

# Association Between Oral Health Literacy, Behaviour And Socio-Economic Status Among School Teachers Of Chennai City: A Cross Sectional Survey

Harish Raghav<sup>1</sup>, Jagannatha.G.V<sup>2</sup>, Nagaland.T<sup>3</sup>, Cyril Benedict.H<sup>4</sup>

<sup>1</sup>Department of Public Health Dentistry, Chettinad Dental College and Research Institute, Kelambakkam, Chennai, India

<sup>2</sup>Department of Public Health Dentistry, Chettinad Dental College and Research Institute, Kelambakkam, Chennai, India

<sup>3</sup>Department of Public Health Dentistry, Chettinad Dental College and Research Institute, Kelambakkam, Chennai, India

<sup>4</sup>Department of Public Health Dentistry, Chettinad Dental College and Research Institute, Kelambakkam, Chennai, India

\*Corresponding author: Dr.Jagannatha.G.V

\*Department of Public Health Dentistry, Chettinad Dental College and Research Institute, Kelambakkam, Chennai, India. [drjagannathmds@gmail.com](mailto:drjagannathmds@gmail.com)

## Abstract:

**Background:** Health literacy is a non-pharmacological method of managing diseases. For an individual to prevent and manage diseases, basic health knowledge is a must. Non health professionals like school teachers could influence children's oral health decisions. In addition to the Oral Health Literacy (OHL), teachers can spread knowledge on oral health more than dental health professionals in an effort to shift the focus towards preventive dentistry. If similar morals are promoted among students, perceptions of oral health will begin to change.

**Method:** This cross-sectional e-survey was conducted among school teachers using a pre-validated, closed – ended 30 item questionnaire (demographic details, oral health behaviour and practices). Oral Health Literacy-Adult Questionnaire (OHL-AQ) was used in this study to assess the Oral Health Literacy. The e-questionnaire was sent to the school teachers in Chennai city. Chi-Square test was used where ever applicable. Significance level was set at  $P < 0.05$ .

**Results:** A total of 80 participants were evaluated with mean age of  $41 \pm 8.8$  years. The overall mean OHL was  $9.2 \pm 3$  (Mean $\pm$ SD). The results states that OHL was significantly adequate for individuals who visited dentist within 6 months - 1 year as compared to those who never visited dentists.

**Conclusion:** Considering the inadequate level of OHL, promotion of oral health among teachers should be done by including regular dental workshops by government and dental professionals in schools.

**Keywords:** Last dental visit, Oral health literacy, Oral behaviour, Socioeconomic status.

## I.INTRODUCTION:

Health literacy is a non-pharmacological method of managing diseases<sup>1</sup>. World Health Organization (1998) has defined health literacy as cognitive and social skills which determine the motivation and ability of individuals and communities to gain access to understand and use information in ways which promote and maintain good health<sup>2</sup>. Poor health literacy increases underutilization of health care services<sup>3</sup>. Improving health literacy improves the utilization of preventive services, low hospital expenditures etc. Therefore, for an individual to prevent and manage diseases, basic health knowledge is a must.

Mouth being an integral part of the general body, necessitates proper maintenance for overall health. Dentists often presume that instructions given to their patients are understood correctly but these are often misinterpreted due to patient's low oral health literacy<sup>4</sup>. Oral Health Literacy (OHL) is described as the ability of individuals to perceive and analyse oral health information for appropriate decision-making with regard to oral health problems. OHL involves factors like reading, communication, speaking, writing in addition to one's own literacy; which is affected by culture<sup>5,6</sup>. Schools being places where such new skills are developed are a platform to enhance oral health among children<sup>7</sup>. Non health professionals like

school teachers influence children's oral health decisions<sup>8</sup>. Therefore, oral health knowledge is important not only for them but also for the children they are educating<sup>7,9</sup>. Studies shows that there is dependency between the society, education system and healthcare which in turn will have an influence on oral health outcomes<sup>4,10-12</sup>. Hence, the knowledge of oral health is to be inculcated right from the schools to the children through the teachers.

Research shows that school teachers in India tend to have high oral health literacy<sup>8,13</sup>. In addition to the OHL, teachers can spread knowledge on oral health more than dentists in an effort to shift the focus towards preventive dentistry. If such messages are promoted among students, perceptions of oral health will begin to change. On the other hand, if students could develop interest during their development ages, there could an increasing chance that these skills will continue into professional practice following graduation. Emphasising the importance of decision-making skills which is a key component of health literacy,<sup>13,14</sup> this study has been put together to determine the oral health literacy levels and behaviour of school teachers with respect to socioeconomic status in Chennai city in the Indian state of Tamil Nadu.

## II. MATERIALS AND METHODOLOGY:

The study is a cross-sectional survey. An e-questionnaire was sent by the investigator among the school teachers presently working in schools in Chennai city. Teachers responding to the e-questionnaire were considered as given consent. The study period was carried out for a period of three months from January to March in 2022. The study was approved by the Institutional Human Ethical Committee (IHEC), CARE.

The questionnaire consists of demographic details, socioeconomic status<sup>15</sup>, Oral Health Literacy-Adult Questionnaire (OHL-AQ)<sup>16,17</sup> and oral health practices along with self-reported oral health status.

### A. The Questionnaire:

The Oral Health Literacy Adult Questionnaire has 17 items in four sections.

Section-1 assesses the perception of oral health.

Section-2 assesses the ability to calculate values related to antibiotic and mouth rinse prescriptions.

Section-3 assesses the efficacy of listening skills, and

Section-4 is about decision-making.

The total score for the index was a simple sum of responses, ranging from 0 to 17. Oral health

literacy was categorized into three levels: Inadequate (0-9), Borderline (10-11), and adequate (12-17).

### Inclusion Criteria

1. Teachers willing to participate in the study.
2. Teachers able to read and interpret English language.

### Exclusion Criteria

Teachers not having android / IOS mobile phones to receive the google forms.

**Sample size:** The sample size was 80 calculated with a Power( $1-\beta$ ) of 80%, Level of significance being 5% and 7% margin of error.

**Statistical analysis:** The data were analysed for differences in Oral health literacy scores with respect to socioeconomic class, oral health behaviours and oral health status by using the IBM SPSS version 20.0. Descriptive and Inferential statistics were analyzed by IBM SPSS version 20.0 (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp). frequency and Percentage was used for summarizing categorical data (demographic variables and OHL categories). Mean and SD were used for summarizing quantitative data. Chi-square tests was used for testing the association of OHL scores with oral health behaviour, Oral health status and social class. P value of <0.05 was considered as a statistically significant difference.

## III. RESULTS:

A total of 80 participants from various grades of levels of teaching were evaluated in the study with mean age of  $41 \pm 8.86$  years. About 86.25% females and 13.75% males participated in the study. Nearly 50% of the teachers had more than 10 years of experience. 60% of the participants belonged to upper middle class, 31.25% belonged to upper class and 8.75% belonged to lower middle class. None of the participants were from upper lower and lower socioeconomic class. The overall mean OHL-AQ literacy score was  $9.2 \pm 3.26$ . Majority (45%) of the participants had inadequate literacy followed by borderline literacy level which was seen in 30% and 25% had adequate literacy [Table 1]. In evaluating the OHL response of the participants, highest percentage of correct answers 87.5% were related to the questions regarding listening component (Consumption of hot food after tooth extraction). Whereas, lowest number of correct answer (6.3%) was observed in the question "What is the best action after gingival bleeding when using dental floss"?

In analysing the results, all the adequately scored participants have answered correctly as ‘visiting dentist as their best decision when encountering an oral swelling and pain’. Of all the participants with inadequate OHL scores, 2.5% were from lower middle class, 31.25% were from upper middle class and 11.25% were from upper class. Similarly, in borderline OHL scores, 3.75% belonged to lower middle class, 18.75% belonged to upper middle class and 7.50% belonged to upper class. Whereas, participants with adequate OHL scores, 2.5% belonged to lower middle class, 10% were from upper middle class and 12.5% belonged to upper social class. There was no statistical significant association between oral health literacy scores and socioeconomic status. ( $P=0.220$ )

In terms of the oral health behaviours, present study shows that 30% of participants had been to dentist in the last 6 months to 1 year. Oral health literacy scores were significant in the adequate range for individuals who visited dentist within 6 months to 1 year as compared to those never visited dentist who predominantly had inadequate oral health literacy scores. There was a significant association between OHL scores and their last dental visit. ( $P=0.029$ ). [Table 2].

On comparing the oral health behaviour with the participant’s socioeconomic status, there was no statistically significant association between oral health behaviour (Last dental visit ( $P$  value=0.915), Frequency of change of tooth brush ( $P$  value=0.681), Self-reported oral health status ( $P$  value=0.679) ( $P>0.05$ )

**Table 1.** Demographic Characteristics

Survey Characteristics	N(%)
<b>Gender:</b>	
Male	11(13.75)
Female	69(86.25)
<b>Mean age</b>	41±8.86 years
<b>Socioeconomic Status</b>	
Upper	25(31.25)
Upper Middle	48(60)
Lower Middle	7(8.75)
Upper lower	0
Lower	0
<b>OHL-AQ Literacy Scores:</b>	
Inadequate (0-9)	36(45)
Borderline (10-11)	24(30)
Adequate (12-17)	20(25)

**Table 2:** Association between OHL scores and Last dental visit

		Oral health literacy scores range			Total	Statistical value	P-Value
		Inadequate	Borderline	Adequate			
Last dental visit	Within 6 months-1 year	4	1	8	13	19.978	0.029*
	Past 6 months-1 year	6	5	0	11		
	1-2 years ago	10	6	3	19		
	2-5 years ago	6	3	6	15		
	More than 5 years ago	6	7	3	16		
	Never visited dentist	4	2	0	6		
Total		36	24	20	80		

\*Significant association was found between OHL scores and last dental visit ( $P=0.029$ ). Oral health literacy scores were significant in the ‘Adequate’ range for the teachers who visited dentist within 6 months-1 year as compared to those never visited dentist who predominantly had ‘inadequate’ oral health scores.

**Table 3:** Association between SES and Last dental visit

		Socioeconomic status			Total	Chi square statistic	P value
		Lower middle	Upper middle	Upper			
Last visit dentist	Within the past 6 months	1	7	5	13	4.613	0.915
	6 months -1 year	1	8	2	11		
	1-2 years ago	2	12	5	19		
	2-5 years ago	2	8	5	15		
	More than 5 years ago	1	8	7	16		
	Never visited dentist	0	5	1	6		
Total		7	48	25	80		

No significant association was found between oral health behaviour (Last dental visit) and SES  $P=0.915$ .

**Table 4:** Association between SES and Oral health behaviour (Frequency of change of toothbrush)

		Socioeconomic status			Total	Chi square statistic	P value
		Lower middle	Upper middle	Upper			
Frequency of changing tooth brush	Every month	0	10	3	13	3.965	0.681
	3 months once	4	26	16	46		
	Change after bristles are flared	3	11	6	20		
	Don't prefer using toothbrush	0	1	0	1		
Total		7	48	25	80		

No significant association was found between oral health behaviour (Frequency of changing tooth brush) and SES since  $P=0.681$

**Table 5:** Association between SES and self-reported oral health status

		Socioeconomic status			Total	Chi square statistics	P value
		Lower Middle	Upper middle	Upper			
Self-reported oral health status	Very good	0	1	2	3	7.480	0.679
	good	3	18	10	31		
	Moderate	4	16	10	30		
	Poor	0	8	1	9		
	Very poor	0	1	1	2		
	I don't know	0	4	1	5		
Total		7	48	25	80		

No significant association was found between oral health status and SES since  $P=0.679$

#### IV.DISCUSSION:

Maintenance of oral health has become a necessity. However, discrepancies in certain factors like socioeconomic status, behavioural and cultural differences influence the ability to understand the oral health care instruction provided to them to ultimately take effective decisions related to oral as well as general health care. In this study Oral Health Literacy–Adult Questionnaire (OHL-AQ) is opted to calculate the oral health literacy since it evaluates the decision-making skills which is important in assessing the oral health literacy along with reading skills, listening skills and numerical skills.

The present study was conducted in school teachers as teachers can influence students of various age groups during their developmental process and any change in behaviour during these periods tends to last long. Number of female participants were more than males, and they had scored high mean score and associated with OHL ( $P=0.010$ ) which is similar to previous studies [7,11,13]. The results of our study was different from previous studies<sup>18,19,20</sup> which indicates that females are more aesthetically conscious to preserve their oral health. The mean OHL scores in this study are inadequate, and similar results were observed in studies done in college students<sup>19</sup>. D'Cruz and Shankar Aradhy also reported similar trends<sup>3</sup>. On the other hand, studies done using REALD-99 OHL instrument<sup>8,21</sup> in similar population as that of the present study showed a higher mean value. This might be due to the cultural differences across regions which might have had impact on understanding of basic oral health instructions<sup>21</sup>.

About 25% of individuals from this study scored adequately, which were higher compared to the

males which are in accordance with study done on adult population<sup>22</sup> and in contrast to study done by Simon AK using REALD-99 in similar population as that of the present study<sup>8</sup>. The reason for high adequate scores among females could be, apart from being a teacher they also practice looking after their own children. On the other hand, on considering the characteristics of two genders it could be acceptable. In fact, evidences states that there is no need to provide separate oral health instruction programs for males and females from educational background<sup>20,21</sup>. Hence, the findings in this study were justified.

In the present study, individuals who visited dentist in 6 months-1 year had significant association with high OHL scores than other groups. Previous study showed statistically significant difference in REALD-30 scores in individuals who visited dentist less than 6 months but no association was found between OHL and dental visits<sup>18</sup>. Studies done in Mangalore<sup>8</sup>, Pondicherry<sup>19</sup> showed no significant difference in OHL scores. On the other hand, studies in Brazil shows people with low OHL visit dentist only when pain and emergency<sup>23</sup>. Whereas, Yazdani et al showed association between OHL scores and last dental visit<sup>20</sup>. Though subjective (persons own interest), step towards oral health needs has to be taken care of.

This practice should originate from childhood and such intervention should be done in the right age in the developmental process of the child. An appropriate way to promote this practice is school based dental care, where dental professionals can visit schools for check-ups at regular intervals for the benefit of teachers as well as students<sup>19</sup>.

Though statistically insignificant, the frequency of change of toothbrush every 3 months was observed in 60% of the study population and nearly 15% of the population changed toothbrush every month. [Table 2] highlighting that these category people are highly conscious on taking care of their oral health. This could also mean that, appropriate preventive oral health care measures are being taken care. On the other hand, the findings of this study are contrary to the previous studies where significant association between oral health literacy scores and self-reported oral health status was observed<sup>11,19</sup>. The finding of our study, being subjective (self-reported), the results could be justified.

Socioeconomic status being one among the factors for oral health literacy and poor oral health outcomes had insignificant ( $P=0.220$ ) association between oral health literacy and socioeconomic status. Majority of the study subjects in the present study who had inadequate oral health literacy levels were from the upper middle socioeconomic class

(31.25%) followed by upper class (11.25%) which is contrary to studies done previously<sup>18,22,23,24</sup>. This might be due to individuals coming from educated, diverging high income background. This also shows how the work culture and occupation of people determines the knowledge level. In this study, none of the subjects has been associated with smoking. This can be attributed to role of teachers in teaching children appropriate oral health behaviour in their early years of developmental and socialization<sup>21</sup>.

In this study, on evaluating the OHL responds the lowest amount of correct answer was given to the question "what teeth erupts in the mouth at six years of age?" Similar trend was seen in previous studies<sup>20,21</sup>. The deficiency in this question shows inadequate knowledge towards development of children's tooth system. The need for proper awareness in this area for school teachers is necessary because teachers are the first to attend untoward incidents like traumas, and children do not know how painful dental problems can be. If not taken care in the growing age, it may lead to decreased self-esteem and poor general health as well<sup>21</sup>.

Macek's conceptual model of health literacy was adapted to the oral health context in order to compare this study [14]. According to the model, one's health literacy and knowledge of health is modulated by socioeconomic and demographic variables can generate appropriate oral health decisions that will impact on health outcomes. Our results were different to his conceptual model. This study is a peculiar one as it presents both OHL and oral health behaviour status in Chennai, India where studies on OHL are scarce. The high ratio of women in this study can be explained by the fact that teaching profession has predominant females. Future studies should try to incorporate equal participants to eliminate this limitation. Another possible limitation could be; information bias could have influenced responses. However, in this study significant associations were still found between OHL scores and last dental visit. Combined clinical examinations could have yielded accurate results regarding the oral health status of the individual.

## V.CONCLUSION:

The results of the present study conclude that, OHL and oral health behaviour is independent of socioeconomic status of school teachers and OHL is related to oral health behaviour such as dental visits, which could interfere with quality of life. Despite all the resources existing in this modern era, especially with the advent of internet oral health literacy is found to be inadequate among

school teachers of Chennai city. Considering the inadequate level of oral health literacy of school teachers, it is becoming need of the hour to include oral health strategies in the schools to enhance awareness regarding oral health as the effects of low OHL of teachers can have a domino effect on tomorrow's society. Future studies in the same context can use various oral health literacy tools upon a larger population to assess similar circumstances.

## VI.REFERENCES:

- [1]. American Dental Association. Communication between health care providers and patients: Addressing the challenges of limited oral health literacy. A-Z topics: Science in the News; 2007.
- [2]. Horowitz AM, Kleinman DV. Oral health literacy: the new imperative to better oral health. *Dent Clin North Am.* 2008 Apr;52(2):333-44.
- [3]. D'Cruz AM, Shankar Aradhya MR. Health literacy among Indian adults seeking dental care. *Dent Res J (Isfahan).* 2013;10(1):20-24.
- [4]. Wehmeyer MM, Corwin CL, Guthmiller JM, Lee JY. The impact of oral health literacy on periodontal health status. *J Public Health Dent.* 2014;74(1):80-87.
- [5]. Horowitz AM, Kleinman DV. Oral health literacy: a pathway to reducing oral health disparities in Maryland. *J Public Health Dent.* 2012 Winter;72 Suppl 1: S26-30.
- [6]. NIH: National Institute of Dental and Craniofacial Research. Healthy People 2010 Oral Health Toolkit. Available at: [https://stacks.cdc.gov/view/cdc/11474/cdc\\_11474\\_DS1.pdf](https://stacks.cdc.gov/view/cdc/11474/cdc_11474_DS1.pdf).
- [7]. Ahmad MS. Oral Health Knowledge and Attitude among Primary School Teachers of Madinah, Saudi Arabia. *J Contemp Dent Pract* 2015;16(4):275-279.
- [8]. Simon AK, Rao A, Rajesh G, Shenoy R, Pai MB. Influence of oral health literacy on the oral health status of school teachers in Mangalore, India. *J Indian Assoc Public Health Dent* 2018; 16:127-32.
- [9]. Jourdan D. Health Education in Schools. The Challenge of Teacher Training; 2011. Available from: <https://www.aber.ac.uk/en/media/departmental/sell/pdf/wellbeinghealth/Health-education-in-schools.pdf>.
- [10]. Garcia RI, Cadoret CA, Henshaw M. Multicultural issues in oral health. *Dent Clin North Am.* 2008 Apr;52(2):319-32,

- [11].Naghibi Sistani MM, Yazdani R, Virtanen J, Pakdaman A, Murtomaa H. Determinants of oral health: does oral health literacy matter? *ISRN Dent*. 2013; 2013:249591.
- [12].Lee JY, Divaris K, Baker AD, Rozier RG, Lee SY, Vann WF Jr. Oral health literacy levels among a low-income WIC population. *J Public Health Dent*. 2011 Spring; 71(2):152-60.
- [13].Jagan P, Fareed N, Battur H, Khanagar S, Manohar B. Conceptual knowledge of oral health among school teachers in South India, India. *Eur J Dent*. 2018; 12(1):43-48.
- [14].Macek MD, Haynes D, Wells W, Bauer-Leffler S, Cotten PA, Parker RM. Measuring conceptual health knowledge in the context of oral health literacy: preliminary results. *J Public Health Dent*. 2010 Summer; 70(3):197-204.
- [15].Sheikh Mohd Saleem. Modified Kuppuswamy socioeconomic scale updated for the year 2019. *Indian J Forensic Community Med* 2019;6(1):1-3
- [16].Naghibi Sistani MM, Montazeri A, Yazdani R, Murtomaa H. New oral health literacy instrument for public health: development and pilot testing. *J Investig Clin Dent*. 2014 Nov; 5(4):313-21.
- [17].Flynn PM, John MT, Naik A, Kohli N, VanWormer JJ, Self K. Psychometric properties of the English version of the Oral Health Literacy Adults Questionnaire - OHL-AQ. *Community Dent Health*. 2016 Dec;33(4):274-280.
- [18].An, Keshav & Prabhakar, Ramachandra & Chaly, Preetha & Saravanan, R. & Mary, Vinita. Assessment of Oral Health Literacy and Its Relationship with Oral Health Related Behaviour and Socioeconomic Status Among Students of A University in Chennai City. *Biomedical and Pharmacology Journal*. 2019. 12. 739-746.
- [19].Arunima Chauhan, Sunya Gyati, Kuldeep Singh Shekhawat, M Senthil. Oral Health Literacy among Students of an Engineering College in Puducherry. *Indian Journal of Public Health Research & Development*.2019, 10(8), 409-414.
- [20].Yazdani R, Mohebbi S.Z, Chehree S. Oral Health Literacy and Oral Health Behavior of Senior Medical and Pharmacy Students. *J Islam Dent Assoc Iran*. 2017; 29(4):141-148.
- [21].Mirzapour Ermaki R, Mirzaie M, Naghibi Sistani M. Oral health literacy and health behavior of primary school teachers in Babol. *Journal of Health Literacy*. Winter 2019; 3(4): 66-74.
- [22].Das D, Menon I, Gupta R, Arora V, Ashraf A, Ahsan I. Oral health literacy: A practical strategy towards better oral health status among adult population of Ghaziabad district. *J Family Med Prim Care* 2020; 9:764-70
- [23].Batista ML, Lawrence HP, Sousa LR. Oral health literacy and oral health outcomes in an adult population in Brazil. *BMC Public Health* 2018; 18:60.
- [24].Mahmud SZ, Amin MS, Tarafder MA, Hossain SM. Measurement of oral health literacy level among Bangladeshi adults seeking dental care and its relationship with socio-demographic characteristics. *AKMMC J* 2016