

# Conceptual knowledge of oral health among school teachers in South India, India

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## ABSTRACT

**Objective:** To measure conceptual oral health knowledge among school teachers using comprehensive measure of oral health knowledge (CMOHK) instrument. **Materials and Methods:** A total of 240 school teachers drawn through cluster random sampling from across Sullia taluk. Conceptual knowledge was assessed using Comprehensive measure of oral health knowledge questionnaire. Oral health status was recorded on a World Health Organization oral health assessment Proforma. **Results:** Overall distribution of CMOHK scores revealed that 106(44%) subjects had good conceptual oral health knowledge, 81(33.7%) subjects had fair and 53(22%) subjects were categorized under poor conceptual knowledge respectively. Statistically significant difference was observed for mean scores for conceptual knowledge in relation to gender (12.8v/s 15.3), in terms of type of school teachers (14.4 v/s 11.2) and in relation to age of the subjects. Primary school teachers exhibited a consistently better CMOHK scores 0.003(0.001-0.011) compared to their high school counterparts 0.003(0.001-0.012). **Conclusion:** The mean CMOHK score of this group was 12.5±1.3 and is considered to be fair. There is an inverse association between age, educational levels and income in relation to CMOHK scores.

**Key words:** Oral health knowledge, oral health literacy, oral health status, school teachers

## INTRODUCTION

The concept of health literacy initially emerged in the 1970s and continues to gain strength as an approach to improve health status.<sup>[1]</sup> It essentially means placing one's own health and that of one's family and community into the context of understanding the factors that are influencing it and knowing how to address them.<sup>[1]</sup> Theoretical understandings and methods of evaluating health literacy have been in continual evolution ever since the idea of health literacy was first put forward in the 1970s.<sup>[2]</sup> Research clearly links low levels of education, literacy, and

health literacy with poor health, poor health care utilization, increased barriers to care, and premature mortality around the world.<sup>[2]</sup>

Lower levels of health literacy are associated with poorer health, lesser understanding of prevention, maintenance, and self-care instructions.<sup>[3]</sup> These are the skills that are particularly critical in the management of chronic diseases including the oral diseases.<sup>[3]</sup> Oral health literacy is defined as the "degree to which individuals have the capacity to obtain, process, and

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understand basic oral health information and services needed to make appropriate health decisions.”<sup>[4]</sup> Limited literacy skills among adults are widespread and are hypothesized to have a large effect on oral health disparities, creating a barrier to achieve better oral health outcomes. Management of oral disease requires detailed understanding of complex self-care regimens as well as strict adherence to recall intervals; aspects of care which are related to oral health literacy.<sup>[3]</sup>

Assessment of oral health literacy skills is generally carried out by the instruments such as the Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30), REALD-99, and the Test of Functional Health Literacy in Dentistry. These instruments are divided into two types: word recognition tests and comprehension tests. Word recognition tests are those in which participants read aloud a list of common medical words, test the ability to recognize, or read and pronounce individual words. Comprehension tests, on the other hand, assess a person’s ability to understand written texts.<sup>[5]</sup> None of the developed instruments stress on the individuals decision-making skills.

More recently, research has shown that difficulties with reading and word recognition probably do not influence health outcomes directly. It is difficult to imagine how word recognition influences an individual’s unmet oral health needs, which needs numerous health-related decisions to be made by that individual, along the way.<sup>[6]</sup> Macek *et al.* have identified several intervening factors between health literacy and oral health outcomes. Word recognition and reading comprehension alone probably do not fully explain the role that health literacy plays, rather conceptual knowledge is hypothesized to have a more direct relationship to oral health outcomes than either word recognition or reading comprehension. Conceptual knowledge is a key component of health literacy that has received little attention.<sup>[6]</sup>

Macek *et al.* have recently developed a conceptual oral health knowledge instrument which analyzes the findings in the context of a conceptual framework that lists word recognition, reading comprehension, conceptual knowledge, and communication skills as independent, yet related health literacy components and more importantly links health literacy with oral health decision-making and outcomes.<sup>[6]</sup>

With this background, this study was undertaken to assess the levels of conceptual knowledge of

oral health among school teachers in Sullia Taluk, Dakshina Kannada district, in South India. The present study also had an additional objective to assess the oral health status of school teachers through world health organization oral health assessment pro forma (2013).<sup>[6]</sup>

## MATERIALS AND METHODS

A cross-sectional descriptive epidemiological study was conducted among school teachers employed in the schools of Sullia Taluk, Dakshina Kannada, South India. Ethical clearance was obtained from the institutional review board, and the permission to conduct the study was obtained from the concerned authorities. Sample size was estimated with the power of 80% and 95% confidence interval for a prevalence of 50%. Thus, the sample size obtained was 240. A sample proportionate to size was drawn from 35 schools randomly selected schools. Stratified cluster sampling methodology was employed for the selection of samples. Sullia Taluk has a total of 93 schools, of which 79 schools were from rural area and 14 schools were from urban area. Sixty-five schools were managed by the government, whereas 14 schools were under private management. A total of 35 schools were selected by means of simple random selection and included in the study.

### Inclusion criteria

All willing participants with informed consent drawn from the included schools of Sullia Taluk, Dakshina Kannada, were included.

### Exclusion criteria

Teachers who were edentulous, undergoing orthodontic treatment and those having a history of pregnancy were excluded.

The study was conducted over a period of 3 months (August–October) 2015. The data were collected by an investigator himself on a specially designed pro forma containing three parts.

- Part A – It recorded the basic demography of the participants
- Part B – It was a self-administered, pretested, structured questionnaire containing statements on conceptual oral health knowledge<sup>[6]</sup>
- Part C – It recorded oral health status according to the recommendations given by the WHO.<sup>[7]</sup>

ADA-specified Type III examination was followed to record the clinical parameters by investigator himself.

The questionnaire was pilot tested for its feasibility and validity. A few modifications were done and the pro forma was finalized. Test-retest reliability was performed to test the reliability of the questionnaire; it was found to be good with Cronbach’s alpha ( $\alpha$ ) 0.75. Intra-examiner reproducibility determined using the kappa statistic was 0.85.

**Statistical analysis**

Statistical analysis was performed through IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp. Descriptive data were recorded; Chi-square and ANOVA tests were conducted to test significance of the findings. Conceptual knowledge was assessed as per the recommendations given by the author. Regression analysis was further performed to find out the odds for each significant finding. *P* value was set  $\leq 0.05$

**RESULTS**

Analysis of the sociodemographic characteristics of the studied population revealed that approximately almost equal number of participants were present in different age groups and from different geographical areas as well as different types of schools. A significantly higher proportion of teachers were from the public schools teaching predominantly the vernacular language (91%).

Analysis of the educational qualification of the participants revealed a minimum qualification of diploma in education as held by 45%, whereas 55% among them were graduates.

There were differences in income of the participants included in the study as socioeconomic status of the family was considered. Scores from 0 to 11 represented “poor,” from 12 to 14 corresponded to “fair,” and from 15 to 23 represented “good” conceptual oral health knowledge. Overall distribution of Comprehensive Measure of Oral Health Knowledge (CMOHK) scores revealed that 106 (44%) participants had good, 81 (33.7%) participants had fair, and 53 (22%) participants were categorized under poor conceptual knowledge. Statistically, significant difference was observed for mean scores for conceptual knowledge in relation to gender (12.8 vs. 15.3), in terms of type of school teachers (14.4 vs. 11.2), and in relation to age of the participants as shown in Table 1.

Categories of the CMOHK were regressed over the variables recorded in the study through a multivariate

**Table 1: Sociodemographic characteristics of the studied population in relation to Comprehensive Measure of Oral Health Knowledge scores**

Parameters	n (%)	CMOHK score	P
Gender			
Male	24 (10)	12.8±2.8	0.004
Female	216 (90)	15.3±1.9	
Age			
<35	81 (33.7)	14.5±2.1	<0.001
35-44	84 (35)	14.3±1.3	
>44	75 (31.3)	10.9±0.3	
Geographical location			
Urban	114 (47.5)	14.2±1.3	0.92
Rural	126 (52.5)	13.9±1.9	
Medium of instructions			
English	21 (9)	14.8±1.8	0.99
Kannada	219 (91)	14.1±1.6	
Type of schools			
Private	21 (9)	14.1±1.8	0.99
Government	219 (91)	14.8±1.6	
Type of school teachers			
Primary	111 (46.3)	14.4±1.4	0.004
High	129 (53.7)	11.2±1.2	
Education			
Diploma	108 (45)	13.8±1.3	0.03
Graduation	132 (55)	15.3±1.9	
Income			
<10 K	55 (23)	13.8±1.3	0.002
10-20 K	81 (33.7)	14.3±1.6	
>20 K	104 (43.3)	15.2±1.8	

CMOHK: Comprehensive Measure of Oral Health Knowledge

regression analysis. Eliminating for probable confounders, statistically significant difference was observed for gender with an odds ratio (3.6 [0.6–21.8]) compared to the females. A statistically significant inverse relation was observed with regard to age of studied participants with an odds ratio (5.7 [2.4–13.6]) in fair/poor category compared to their lesser age counterparts as shown in Table 2.

Primary school teachers exhibited a consistently better CMOHK scores, 0.003 (0.001–0.011) compared to their high school counterparts, 0.003 (0.001–0.012). There was an inverse association between educational levels in relation to CMOHK scores, with odds of 0.28 (0.06–0.08) and 0.36 (0.21–0.92), respectively.

Analysis of the CMOHK scores in relation to oral health status revealed a statistically significant inverse relation for gingival bleeding (13.9 ± 1.1 vs. 15.3 ± 1.3) and periodontal pockets (13.9 ± 1.9 vs. 16.5 ± 1.6), but no difference was observed for dental caries experience of the participants as shown in Table 3. Further analysis of CMOHK scores and decayed

**Table 2: Multivariate logistic regression analysis of Comprehensive Measure of Oral Health Knowledge scores**

Variables	CMOHK scores				
	Good		Fair	Poor	
	n	n	Beta (OR [95% CI])	n	Beta (OR [95% CI])
Gender					
Female	94	75	Reference Group	47	R
Male	12	6	0.88 (2.4 [0.4-13.8])	6	1.2 (3.6 [0.6-21.8])
Age					
>44	47	18	Reference Group	10	R
35-44	34	38	1.21 (3.3 [1.6-7.02])*	12	0.54 (1.7 [0.6-4.5])
<35	25	25	0.94 (2.5 [1.1-5.6])*	31	1.74 (5.7 [2.4-13.6])*
Geographical location					
Rural	61	38	Reference Group	27	R
Urban	45	43	0.59 (1.8 [0.9-3.3])	26	0.16 (1.17 [0.5-2.3])
Medium of Instructions					
Vernacular	98	74	Reference Group	47	R
English	8	7	-0.09 (0.9 [0.3-2.6])	6	-0.16 (0.84 [0.2-2.7])
School management					
Public	98	74	Reference Group	47	R
Private	8	7	-0.147 (0.86 [0.2-2.4])	6	-0.44 (0.63 [0.2-1.9])
Type of schools					
High schools	5	75	Reference Group	49	R
Primary schools	101	6	-5.84 (0.003 [0.001-0.011])*	4	-5.95 (0.003 [0.001-0.012])*
Education					
Graduate	55	36	Reference Group	17	R
Diploma	36	45	-1.07 (0.34 [0.09-1.1])	51	-1.5 (0.20 [0.05-0.75])*

\* Statistically Significant. OR: Odds ratio, CI: Confidence interval, CMOHK: Comprehensive Measure of Oral Health Knowledge

**Table 3: Conceptual knowledge scores and its relation to oral health status**

Parameters	n (%)	CMOHK scores	P
DMFT			
Very low	94 (40)	14.0±1.4	0.09
Low	58 (25.5)	14.04±1.1	
Moderate	72 (30)	14.0±2.1	
High	16 (6.6)	14.16±1.6	
Gingival bleeding			
Present	166 (69.2)	13.9±1.1	0.0001
Absent	74 (31.1)	15.3±1.3	
Periodontal pockets			
Present	60 (24.1)	13.9±1.9	0.0001
Absent	180 (75.8)	16.5±1.6	

DMFT: Decayed-missing-filled teeth, CMOHK: Comprehensive Measure of Oral Health Knowledge

component alone revealed a highly significant inverse relation as shown in Table 4.

## DISCUSSION

This study was undertaken to assess the levels of conceptual knowledge and its relation to oral health status among school teachers in Sullia Taluk, Dakshina Kannada. Studies have traditionally focused on oral health literacy among the patients and selected group

of professionals. In this study, we have focused on conceptual knowledge among school teachers who can undoubtedly talk and pronounce in a more effective way than others.

Further, teachers constitute an important, influential part of the society and play an important role in the formation and modification of behaviors of young children. Therefore, oral health knowledge is critically important to them not only for their own oral health but also for the children that they are interacting with and teaching.<sup>[8]</sup>

This study is first to explore the relationship between conceptual knowledge and oral health outcomes in a population-based sample of school teachers in India. Hence, interpretation of the findings of this study should be made with caution.

The process of developing a questionnaire involved four main topic areas: basic knowledge of oral health, caries prevention and management, periodontal disease and management, and oral cancer and management. Originally, the questionnaire was 44 items. Later on, it was modified for a 23-item questionnaire.<sup>[8]</sup> The modified CMOHK questionnaire with 23 questions was adopted in

**Table 4: Comprehensive Measure of Oral Health Knowledge and decayed component of dental caries experience**

Decayed component	n (%)	CMOHK score	P
Very low	80 (34)	14±2.4	<0.001
Low	79 (33)	11±3.4	
Moderate	67 (28)	12±1.3	
High	14 (6)	9±1.2	

CMOHK: Comprehensive Measure of Oral Health Knowledge

our study; further, the questionnaire was pretested and a few necessary modifications were performed, both the English and the regional language versions were distributed to the participants, and the participants were free to answer whichever they were comfortable with.

A study conducted by Macek *et al.*, which compared three oral health literacy instruments, showed that the CMOHK scores showed more variability in assessing patients oral health compared to REAL-M and TOFHLA.<sup>[6]</sup>

The mean CMOHK score of this group was  $12.5 \pm 1.3$  and is considered to be fair. Comparable inferences were obtained in the previous studies conducted by Parker *et al.* and Lee *et al.* on other populations with different health literacy instruments.<sup>[9,10]</sup>

This study revealed that an increase in age was associated with low level of conceptual knowledge in accordance with which is found similar to the studies conducted by McQuistan *et al.* and Reshmi Haridas *et al.* but in contrast with the findings of the study conducted by Jones *et al.* for health literacy.<sup>[11-13]</sup>

Conceptual knowledge scores of male participants in the present study were lower compared to the female participants; a similar trend has been reported in the findings of study conducted by Gambhir *et al.*<sup>[14]</sup> Higher income and better education were associated with higher levels of CMOHK scores similar to the findings of the study conducted by McQuistan *et al.*<sup>[12]</sup>

In this study, we found a statistically significant difference for CMOHK scores among primary and high school teachers where primary school teachers had a better conceptual knowledge than their senior counterparts. Probable reason for this finding could be the type of curriculum that is provided to the students at that level of teaching for high school teachers, whereas primary school teachers are being constantly trained and retained in the educational

system, thus having a better conceptual knowledge and oral health status.

Further, it was observed in this study that conceptual knowledge and oral health status were significantly associated in an inverse relation in accordance with the studies conducted by Wehmeyer *et al.*, Ueno *et al.*, and Lee *et al.*; however, it is emphasized that these studies have focused on oral health literacy and not conceptual knowledge.<sup>[3,5,9]</sup>

One may argue that the sample studied in our study is a region-specific one; however, we would like to stress that the basic sociodemographic factors of school teachers across India remains the same (qualification, income, gender, etc.).<sup>[6]</sup> It is prudent to realize that this study is the first of its kind to test these relationships in India. The findings of this study suggest that age, gender, income, education, type of schools, and poor oral health status are associated with conceptual knowledge, and conceptual knowledge is positively linked with improved oral health.

Schools being the first level of learning may be regarded as the most essential aspect in an individual's life. The schools are an effective forum to enhance general as well as the oral health awareness among children.<sup>[8]</sup> Students follow what teachers do and say. Teachers are considered as role models to transmit values of life. School teachers by virtue of their training can influence a large number of children, thereby playing a major role in shaping of oral health practices and behavior and also in decision-making for oral health care.<sup>[16]</sup> It is therefore important that their own oral health knowledge is good and their oral health behavior conforms to expectation of the population.<sup>[16]</sup>

## CONCLUSION

We conclude that conceptual knowledge is a critically important aspect of oral health and is influenced by gender, age, education, and income.

We recommend that conceptual knowledge and issues such as tobacco consumption, oral health self-care, and utilization of dental services can be studied. The effect of conceptual knowledge on parents/caregivers/healthcare providers and their associated subgroups may be an interesting avenue of further research.

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## Conflicts of interest

There are no conflicts of interest.

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