International Journal of Contemporary Dental Research (IJCDR)
Vol. 01, Issue. 2, Apr 2023, pp. 7~14
ISSN –2584-0274 DOI: https//doi.org/10.62175/apdch2308

Assessing the Oral Health Status and Oral Health Literacy among Adult Population Visiting the Dental College in Aurangabad – A Cross Sectional Study

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Article Info

Article history:

Received:01/08/2023
Revised: 02/11/2023
Accepted: 03/20/2023

Keywords:

Oral health status,
carious teeth,
oral health awareness,
practitioner-patient,
communication,
Rapid Estimate Of Adult,
Literacy in Dentistry (REALD)

ABSTRACT

INTRODUCTION Detecting patients with insufficient oral health literacy (OHL) and enhancing communication between healthcare providers and patients is crucial in addressing the prevalence of preventable diseases and the reluctance to adopt healthy practices. This research endeavors to examine the correlation between OHL and specific socio-demographic factors, as well as adult oral health status of people residing in Aurangabad, Maharashtra, India. MATERIALS AND METHODS: The Rapid Estimate of Adult Literacy in Dentistry (REALD-30) was used to evaluate 150 participants who were chosen at random from the outpatient department of Shri Chatrapathi Shahu Maharaj Shikshan Sanstha (CSMSS). Using the 1997 World Health Organization oral health survey proforma, the demographic information and dental health status of each assessed individual were recorded. The Kruskal-Wallis test, correlations, analysis of variance, and t-tests were used in the statistical study. RESULTS: Statistically, there were no significant associations noticed between gender, age, or ethnicity and REALD-30 scores. However, notable associations were observed between specific oral health-related factors and the obtained REALD scores, including temporomandibular joint (TMJ) problems, prevalence of prosthetic needs, loss of attachment scores and CPI (Community Periodontal Index). Additionally, REALD-30 scores exhibited negative correlations in Dental Aesthetic Index (DAI) and DMFT (Decayed, Missing, and Filled Teeth) values. CONCLUSION: Sex, age, and ethnicity did not show associations with oral health literacy (OHL) within this sampled population from Aurangabad. However, a noteworthy association was identified between OHL and oral health status, revealing that lower OHL levels were linked to a deteriorating oral health status. Considering these findings, OHL instruments are crucial screening tools to determine who or what groups is most vulnerable to poor dental health.

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1. INTRODUCTION:

Literacy about health is a critical component of individuals' ability to understand, access, and utilizes health information effectively, ultimately influencing their overall well-being. In a world inundated

with complex medical information, health literacy serves as the key to empowering individuals to make informed decisions about their health.

Health literacy, as defined by Healthy People 2010, refers to the extent to which individuals possess the capability to acquire, process, and comprehend fundamental health information and services essential for making well-informed health decisions. It is intricately linked to disease prevention and health promotion. Individuals with high health literacy are better equipped to comprehend precautionary actions, interpret nutritional information, and engage in healthy behaviors. Consequently, this lowers the incidence of diseases that may be prevented and advances public health in general.

The effective communication between healthcare providers and patients relies heavily on health literacy. Patients with adequate health literacy can comprehend medical instructions, adhere to prescribed treatments, and articulate their health concerns. This fosters a more collaborative and informed healthcare environment, ultimately improving patient outcomes and satisfaction.[1]

Numerous obstacles hinder the utilization of healthcare and the embrace of healthy oral practices, spanning financial challenges, limited provider access, insufficient preventive care, and an array of behavioral and biological as well as community, and cultural factors. Within these factors, low literacy rates of health stands out as a significant contributor.

Despite healthcare professionals assuming that instructions and information provided to patients are easily grasped, the reality often involves misunderstandings, occasionally leading to serious errors. A prevalent cause for these misunderstandings is attributed to patients having low literacy about health.[2]

Pertaining to the context of oral health, the knowledge and awareness extends beyond basic reading and writing skills. It encompasses the ability to comprehend the origins of poor oral health, grasp the essential facets of good attitude toward dental self-care, converse effectively with their oral healthcare providers, navigate dental treatment processes, complete necessary forms, and adhere to prescribed regimens, including medication compliance and follow-up appointments. Recognizing the broader role of literacy in oral health is crucial for fostering effective communication, understanding, and adherence to oral health practices.[3]

Furthermore, one effective strategy for lowering health inequities is health literacy. People with lower levels of health literacy frequently encounter obstacles while trying to access healthcare services, which can cause delays in diagnosis and subpar treatment of medical illnesses. This gap can be closed by implementing health literacy programs, which will give a variety of people equitable access to healthcare resources and information.

Previous studies indicate a weak correlation between years of schooling and literacy, with literacy skills often lagging behind the achieved educational level. Thus, relying solely on educational attainment as a proxy for literacy may be misleading, as it does not accurately gauge an individual's capacity to comprehend and apply written information.[4]

Individuals with improved health literacy are more able to absorb, comprehend, and adopt healthy habits while reducing risk factors. Detecting individuals with inadequate oral health literacy (OHL) early on is crucial for improving communication between healthcare providers and patients, both in clinical settings and at the community level. In order to ensure that health activities are effective at the community level, early identification becomes crucial for modifying materials for learning and intervention initiatives to match the literacy levels of the target population.[1-3]

The following were the study's particular goals:

Examine the relationship between a number of sociodemographic factors, such as gender, age, and ethnicity, and oral health literacy (OHL), as measured by the Rapid Estimate of Adult Literacy in Dentistry (REALD-30).

2. Assess the relationship between OHL and oral health status using the Oral Health Assessment Proforma 1997 from the World Health Organization (WHO).

2. MATERIALS AND METHODS:

A cross sectional research was carried out in the CSMSS, Aurangabad, from March 2023 to October 2023. The overall incidence of dental caries was used as the primary response variable while estimating the sample size. Based on the preliminary investigation that preceded this study, which found that dental caries was prevalent in 85.5% of cases, 150 participants were included in the sample calculation.

Convenient sampling entailed selecting research subjects from the CSMSS Aurangabad main reception room waiting area. Patients and onlookers who visited the outpatient department of the dental hospital at CSMSS, Aurangabad was included in the sample. To be eligible to be included, subjects must fulfill certain standards, such as being at least eighteen years old, cognitively normal, able to speak and converse in English, and free of visual or auditory impairments. Participants also had to seem completely sober and free of any evident signs of drug or alcohol abuse.

Informed consent was obtained from every participant, and the study did not include the people who refused to provide consent.

A calibrated examiner performed a clinical oral examination on the approved patients. The oral health status of every screened individual was recorded using the World health organization Oral health survey proforma of the year 1997.

The study objectives mandated the recording of socio-demographic details. The ethnicity of the patient was classified based on their mother tongue because a sizable fraction of hospital visitors at CSMSS spoke one of the languages indicated below as their native tongue. Consequently, the codes assigned for ethnicity were as follows: 1-Marathi, 2-Hindi, 3-Urdu, and 4-other languages.

Every patient received a thorough evaluation during clinical examinations that included every element of the WHO Oral Health Survey. The exams were conducted in dental chairs located in the CSMSS Aurangabad Department of Public Health Dentistry and the Department of Oral Medicine and Radiology. Community periodontal index (CPI) probes and mouth mirrors were used for examining.

The calculations were made using the information gathered via the proforma:

1. The decayed teeth (DT), filled teeth (FT), and missing teeth (MT) components of the Decayed, Missing, and Filled Teeth (DMFT) index.
2. The score on the Dental Aesthetic Index (DAI).

For analytical purposes, specific components of the Oral Health Survey Proforma were dichotomized, indicating the presence or absence of particular conditions. Any score other than "0" or "9" in each component signified the presence of the respective condition. The oral health-related variables that underwent dichotomization included:

- Temperomandibular joint (TMJ) issues
- Mucosal lesions and conditions of oral bio-environment
- Enamel opacities
- Dental fluorosis
- Prosthetic status (presence of any prosthesis)
- Prosthetic need

The assessment of Oral Health Literacy (OHL) using the REALD-30 instrument involved brief interviews conducted post-oral health examinations. Each participant's interview lasted approximately 5 minutes. In an attempt to rule out the potential that respondents would pronounce terms correctly by accident, participants were told not to try pronouncing words for which they were unfamiliar with the correct pronunciation.

A statistical evaluation:

The collected data were subjected to the Kruskal–Wallis test, one-way analysis of variance, Karl Pearson's correlation coefficient (r), and Independent Samples t-tests. The SPSS-16 program was used for the analysis (SPSS Inc., 2007).

3. RESULTS:

The subjects were categorized by language (ethnicity), with the majority (49.9%) speaking. Marathi as their native language, followed by Hindi-speaking (21.7%) and Urdu-speaking (16.1%) individuals. Due to the limited number from other ethnic groups, they were excluded from the analysis concerning the association between nationality and OHL, and subsequent analyses if the association proved insignificant. The link between nationality and REALD scores did not show statistical significance (P > 0.005).

According to statistics, there were no discernible variations in the intra-examiner validity (P=0.048, paired t test). For the analysis, A total of 150 individuals were examined and interviewed. 53.3% (n = 80) of the population was male, and 46.6% (n = 70) was female. The ages of individual ranged from 18 to 73 years, with a mean age of 37.4 ± 13.7 years. REALD OHL mean-score was 14.08 ± 4.47. Four was the lowest possible score, and twenty-four was the highest. There was no analytical difference (P > 0.826) between the two genders, according to the findings of the independent samples t-test that looked at differences in REALD scores between males and female (Table 1).

Table 1: Distribution of subjects by gender and its association with REALD scores.

Gender	Number of subjects (*n*)	Frequency (%)	Mean REALD score (±SD)	*t*-value	*P* value
Males	80	53.3	14.08±4.47	0.082	0.826
Females	70	46.6	14.01±3.70		

REALD: Rapid estimate of adult literacy in dentistry, SD :Standard deviation

Less than 10% prevalence was observed in the following conditions in the present sample:

- Dental Fluorosis
- Temporomandibular Joint Disorders
- Oral mucosal lesions and conditions (Table 2)

Apart from the dichotomized components, more than 10% prevalence was observed in the present sample:

- Prosthetic need
- Presence of crowns or prosthesis
- Enamel opacities (Table 2)

Surprisingly the mean REALD scores were greater in subjects without TMJ issues, oral mucosal diseases, lesions, enamel opacities, prosthetic needs, or any prosthesis. However, only those with TMJ issues (P = 0.00) and those in need of prosthesis (P = 0.00) showed analytical differences. The mean REALD scores of those with dental fluorosis were somewhat higher than those of people without fluorosis, but the difference was not of statistical significance (P = 0.099).

Table 2: Frequency distribution table based on dichotomized outcome variables and their associations with REALD scores (independent- samples t-test).

Outcome variable	Number of subjects(*n*)	Frequency (%)	Mean REALD score (±SD)	*T* Value	*P* value
TMJ problems(symptoms/signs)					
Absent	142	94.7	14.29±4.56	0.635	0.00
Present	8	5.3	9.60±2.89		
Oral mucosal lesions/ conditions					
Absent	142	94.7	14.09±6.60	0.435	0.66
Present	8	5.3	14.30±6.22		
Enamel opacities					

Absent	109	72.7	14.35±6.66	2.223	0.22
Present	41	27.3	13.23±6.28		
Dental fluorosis					
Absent	136	90.9	14.04±6.67	−0.008	0.99
Present	14	9.1	14.05±6.58		
Prosthetic status(prosthesis)					
Absent	135	89.8	15.05±5.67	0.083	0.93
Present	15	10.2	14.94±4.69		
Prosthetic need					
Absent	118	78.6	16.24±5.38	7.442	0.00
Present	32	21.4	10.65±3.84		

*Statisticallysignificant(*P*<0.05),READL:Rapidestimateofadultliteracyindentistry,TMJ:Temperomandibularjoint,SD:Standarddeviation

The sample showed 48.75 ±16.15 DAI scores and a mean DMFT index of 3.40 ± 2.14. The table shows the means of the three different DMFT index components: DT, MT, and FT (Table 3).

Table3: Mean DMFT, DT, MT, FT scores and DAI scores of the subjects.

Outcome variable	Mean (±SD)	Range
DMFT	3.40±2.14	0-32
DT	0.13±0.83	0-9
MT	1.04±2.18	0-15
FT	2.24±2.26	0-16
DAI score	48.75±16.15	13-105

DMFT: Decayed, missing and filled teeth, DT: Decayed teeth, MT: Missing teeth, FT: Filledteeth, DAI: Dental aesthetic index, SD: Standard deviation

The study computed the degrees of correlation between the READL scores and different parametric factors. Age and READL scores had a non-significantly negative connection. DMFT, DT, MT, and DAI scores, nevertheless exhibited significant negative correlations with READL ($P < 0.05$), while FT scores displayed a positive correlation without statistical significance (Table 4).

Table 4: Correlations of READL scores with age, DMFT, DT, MT, FT, DAI scores.

Variable	Pearson correlation coefficient (*r*)	*P* value
Age	−0.005	0.944
DMFT	−0.417	0.00*
DT	−0.557	0.00*
MT	−0.445	0.00*
FT	0.217	0.11
DAI score	−0.663	0.02*

*Statistically significant ($P < 0.05$), READL: Rapid estimate of adult literacy in dentistry, DMFT: Decayed, missing and filled teeth, DT: Decayed teeth, MT: Missing teeth, FT: Filled teeth, DAI: Dental aesthetic index

The highest mean READLD score (14.44 ± 6.57) was observed in subjects with a CPI score of 0 for all sextants. A rise in the maximum CPI scores was pertained with a discernible reduction in mean READLD scores, and there were significant differences (P = 0.00) between patients who had different maximum CPI values.

A score of 2 was observed to be the maximum CPI value by 46.6% in the sample, whereas 2% of the sample had a score of 4. 34.6% of the individuals had a score of zero, meaning that there was no clinical attachment loss (Table 5).

There was a statistically strong correlation (P = 0.005) between LA scores and READLD. Individuals with no LA (Score 0) had a higher mean READLD score (13.23 ± 4.68) compared to those with LA (Score 1) with a mean score of (8.20± 4.91) (Table 5).

Table 5: Associations between CPI scores, LA scores and READLD scores ANOVA.

Variable	Number of subjects	Mean READLD score(±SD)	*F* value	*P* value
CPI				
Score 0	52	14.44±6.57	8.152	0.00*
Score 1	13	14.40±4.49		
Score 2	70	12.82±3.85		
Score 3	12	9.41±2.94		
Score 4	3	7.00±3.35		
LA				
Score 0	145	13.23±4.68	9.049	0.005*
Score 1	5	8.20±4.91		
Scores 2, 3, and 4	0	0		

*Statistically significant (*P* <0.05). CPI: community periodontal Index, LA: Loss of attachment,
READLD: Rapid estimate of adult literacy in dentistry, ANOVA: Analysis of variance

4. DISCUSSION:

Study was conducted from a sample that was chosen for convenience, making it non-representative of Aurangabad population. Only patients proficient in English were included due to the validation of the OHL test (READLD-30) in English only.[5] This inclusion criterion may introduce bias, especially among those in lower socioeconomic strata not familiar with English. Therefore, caution is advised when generalizing the findings, despite this study being among the first to measure OHL in this region.

One drawback is that since the majority of participants were seeking care, selection bias may have been introduced because they were chosen from a clinical context. Non-participation may have been influenced by awareness of limited literacy. Despite potential effects on overall mean OHL scores, relationships with other variables such as gender, age, race, and dental outcomes are not diminished by these factors.

READLD-30's limitations, measuring only word recognition without comprehension or function, are recognized. Nevertheless, earlier research indicates that OHL figures from word recognition assessments like as the READLD-30 have a strong correlation with understanding and functional health literacy.[6]

This South Indian population's mean OHL READLD-30 score was 15.04 ± 5.57, although there are no set cut-off marks that indicate insufficient OHL. Studies conducted on low-income WIC participants in North Carolina, USA, and indigenous Australian communities revealed similar mean scores.[2] In comparison to our dental hospital-based investigation, a different study on dental patients in North Carolina, USA, revealed a higher mean READLD score (23.9 ± 1.29).

Our study found no sex-based differences in OHL scores. This result, along with the limitations discussed, doesn't undermine associations between OHL and variables like age, sex, ethnicity, and oral health outcomes.

There are no set cut-off points to define inadequate OHL; the average OHL REALD-30 value for the South Indian population was 15.04 ± 5.57. Research conducted in North Carolina, USA, on a low-income WIC group and an indigenous Australian community revealed similar mean scores. Conversely, our dental hospital-based investigation yielded a lower mean REALD score (23.9 ± 1.29) than a study on patients in North Carolina, USA, involving subjects from private dental clinics.[8]

OHL scores in our study did not vary by gender, aligning with findings from a study in Los Angeles, California, which also found no association between OHL and gender.[8]

Although not statistically noteworthy, OHL values in the research we conducted showed a negative connection with age, indicating higher reading skills in younger age groups. Although a different study found that people over 40 had higher REALD scores, these age-related variations were not statistically significant. Patients' age and health literacy have been linked, with younger patients showing superior skills; however, this association may have greater significance when taken into account in conjunction with educational levels, which were not included in our study.[8]

Expected outcomes were seen with regard to relationships between oral health components and OHL scores. Individuals with lower mean REALD scores were more likely to have conditions such TMJ issues, oral mucosal lesions, enamel opacities, prosthetic presence, and prosthetic demands. REALD scores were highly correlated with TMJ issues and prosthesis requirement. Significantly, the only oral ailment where there was little variation across groups' OHL scores was dental fluorosis. Reduced caries experience (DMFT score) was associated with higher REALD scores; negative relationships were shown for decaying teeth (DT score) and missing teeth (MT score). Significant correlations were found between OHL scores and the likelihood of having less decaying and missing teeth; filled teeth (FT scores) exhibited a positive but non-significant link. It appears from this that people who scored higher on the OHL were more likely to need dental fillings.

Additionally, REALD scores and DAI scores exhibited a significant negative correlation, indicating that status of malocclusion, from DAI, was associated significantly with OHL.Health literacy involves knowledge, skills, and confidence to manage health effectively. Extrapolating this to OHL suggests that better navigation skills can lead to appropriate use of dental services, thereby improving dental health outcomes.[9]Both the CPI and LA index scores in this sample showed a strong association between OHL and periodontal condition. Higher CPI and LA index scores were consistently correlated with a drop in REALD scores, indicating that those with better OHL also had improved periodontal health.[5]

It has been discovered that low health literacy is associated with both reduced self-care behavior and inadequate knowledge, particularly with regard to chronic illnesses and their causes. In this study, individuals with low oral health literacy had greater rates of prosthetic requirements, higher malocclusion index (DAI) scores, and higher caries incidence; these findings were explained by this link.

Reduced compliance with recommendations may result from patients with low literacy levels finding it difficult to comprehend instructions or the value of preventative dental procedures. This study emphasizes how crucial it is to take OHL into account in addition to other determining factors; including gender, chronological age, and financial status, when determining which groups or individuals have worse results related to oral health.

In order to clarify the relationships between OHL and oral health state, the study also recommends that future research in this field look into the educational background of its participants. It highlights the necessity of conducting more study and suggests that adult basic education programs take on a major role in improving OHL abilities. Health care providers, researchers, educators, legislators, public servants, business leaders, and the general public must work together to achieve this.[10]

5. CONCLUSION:

1. The study found no associations between OHL and sex, age, or ethnicity within the Aurangabad population sample.

2. OHL demonstrated significant associations with various oral health outcomes, including TMJ issues, prosthesis requirements, dental caries history, malocclusion state, and state of periodontal disease.

3. There was a definite correlation that showed a lower OHL was associated with a worse state of oral health. As a result, OHL measures might be useful as screening tools to identify people or groups who could have negative oral health consequences.

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