

Assessment of Oral Health Literacy and its Relationship with Oral Health Related Behaviour and Socioeconomic Status Among Students of a University in Chennai City

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Health literacy is the ability of a person to understand instructions on prescription, appointment cards, health education pamphlets, doctor's directions and consent forms. A common reason for misunderstanding health instructions may be the patient's low health literacy skills. Therefore the present study was conducted with the aim of assessing the oral health literacy and its association with socioeconomic status and Oral health related behaviour among University students in Chennai City. A descriptive cross sectional study was conducted among 362 students of a private University in Chennai City. The subjects were selected using stratified random sampling from different faculty of studies. Oral health literacy was assessed using a validated instrument, the Rapid Estimate of Adult Literacy in Dentistry (REALD-30). The overall mean REALD-30 score of the participants was 19.13±5.6. The mean REALD-30 scores were lowest among students in the low socioeconomic status and highest among those in high class. The Mean REALD-30 scores among participants who rinsed their mouth were higher than those who did not rinse. About 46% had oral pain or discomfort during the past one year and their mean OHL score was significantly higher than those who did not had any pain or discomfort. The present study concludes that the overall oral health literacy of the study population is moderate and it does have a relationship with socioeconomic status and oral health behaviour although the different educational categories don't influence it. Further studies are required to establish one to one causal relationship.

Keywords: Literacy; Oral health; Behaviour; REALD-30; Students.

Health literacy has been acknowledged as one of the elements of staying healthy, recuperating from illness and augmenting health-related quality-of-life among individuals. Health literacy is the ability of a person to understand instructions on prescription, appointment cards, health education pamphlets, doctor's directions and consent forms.¹

Although healthcare professionals generally assume that the health explanations and instructions given to patients and families are readily understood, in reality these instructions are frequently misunderstood, sometimes resulting in serious errors. A common reason for misunderstanding health instructions may be the patient's low health literacy skills.²

Studies conducted in medical backgrounds demonstrate the importance of health literacy for patient adherence to medical instructions and increased positive health outcomes. Poor health literacy is linked with worse health and reduced understanding of prevention, maintenance, and self-care instructions provided by the health care professional. These abilities are predominantly critical in the managing chronic diseases.³

Oral health literacy (OHL) is the degree to which individuals have the capacity to obtain, process, and understand basic oral health information and services needed to make appropriate health decisions.⁴ Most of the patients acquire information from various sources, but the information provided to them by their dentist and dental team members serve to guide and inform their ability for optimum oral health self-care and decision-making related to health overall. The encounter with a dentist is a chance for patients to receive guidance and learn skills for their self-care and for additional health services. The communication skills of the dental team contribute to a patient's oral health literacy that in turn results in improved oral health outcomes.⁵

Limited oral health literacy among adults is assumed to have a large effect on oral health disparities, creating a barrier to achieving better oral health outcomes. It is suggested that the complexity of both verbal and written oral health communications create a significant barrier to improving oral health and that oral health literacy is required in order to promote oral health and to prevent oral diseases.⁶

Oral health literacy levels can be estimated with the previously validated instrument called Rapid Estimate of Adult Literacy in Dentistry (REALD-30).⁶ Studies conducted using this instrument reveals that those with incorrect knowledge of dental questions and fair/poor oral health status had greater odds of having a low literacy level than those with correct knowledge.¹⁻³

The precise relationship between literacy and oral health outcomes has not been established, but it has been conceptualized that there is interplay between oral health literacy, culture, socioeconomic status, education and health system in determining oral health related outcomes.⁷

Adolescent life is a critical period of transition with personal responsibility. Students

in this period can be targeted for preventing dental disease and building future oral health. Assessing the effect of oral health literacy among this age group is a crucial component in development prevention oriented oral health programs in the future targeted towards improving oral health literacy which in turn can lead to improved oral health.

Although recently gaining more attention, there has been minimum research in the field of oral health literacy or, more specifically, the impact of oral health literacy on oral health related outcomes among adolescent Indian population.

Therefore the present study was conducted with the aim of assessing the oral health literacy and its association with socioeconomic status and Oral health related behaviour among University students in Chennai City.

MATERIALS AND METHODS

A descriptive cross sectional study was conducted among students of a private University in Chennai City. The study period was between the months June and September 2018. The study was approved by the Institutional Review Board of Dr. MGR Educational and Research Institute University. (Dr.MGRDU/TMDCH/2016-17/1406022)

Training and calibration of the principle investigator was done using 20 samples. The intra-examiner reliability was assessed using kappa statistic (0.95). The REALD 30 is a pre-validated instrument. However, the face and content validity was checked by expert evaluation and group discussions among the investigators and few study participants.

A pilot study was conducted among 50 participants to validate the assessment form and to get the required sample size. The estimated sample size was 362 with 90% power and margin of error at 5% with 95% confidence level.

Sampling Methodology

The subjects were selected using stratified random sampling where each faculty of studies forms strata. After obtaining the list of students in each faculty of studies, they were randomly selected till the required sample size was achieved. Students were selected from engineering, arts and science and polytechnic courses. Students from

medical, dental and paramedical courses were not involved to prevent confounding bias.

Data Collection

The students were approached after obtaining the necessary permission from the head of the institution. The nature and purpose of the study was explained to them and written informed consent was obtained. They were involved in one to one interview with the principle investigator once they satisfy the inclusion criteria.

Inclusion Criteria

1. Undergraduate students from engineering, arts & science and polytechnic courses.
2. They should be able to read, write and speak English language.
3. Students who have studied English as their first language in schools.

Exclusion Criteria

1. Students who were chronically absent during the days of the visit.
2. Students studied languages other than English as first language.
3. Those who were not willing to participate in the study.

A pre-tested semi-closed ended questionnaire was used to collect the information regarding demographic details, socioeconomic status, oral health literacy and oral health related behaviour. The questionnaire is filled by the examiner to ensure uniformity in data collection and to avoid misinterpretation of the questions by the study subjects.

Assessment of Oral Health Literacy

Oral health literacy was assessed using a newly developed instrument, the Rapid Estimate of Adult Literacy in Dentistry, called REALD-30. (Figure 1) This previously validated word recognition test has demonstrated good psychometric properties. It includes 30 dentally-related words arranged in order of increasing difficulty. The participants were asked to read the words loudly. They were asked to read only the words which are familiar and which they can pronounce correctly. To score REALD-30 one point is given to each word pronounced correctly and then summed to get an overall score. The score has a possible range of 0 (lowest literacy) to 30 (highest literacy).⁶

Socioeconomic Status

Socioeconomic status was assessed using

Modified Kuppaswamy Scale updated for the year 2018. The various dimensions taken under consideration to obtain a composite score are the education and occupation of the head of the family, together with total monthly income of the family. The score ranges from 3 (Lower class) to 29(Upper class).⁸

Oral Health Related behaviour

Oral health related behaviour was assessed using oral health questionnaire for adults from WHO Oral Health Survey, fifth edition. The questionnaire was modified and pretested according to the need of the study.⁹

Statistical Analysis

The data was analysed using Statistical Package for Social Sciences, IBM Corporation, SPSS Inc., Chicago, IL, USA version 21 software package (SPSS). Descriptive statistics with frequency mean and standard deviation was computed. Independent t test and one way ANOVA was used to assess the level of significance which was kept as $p < 0.05$.

RESULTS

Among 362 undergraduate students participated in the study 58.3% were males. The age of the participants ranged between 17 to 25 years with the mean age of 19.4 ± 1.5 . Around 33.1% were from engineering and polytechnic courses and 33.8% from arts & science. Most of the students were from upper lower and middle classes. The overall mean REALD-30 score of the participants is 19.13 ± 5.6 . There was not much difference in the mean REALD-30 scores among students with different education. Although the mean REALD-30 score for females is slightly higher than males, statistically it was not significant. The mean REALD-30 scores were lowest among students in the lower socioeconomic status and highest among those in higher class and the differences were found to be statistically highly significant. (Table1)

Table 2 describes the study subjects based upon diet, oral hygiene practices and REALD-30 scores. Most of the participants (86.7%) have a mixed diet and almost the same number have the habit of in between meals snacking. The mean REALD Scores for individuals having a vegetarian diet and who does not have habit of in between meals snacking were significantly higher than

those with mixed diet and have snacking habit. Only 23.8% brush their teeth twice daily and about 60.2% rinse their mouth after every meal. The Mean REALD-30 scores among participants who rinse their mouth were higher (20.5) than those who don't rinse (16.9) and the difference were found to statistically highly significant.

The distribution of certain variables pertinent to oral health behaviour and their association with REALD scores is provided in table 3. About 46% of the study subjects described their

oral health as good and around 42.2% described it as average. Although the frequency was less, the mean REALD scores of Individuals who described their oral health as very good was highest (21.5) when compared to other groups. The difference was also found to be statistically highly significant. Nearly half of the participants (46%) had oral pain or discomfort during the past one year and their mean OHL score was significantly higher than those who did not had any pain or discomfort. Among the study subjects, around 43.9% have not

Table 1. Distribution of subjects based upon demographic details and their association with REALD scores

Gender	Number	Frequency (%)	Mean REALD± SD	P value
Male	211	58.3	18.71±5.4	0.09
Female	151	41.7	19.71±5.8	
Education				0.99
Engineering	120	33.1	19.13±5.5	
Arts and Science	122	33.8	19.08±5.6	
Polytechnic	120	33.1	19.14±5.3	
Socioeconomic status				<0.01*
Upper class	41	11.3	20.9±4.6	
Upper Middle	90	25	19.61±4.9	
Lower Middle	95	26.2	20.20±5.4	
Upper Lower	98	27.1	17.48±5.4	
Lower	38	10.5	17.52±6.3	
Total	362	100	19.13±5.6	

Student's Independent t test and One way ANOVA
* Highly significant

REALD-30 Assessment form					
1. Sugar	_____	11. Abscess	_____	21. Periodontal	_____
2. Smoking	_____	12. Extraction	_____	22. Sealant	_____
3. Floss	_____	13. Denture	_____	23. Hypoplasia	_____
4. Brush	_____	14. Enamel	_____	24. Halitosis	_____
5. Pulp	_____	15. Dentition	_____	25. Analgesia	_____
6. Fluoride	_____	16. Plaque	_____	26. Cellulitis	_____
7. Braces	_____	17. Gingiva	_____	27. Fistula	_____
8. Genetics	_____	18. Malocclusion	_____	28. Temporomandibular	_____
9. Restoration	_____	19. Incipient	_____	29. Hyperemia	_____
10. Bruxism	_____	20. Caries	_____	30. Apicoectomy	_____

Fig. 1. REALD-30 Assessment form

Table 2. Distribution of subject based on diet, oral hygiene practices and REALD scores

Variables	Number	Frequency (%)	Mean REALD scores \pm SD	p value
Diet				
Vegetarian	48	13.3	22.0 \pm 3.5	<0.01*
Mixed	314	86.7	18.6 \pm 5.7	
In between meals Snacking				
Present	315	87	18.6 \pm 5.7	<0.01*
Absent	47	13	22.6 \pm 3.3	
Brushing frequency				
Once	276	76.2	18.8 \pm 6.0	0.09
Twice	86	23.8	20.0 \pm 4.2	
Rinsing after meals				
Yes	218	60.2	20.5 \pm 4.9	<0.01*
No	144	39.8	16.9 \pm 5.9	
Any other aids				
No	332	91.7	19.1 \pm 5.6	0.46
Yes	30	8.3	18.4 \pm 6.0	

Student's Independent t test

* Highly significant

Table 3. Distribution of subjects according to certain variables and their association with REALD scores

Variables	Frequency	Percentage (%)	Mean REALD scores	p value
Self-description of oral health				
Very good	40	11	21.5 \pm 5.6	<0.001**
Good	139	38.4	18.8 \pm 5.9	
Average	138	38.1	18.0 \pm 5.0	
poor	45	12.4	21.0 \pm 4.0	
Pain or discomfort in last 12 months				
Present	166	46	21.2 \pm 5.7	<0.01*
Absent	196	54	17.3 \pm 4.9	
Last Dental Visit				
Less than six months	30	8.3	23.2 \pm 3.0	<0.001**
6-12 months	76	21	18.8 \pm 2.7	
1- 2 years	16	4.4	13.8 \pm 2.5	
More than 2 years	81	22.4	18.3 \pm 7.2	
Never received dental care	159	43.9	19.6 \pm 5.6	
Tobacco smoking				
Present	32	8.8	18 \pm 6.0	0.23
Absent	330	91.2	19.2 \pm 5.6	

Student's Independent t test and one way ANOVA

* Highly Significant; ** Very highly significant

received any dental care in their life. Around 8.3% of the respondents have visited the dental office in the last 6 months and their mean REALD-30 score is significantly higher than the other groups.

DISCUSSION

Health literacy has been shown to function as a mediator between socioeconomic factors, health behaviours and health outcomes.¹⁰ The body of literature concerning the effect of health literacy to overall health is copious, but studies linking oral health literacy to oral health are minimal. The present study was conducted to assess the oral health literacy among adolescent university students since it is a distinct period of development, not only physically but also psychologically and cognitively. During this period, the individuals are about to begin a new episode in their lives and the society legally considers them as an adult.¹¹ Any changes in behaviour occurring during this period tends to last lifelong. In this study we used a word recognition instrument (REALD-30) to assess the oral health literacy since previous studies demonstrated a strong correlation with general reading ability and reading comprehension with evidence suggesting that if a person has difficulty pronouncing dental-related words, then that person may additionally have difficulty with comprehension which is a higher order skill.¹⁰ In the general health realm, those with limited health literacy skills are more likely to miss important preventive measures.¹² Standards for what constitutes "low oral health literacy (OHL)" have not been clearly established; however in previous investigations an arbitrary threshold of less than 13 was used to define a "low OHL" group.^{2, 6, 10} The oral health literacy of the present study population is considered to be moderate with a mean REALD score of 19.13 ± 5.6 , whereas studies conducted by Sharma *et al.*¹¹, Aruna Devi *et al.*¹³ and Jamieson *et al.*¹⁴ showed a lesser mean REALD score. This may be due to the fact that the current study was done among college and most of the other studies were done on general public with varying levels of education and socioeconomic status. A higher mean REALD score of 23.9 ± 1.29 was obtained by Jones *et al.*¹⁵ and it should be acknowledged that the study was done among patients attending a dental clinic, while the present

study was done among students irrespective of their dental visits. There was no significant difference in the oral health literacy scores among different genders of the study population. The educational status also doesn't seem to affect the oral health literacy of the study subjects since the REALD scores were almost similar among different educational groups. There was a significant difference in the oral health literacy among subjects with different socioeconomic statuses, with the upper class having the highest literacy and vice versa.

Individuals who don't have the habit of in-between meals snacking and those who rinse their mouth regularly after each meal have significantly higher mean REALD scores and this implies the fact that better oral health literacy results in improved oral health behaviour. Although there was a difference in REALD scores among individuals who brush their teeth once and twice, it was not statistically significant. But a study conducted by Simon *et al.*¹⁶ showed significant difference with individuals who brush their teeth twice had better oral health literacy.

In the present study, the oral health literacy scores were significantly higher among individuals who describe their oral health as very good and poor. This can be attributed to the fact that better oral health literacy can lead to better knowledge and understanding of their oral health. Similar results were obtained in studies conducted by Lee *et al.*¹⁰ and Jamieson *et al.*¹⁴

Better oral health literacy among the individuals who had experienced any oral pain or discomfort during the past one year in the current study might be due to the fact that these individuals may have visited the dentist who would have read literature concerning their oral health problems.

Statistically significant difference in REALD-30 scores was found between individuals who have visited a dentist less than 6 months and other groups. Incidentally participants who have not received any dental care have significantly higher OHL literacy scores than some of the other groups who had received dental care. Therefore the present study did not provide conclusive evidence on the association between dental visits and oral health literacy. These results are in agreement with most of the studies conducted elsewhere.^{12, 14, 15}

Limitations

- The limitations of the REALD-30, particularly that it measures word recognition only with no test of comprehension or function have been recognized. Nevertheless, it has been demonstrated by previous studies that OHL estimates derived from word recognition tests such as REALD-30 correlate well with comprehension and functional health literacy.¹⁰
- Since REALD-30 has been validated in English language, this prevents generalization of results beyond students who were from English medium of education. Although the OHL showed an increasing trend with increasing socioeconomic status, the number of individuals in each group is not equivalent which may be a potential limitation of the study.
- Another limitation of the study particularly with respect to the Indian population is they are not native English language speakers but have incorporated the language as their mode of education and communication. This can result in mispronunciation of certain English words resulting in decreased REALD-30 scores.

Recommendations

- Low oral health literacy when assessed early can alert dental care providers, to improve communication skills with such patients.
- Proper interventions may be effective in patient amenability in dental programs.
- The threat of low health literacy should be recognized in all research activities because of the participant's difficulty in reading and comprehending informed consent forms and survey questionnaires.
- Health education aids comprising commonly used terminologies can improve population OHL levels.

CONCLUSION

The present study concludes that the overall oral health literacy of the study population is moderate and it does have an association with socioeconomic status and oral health behaviour although the different educational categories don't influence it. Further studies required to establish one to one causal relationship evaluating the effects of OHL on oral health status and to involve sufficient number of subjects from different

socioeconomic status; which will be our future scope.

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