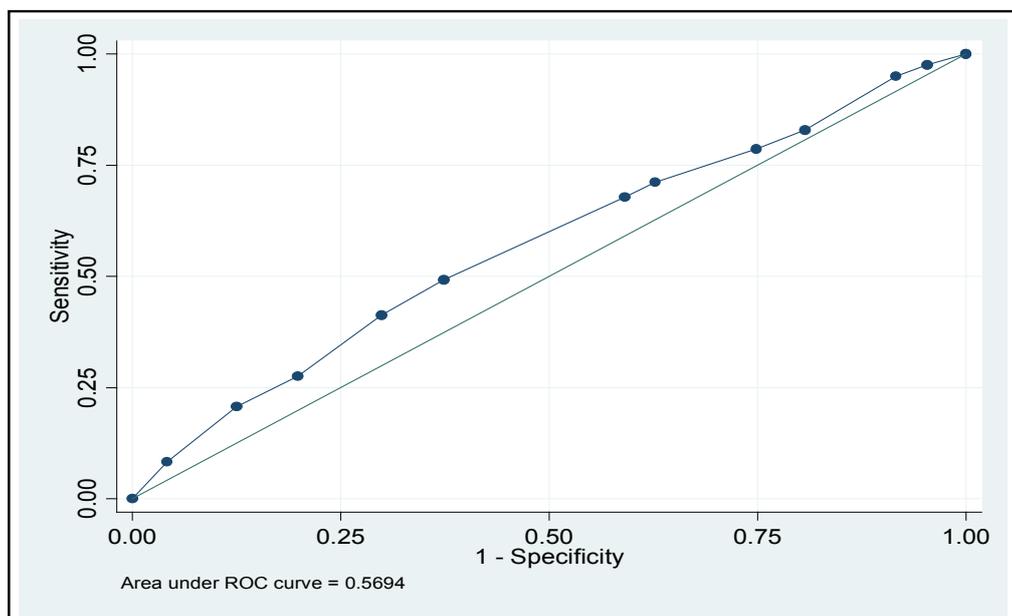| Variables	Gender	Age groups	Educational qualifications
Overall Health literacy	-0.0071	-0.0702*	-0.1015*
Reading appointment slips	0.0037	-0.0593*	-0.1160*
Following medical instructions	-0.0237	-0.0540*	-0.0496*
Completing medical forms	-0.0001	-0.0802*	-0.0793*
Interaction with providers	-0.0034	-0.0420	-0.1103*
Navigating health system	0.0067	-0.0511*	-0.0444*

*$p<0.05$ statistically significant

Table 3. *Correlation between gender, age groups and educational qualifications with health literacy domains.*

Variables	Coefficient	Std. Err.	Z-value	P-value	95% Conf. Interval
Constant	-1.3280	0.2232	-5.9500	0.00001*	-1.7654, -0.8905
Age Groups	0.3315	0.0931	3.5600	0.00001*	0.1491, 0.5140
Gender	0.0852	0.0915	0.9300	0.3520	-0.0941, 0.2644
Educational Qualifications	0.3080	0.0634	4.8600	0.00001*	0.1838, 0.4322

*$p<0.05$ statistically significant.

Table 4. *Logistic regression analysis of health literacy based on gender, age groups and educational qualifications.*

Area under ROC curve = 0.5694

Graph 1. *Area Under Receivers Operating Characteristic Curve - Fair curve. Graph 1 reveals fair predictive value. Depicting that the variables: age groups and educational qualifications covers 56.9% significance for health literacy.*

by the variables age groups and educational qualifications covering 56.9% of the Area under Receivers Operating Characteristic (AUROC) curve.

Discussion

Literacy is counted to be one of the key foundations for social and economic growth of the country. India, being a developing

country with estimated population of apparently 1.27 billion has a literacy rate of 74.04%, with Kerala projecting highest literacy rate at 93.9% and with Andhra Pradesh at 67.66% as per recent Census of India [12]. Literacy skills are often associated with general health and intersect with other health determinants which consider "Health Literacy" as chief concern. Health literacy encompasses a set of skills which includes accessing, processing and acting on information to manage health.

Health literacy is a shared function of social and individual factors including, education, culture, economics and various aspects of health system [8]. American Dental Association (ADA) affirmed that limited health literacy is a potential barrier to effective prevention, diagnosis and treatment of oral diseases; clear, accurate and effective communication is an essential skill for effective dental practice [4]. Therefore, higher the health literacy greater is the adoption of potent disease prevention methods, successful adherence to treatment regimens and ultimately improved oral health status.

Most of the studies found in literature [6,13-15], focused on the readability scales like Rapid Estimate of Adult Literacy in Medicine/ Dentistry (REALM/D), Rapid Estimate of Adult Literacy in Dentistry (REALD-30), Test Of Functional Health Literacy in Adults (TOFHLA), Short Test Of Functional Health Literacy in Adults (STOFHLA) etc., which are either too long or potentially embarrassing to the patient to be routinely integrated into clinical care. These tests assess the ability to recognize scientific words and therefore do not measure patients understanding ability of these words. In such studies, high educational qualifications, mispronunciation and frequent dental/medical visits can make patients familiar with medical terms. Therefore, bias due to these variables cannot be ruled out. Hence, our study aimed to determine the ability of patient to understand and follow medical instructions and due to absence of any standardized questionnaire, we opted a questionnaire developed and validated by Chew and colleagues [5].

To our surprise, it was noted that 82% subjects reported that appointment slips were written easy to read and understand, 70% were confident enough to fill out the forms and 48% subjects reported to often have someone to help read the hospital information. In contrary, study done by D'cruz A and Aradhya S [16] results reported that 52% subjects had problem reading, 63% were not confident enough and 64% needed help to read the materials. Our findings could be credited to administration of patient-friendly education materials in both English and local vulnerable languages in our hospital, making it easy for patients to read, understand and navigate the health care system.

The current study highlights that females possessing university degree aged 45-55 years had significant higher knowledge of health literacy. This could be due to high esthetic concern among educated females, which makes them aware and utilize more dental services. This was in accordance with the studies done by Sistani et al [17] among Iranian adults and Sabbahi et al [8] among Canadian adults where women reported more frequent dental visits and scored higher literacy levels.

The existing study reported significant difference in mean health literacy scores with age and educational qualifications.

Similarly, study carried out by D'cruz and Aradhya S [16] among adults seeking oral health in Bangalore city revealed that age and education had significant influence on mean health literacy scores ($p \leq 0.01$). Likewise, when educational qualifications were compared with mean health literacy scores in studies of Jones et al [18]; Lee JY et al [11] and Atchison et al [9] revealed similar findings. These authors reported that education plays an important role in determining health literacy. Although education level might be a proxy for literacy, it does not accurately reflect an individual's ability to understand and use written information in order to navigate the dental care system.

The present study stated 51% marginal health literacy rate was prevalent among study be population with only small percentage (0.2%) having inadequate health literacy. This could because of majority of population possessed university degree and also education leads to faster adaptation of learning new terms and acquiring skills, thereby increasing the knowledge and use of preventive care services. Identically, Chew et al [5] reported low inadequate health literacy and greater marginal health literacy among patients attending preoperative clinic in Seattle. However, in contrast to our findings, towering prevalence of 60% inadequate health literacy was reported among Indian adults by D'Cruz and Aradhya S [16] and among American adults by Wehmeyer et al [19].

All the domains of health literacy in our study were positively correlated with each other which indicates that person with high levels of literacy can navigate health care system with ease and exhibit good understanding of information provided in health care and more easily adhere to the instructions given for self- care, post treatment instructions, medications & follow ups.

Our study recorded a significant negative correlation of age and education with domains of health literacy which describes that as the age increases there is decline in the health literacy. This could count on aging factors of the individuals; having difficulty in reading and following the instructions, completing forms & navigating health care system. This was in acceptance with Jackson et al [14] study among adults attending Indiana University reporting low literacy associated with higher age. However Sistani et al [17] showed variance in results with positive correlation of age and education with health literacy.

The current study also stated that age and education are strong predictors of health literacy in comparison with gender by multivariable analysis. Whereas literature offers few studies [8,9,11,20] identifying variables like age, education, race and gender as important predictors for health literacy.

The present study acknowledges certain limitations; such as the study population was confined to a single institution, hence the results cannot be generalized. Secondly, health literacy measures could have also been correlated with other unobserved variables such as occupation, socioeconomic status, oral hygiene practices, dental visits etc.; if included which might have attributed effects on health literacy levels in our study.

To conclude, marginal health literacy was more prevalent amongst the study population, with age and education as important predictors of health literacy. Although inadequate

health literacy prevalence was low, dental care providers should identify patients having difficulty in understanding and using oral health information and should take steps to address their needs. Hence, future investigations are needed to develop appropriate intervention strategies for the improvement of health literacy for better oral health outcomes.

Clinical Relevance

Scientific rationale for study: Health literacy is concerned with people's knowledge, access, understand, appraise of health systems to make appropriate health care decisions to improve quality of life.

Principal findings: The current study reported marginal health literacy among the study population with age and education as important predictors of health literacy.

Practical implications: Intended to ensure that dental care providers should identify patients having difficulty in understanding and using oral health information and take steps to address their needs.

Poor health literacy may act as barrier to access oral health care.

Acknowledgement

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