



“Oral Health Literacy Levels Among Young Individuals Before and After Educational Program – An Epidemiological Study”

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KEYWORDS

Oral Health Literacy, Pre-test/Post-test, Traditional Lecture, Audio-visual aids, Chairside Group Discussion

ABSTRACT:

Introduction: Oral Health Literacy (OHL) is defined as the individual capacity to access, comprehend, and utilize oral health information to make health-related decisions. In India, there are insufficient validated measures to identify OHL, especially in dental students. This study aimed to develop and validate a qualitative instrument to assess OHL and determine the efficacy of different modes of education in improving OHL levels in dental students.

Materials and Methods: In total, 150 Bachelor of Dental Surgery (BDS) students from a Dental College were included. Research subjects were divided into three groups: Group A received a series of traditional lectures, Group B received lectures presented with audiovisual aids, and Group C participated in chairside group discussions. OHL levels were tested by a pre- and post-intervention questionnaire study measuring responsiveness for each educational approach.

Results: All three groups showed a statistically significant increase in OHL levels post-intervention ($p < 0.001$). Comparisons revealed that post-test scores of Groups B and C were significantly higher than Group A ($p < 0.001$), and Group C scores were also higher than Group B ($p = 0.049$), indicating that interactive, patient-centered interventions are more effective than traditional lectures.



Conclusion: Dental students had insufficient oral health knowledge and training, which needs improvement. Chairside group discussion was the most effective intervention for increasing OHL, followed by lectures with audiovisual aids, and traditional lectures.

Clinical Relevance:

- **Scientific Rationale:** Improving oral health literacy (OHL) is vital to patient care; however, dental students are not always sufficiently trained.
 - **Principal Findings:** All three approaches improved OHL, but chairside group discussions and audiovisual lectures were more effective than traditional lectures.
 - **Practical Implications:** Incorporating experiential, discussion-based, and patient-centered learning in dental education can better prepare students to assess and communicate OHL, improving patient outcomes.
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1. Introduction

Health literacy is a crucial determinant of health outcomes, alongside environmental and genetic factors, influencing the maintenance and prevention of diseases. Oral health, in particular, is affected by a wide range of factors, and despite substantial efforts to promote it, a gap persists between theoretical knowledge and practical application. Oral Health Literacy (OHL) is therefore considered essential for optimal oral health outcomes. OHL is typically defined as “the degree to which individuals can acquire, process, and comprehend basic oral health information and services required to make informed health decisions” [1,2].

According to the World Health Organization (WHO), oral health is a critical indicator of general health, well-being, and quality of life. Numerous studies have demonstrated a connection between oral health and overall wellness. Baskaradoss reported that more than one-third of individuals with low OHL had high periodontal risk, compared to only about 7% of those with adequate OHL [3]. Patients with poor OHL often struggle to understand the importance of medical advice or preventive dental procedures. Therefore, enhancing OHL is essential to foster positive attitudes, promote preventive practices, and increase awareness of oral disease [4].

Oral hygiene is a significant preventive measure influencing the overall protection of oral health in the population. Educating people about the importance and effectiveness of oral hygiene, promoting regular hygiene habits from a young age, and guiding them in using appropriate tools and agents are critical for disease prevention [5]. Studies have also shown that dental students themselves are not always sufficiently motivated to maintain good oral hygiene practices [6]. Teaching dental students about preventive and community dentistry has a substantial impact on their attitudes toward oral health, which can benefit their patients [7].

In traditional Indian dental colleges, lectures remain the primary teaching method. While lectures are effective and economical for teaching large groups, student participation is often limited, and learners tend to adopt a passive role [8]. In recent years, technologies such as laptops, tablets, video conferencing, group discussions, problem-solving sessions, case studies, and e-learning have transformed teaching strategies. Group discussions, in particular, provide opportunities to strengthen communication skills, especially listening, while enhancing participation, knowledge retention, and student confidence [9,10].



In the field of oral health education, group discussions have become increasingly common. Additionally, chairside teaching allows dentists to educate patients directly during clinical procedures. Each patient can be instructed on plaque control and motivated to practice daily oral hygiene, creating an interactive learning environment for students [11,12].

This study aims to evaluate the baseline oral health literacy levels of first-year undergraduate dental students and assess the effectiveness of three educational interventions—traditional lectures, lectures with audiovisual aids, and chairside group discussions in enhancing their oral health literacy.

2. Objectives

- To assess the baseline oral health literacy (OHL) levels among first-year undergraduate dental students.
- To evaluate the effectiveness of three different educational interventions in improving OHL levels:
Traditional lectures, Lectures with audiovisual aids, Chairside group discussions
- To compare the post-intervention OHL levels across the three educational methods to identify the most effective approach.
- To provide recommendations for incorporating interactive and student-centered teaching methods into dental education for better oral health literacy outcomes.

3. Methods

Study Design and Participants

This epidemiological study was conducted to evaluate OHL levels among first-year Bachelor of Dental Surgery (BDS) students at Vishnu Dental College, Bhimavaram, India, from September 2022 to November 2022. Ethical approval was obtained from the Institutional Ethics Committee, and written informed consent was collected from all participants [13].

Only first-year BDS students who provided written consent were included; students from higher years were excluded. A total of 150 students were recruited and randomly divided into three groups of 50 each for the educational interventions [14].

Educational Interventions

Group A – Traditional Lecture: Oral health education was delivered through a conventional didactic lecture. Pre- and post-test questionnaires were administered [15].

Group B – Lecture with Audiovisual Aids: Students received oral health education through lectures supplemented with audiovisual aids. Pre- and post-test questionnaires were conducted [16].

Group C – Group Discussion with Chairside Talk: This group participated in interactive discussions beside the patient chair. Pre- and post-test questionnaires were administered to evaluate knowledge improvement [17].

A 15-item questionnaire assessed OHL, with each correct answer scoring 1 point, giving a maximum score of 15. All items carried equal weight [14] (Figure 1).

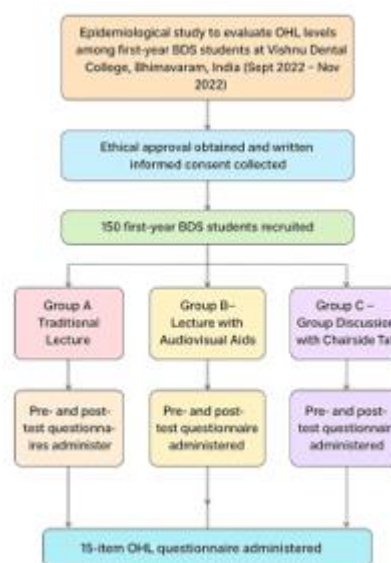


Figure 1. Flow Diagram of the Study Design.



Data Collection and Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 21.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were expressed as mean \pm standard deviation.

Intragroup Comparison: Paired sample t-tests evaluated the change in OHL scores before and after each educational intervention [18].

Intergroup Comparison: One-way analysis of variance (ANOVA) compared post-test OHL scores across the three groups [18].

Post Hoc Analysis: Tukey's HSD test performed pairwise comparisons between groups [18].

A p-value < 0.05 was considered statistically significant. Graphs and tables were generated using Microsoft Excel and SPSS 21.0.

4. Results

A total of 150 first-year BDS students from Vishnu Dental College participated in the study. The students' oral health literacy (OHL) was assessed using a 15-item questionnaire administered before and after the educational interventions. Each correct response was scored as 1, yielding a maximum possible score of 15.

Analysis of the intragroup comparisons revealed that all three educational interventions significantly improved OHL scores. In **Group A** (traditional lecture), the mean pre-test score was 5.40 ± 0.70 , which increased to 10.50 ± 3.80 post-intervention ($p = 0.000$). **Group B** (lecture with audiovisual aids) showed a mean pre-test score of 5.26 ± 0.75 , which improved to 12.76 ± 3.08 following the intervention ($p = 0.000$). **Group C** (chairside group discussion) demonstrated the highest improvement, with mean pre-test and post-test scores of 5.36 ± 0.69 and 14.00 ± 0.64 , respectively ($p = 0.000$). These results indicate that all three educational methods were effective in enhancing OHL among the participants. (Table 1, Figure 2)

Table 1: Intragroup Comparison of Oral Health Literacy Scores using paired sample t-test.

Group	Pre-Test Mean \pm SD	Post-Test Mean \pm SD	Test Statistic	p-value
A	5.40 \pm 0.70	10.50 \pm 3.80	-9.607	0.000*
B	5.26 \pm 0.75	12.76 \pm 3.08	-16.694	0.000*
C	5.36 \pm 0.69	14.00 \pm 0.64	-78.712	0.000*

*Paired sample t-test; statistically significant

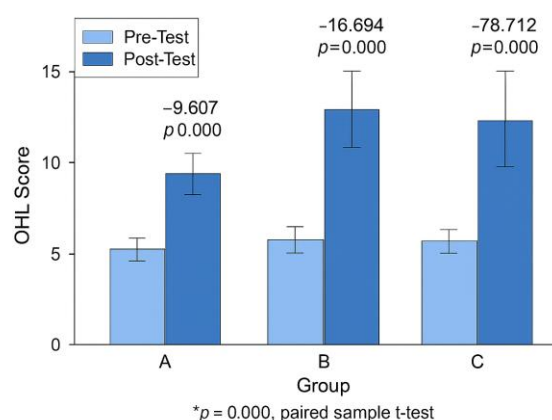


Figure 2: Bar graph showing intergroup comparisons of pre- and post-test mean scores (Mean \pm SD); using paired sample t-test.(p = 0.000*).

Intergroup comparisons of pre-test scores showed no significant differences between the groups (Group A: 5.40 ± 0.70 , Group B: 5.26 ± 0.75 , Group C: 5.36 ± 0.69 ; $p = 0.602$), suggesting comparable baseline OHL levels. Post-test scores, however, differed significantly across the groups (Group A: 10.50 ± 3.80 , Group B: 12.76 ± 3.08 , Group C: 14.00 ± 0.64 ; $p = 0.000$), demonstrating the superior effectiveness of interactive educational strategies.(Table 2, Figure 3)



Table 2: Intergroup Comparison of Oral Health Literacy Scores using One-way ANOVA

Group	Pre-Test Mean ± SD	Post-Test Mean ± SD	F-value	p-value
A	5.40 ± 0.70	10.50 ± 3.80		
B	5.26 ± 0.75	12.76 ± 3.08	19.392	0.000*
C	5.36 ± 0.69	14.00 ± 0.64		

*Statistically significant

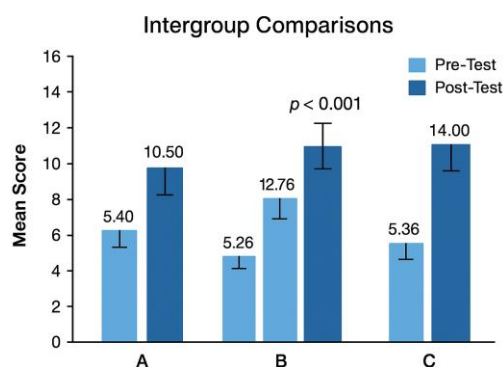


Figure 3: Bar graph showing intergroup comparisons of pre- and post-test mean scores (Mean ± SD); One-way ANOVA indicated a significant difference ($F = 19.392$, $p = 0.000^*$).

Pairwise post hoc analysis further clarified these differences. OHL levels in **Group B** were significantly higher than in Group A (mean difference = 2.26 ± 0.57 , $p = 0.000$). **Group C** scores were significantly higher than both Group A (mean difference = 3.50 ± 0.57 , $p = 0.000$) and Group B (mean difference = 1.24 ± 0.57 , $p = 0.049$). These findings indicate that chairside group discussions were the most effective method for improving OHL, followed by lectures with audiovisual aids, and traditional lectures. (Table 3, Figure 4)

Table 3: Pairwise Comparison of Post-Test OHL Scores using Tukey's HSD

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	p-value	95% CI Lower	95% CI Upper
A	B	-2.26	0.57	0.000	-3.61	-0.91
A	C	-3.50	0.57	0.000	-4.85	-2.15
B	C	-1.24	0.57	0.049	-2.59	0.11

*Statistically significant

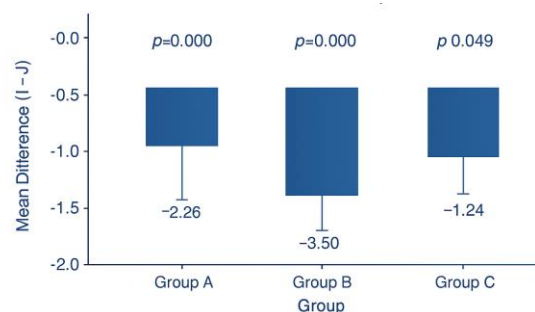


Figure 4: Bar graph showing Post-Hoc Pairwise Comparison (Tukey HSD)

5. Discussion

Oral health literacy (OHL) is a multifaceted concept that significantly influences oral health knowledge, attitudes, and behaviors [21]. Individuals with higher OHL are better equipped to understand preventive measures, adhere to oral hygiene practices, and make informed decisions about their dental care [22]. According to the US Department of Health and Human Services, OHL is defined as "the degree to which individuals have the capacity to access, process, and understand essential oral health information and services necessary to make informed health decisions" [23].

In developing countries, large segments of the population lack awareness and practice poor oral



hygiene habits, increasing the risk of oral diseases [24]. Similarly, dental students' own oral health attitudes and behaviors influence the guidance they provide to patients. Since dentists are expected to serve as role models, their personal oral health practices directly impact the advice they deliver to patients [25]. In light of this, the present study focused on evaluating OHL among first-year undergraduate dental students.

Pre-test and post-test assessments using a 15-item questionnaire revealed a statistically significant improvement in OHL scores for all three educational interventions. These findings align with previous studies by Shivaraju et al. [26] and Imanieh et al. [27], which demonstrated that structured pre-test/post-test educational interventions significantly improved students' knowledge.

Comparisons between groups demonstrated that interactive approaches were more effective than traditional lectures. Group discussions conducted chairside (Group C) yielded the highest improvement in OHL, followed by lectures with audiovisual aids (Group B), and conventional lectures (Group A). Florence et al. [28] and D'Souza et al. [29] reported that students preferred the use of PowerPoint presentations and interactive methods over traditional lectures. However, in contrast, Neeta Kumar et al. [30] found that most students still preferred conventional "talk and chalk" lectures over PowerPoint presentations, indicating that teaching preferences may vary depending on context and learning environment.

Group discussions promote active participation, enhance retention of knowledge, and develop communication and critical thinking skills [31,32]. Chairside teaching allows students to apply theoretical knowledge directly to patient care, improving both learning outcomes and patient education [33]. Rafisa et al. [34] emphasized that chairside talk increases patient knowledge and awareness about oral hygiene. Sweet et al. [35]

highlighted that chairside teaching derived from favorable clinical experiences helps students observe, relate, and apply practical knowledge effectively.

Such interactive approaches not only improve literacy but also prepare students for effective patient communication, a crucial skill in clinical practice. Mungal et al. [36] emphasized that group discussions develop competencies beyond knowledge, including collaboration, problem-solving, and professional behavior. Chairside teaching has been recognized as an effective method to translate theoretical knowledge into practical skills, enhancing both student confidence and patient care outcomes [37].

This study concludes that educational interventions significantly improve oral health literacy among first-year dental students. Chairside group discussions were the most effective, followed by lectures with audiovisual aids, while traditional lectures produced moderate improvement. The findings suggest that incorporating interactive, patient-centered teaching methods into dental curricula can enhance students' knowledge and communication skills, ultimately leading to better patient oral health outcomes.

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