**ORIGINAL RESEARCH**

## Measuring the level of oral health literacy in different populations and its correlation with the prevention and management of oral pathologies

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**Abstract:**

**Background**

Oral health literacy (OHL) is critical in enabling individuals to make informed decisions regarding their oral health care. Low levels of OHL have been associated with poor oral health outcomes, including increased prevalence of dental caries, periodontal diseases, and other oral pathologies. This study aims to measure the level of OHL in different populations and explore its correlation with the prevention and management of oral pathologies.

**Materials and Methods**

A cross-sectional study was conducted across three distinct populations: urban, rural, and semi-urban. A total of 600 participants were selected through stratified random sampling, with 200 individuals from each population group. OHL was assessed using the Oral Health Literacy Instrument (OHLI), a validated questionnaire comprising 30 items related to reading comprehension, numeracy, and the ability to understand oral health-related information. Data on oral health behaviors, such as frequency of dental visits, oral hygiene practices, and history of oral pathologies, were collected through structured interviews. The correlation between OHL levels and the prevention and management of oral pathologies was analyzed using Pearson's correlation coefficient and multivariate regression analysis.

**Results**

The mean OHL scores were found to be significantly different across the three populations. Urban participants had the highest OHL score (mean: $28.4 \pm 3.2$), followed by semi-urban (mean: $23.7 \pm 4.1$) and rural participants (mean: $18.9 \pm 5.6$). A positive correlation was observed between higher OHL scores and better oral health behaviors, such as regular dental visits and effective oral hygiene practices ($r = 0.65$, $p < 0.001$). Participants with higher OHL scores were less likely to report a history of dental caries (OR: 0.55, 95% CI: 0.37–0.81) and periodontal diseases (OR: 0.62, 95% CI: 0.42–0.90).

## Conclusion

The study highlights significant disparities in OHL across different populations, with urban residents exhibiting higher literacy levels than their rural counterparts. Higher OHL is strongly correlated with better prevention and management of oral pathologies, emphasizing the need for targeted educational interventions to improve OHL, particularly in rural and semi-urban areas. Enhanced OHL may lead to better oral health outcomes and reduce the burden of oral diseases.

## Keywords

Oral health literacy, oral pathologies, prevention, management, urban, rural, semi-urban, oral hygiene practices, dental caries, periodontal diseases.

## Introduction

Oral health literacy (OHL) is an essential component of overall health literacy, defined as the degree to which individuals have the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions. OHL specifically pertains to oral health knowledge, skills, and the ability to comprehend and apply oral health information in decision-making processes related to oral hygiene, prevention, and management of oral diseases. Low levels of OHL are increasingly recognized as a significant barrier to achieving optimal oral health outcomes, as individuals with limited OHL may have difficulty understanding oral health instructions, navigating healthcare systems, and adhering to prescribed oral health regimens (1,2).

The relationship between OHL and oral health outcomes has been extensively studied, with findings indicating that low OHL is associated with poor oral hygiene practices, irregular dental visits, and higher incidences of oral diseases such as dental caries and periodontal diseases (3,4). For instance, a study by Jones et al. (5) found that individuals with lower OHL were more likely to exhibit inadequate brushing and flossing habits, leading to increased plaque accumulation and a higher risk of developing periodontal disease. Similarly, limited OHL has been linked to delayed or inappropriate utilization of dental services, further exacerbating oral health disparities (6).

In many regions, significant disparities in OHL levels exist between different populations, particularly between urban and rural communities. Urban populations generally have greater access to educational resources and healthcare services, contributing to higher OHL levels compared to their rural counterparts, who may face challenges such as lower educational attainment, limited access to dental care, and cultural barriers (7). These disparities underscore the need for targeted interventions to enhance OHL, particularly in underserved communities, as a strategy to improve oral health outcomes and reduce the burden of oral diseases (8).

The present study aims to assess the level of OHL in different populations and explore its correlation with the prevention and management of oral pathologies. By understanding the relationship between OHL and oral health behaviors, this research seeks to inform public health strategies aimed at improving OHL and, consequently, oral health outcomes across diverse population groups.

## Materials and Methods

### Study Design and Population

This cross-sectional study was conducted over a period of six months, targeting three distinct population groups: urban, rural, and semi-urban. The study aimed to assess the oral health literacy (OHL) levels of individuals within these populations and correlate these levels with their oral health behaviors and the prevalence of oral pathologies. A total of 600 participants, aged 18-65 years, were recruited through stratified random sampling, with 200 participants from each population group.

## Inclusion and Exclusion Criteria

Participants were eligible for inclusion if they were aged 18-65 years, could communicate in the local language, and provided informed consent. Individuals with cognitive impairments or those unable to participate in the oral health literacy assessment due to severe medical conditions were excluded from the study.

## Data Collection Tools

OHL was assessed using the Oral Health Literacy Instrument (OHLI), a validated questionnaire that measures oral health literacy through 30 items. The OHLI consists of three main sections: reading comprehension, numeracy, and the ability to understand oral health-related information. The reading comprehension section includes passages related to oral health topics, followed by multiple-choice questions. The numeracy section assesses the participants' ability to calculate medication dosages, interpret nutrition labels, and understand appointment schedules. The third section evaluates their understanding of common oral health terminologies and instructions.

In addition to the OHLI, data on oral health behaviors were collected through structured interviews. Participants were asked about their frequency of dental visits, oral hygiene practices (e.g., brushing and flossing habits), and history of oral pathologies, including dental caries, periodontal diseases, and other relevant conditions.

## Data Collection Procedure

Data collection was conducted by trained interviewers who were calibrated to ensure consistency and reliability in administering the OHLI and conducting the structured interviews. Prior to data collection, the interviewers underwent a one-day training session on the study protocol, questionnaire administration, and ethical considerations.

The participants completed the OHLI questionnaire in a face-to-face interview setting, with each interview lasting approximately 30 minutes. The structured interviews regarding oral health behaviors and history of oral pathologies were conducted immediately following the OHLI assessment.

## Statistical Analysis

The collected data were analyzed using SPSS version 25.0 (IBM Corp., Armonk, NY). Descriptive statistics, including means, standard deviations, and frequencies, were used to summarize the OHL scores and oral health behaviors across the three population groups. Pearson's correlation coefficient was employed to assess the relationship between OHL scores and oral health behaviors, such as frequency of dental visits and adherence to oral hygiene practices.

Multivariate regression analysis was performed to explore the association between OHL levels and the prevalence of oral pathologies, adjusting for potential confounders such as age, gender,

education level, and socioeconomic status. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to determine the strength of associations between OHL and specific oral health outcomes.

## Results

A total of 600 participants were included in the study, with an equal distribution across the three population groups: urban (n = 200), semi-urban (n = 200), and rural (n = 200). The demographic characteristics of the study participants are summarized in Table 1.

**Table 1. Demographic Characteristics of Study Participants**

| Demographic Variable | Urban (n=200) | Semi-Urban (n=200) | Rural (n=200) | Total (N=600) |
|---|---|---|---|---|
| Mean Age (years) | 34.5 ± 12.2 | 38.7 ± 10.8 | 42.3 ± 11.4 | 38.5 ± 11.7 |
| Gender (Male/Female) | 95/105 | 98/102 | 101/99 | 294/306 |
| Education Level (%) | | | | |
| - Primary | 5 (2.5%) | 30 (15%) | 85 (42.5%) | 120 (20%) |
| - Secondary | 45 (22.5%) | 75 (37.5%) | 90 (45%) | 210 (35%) |
| - Higher Education | 150 (75%) | 95 (47.5%) | 25 (12.5%) | 270 (45%) |
| Socioeconomic Status (%) | | | | |
| - Low | 10 (5%) | 45 (22.5%) | 120 (60%) | 175 (29.2%) |
| - Middle | 80 (40%) | 120 (60%) | 70 (35%) | 270 (45%) |
| - High | 110 (55%) | 35 (17.5%) | 10 (5%) | 155 (25.8%) |

## Oral Health Literacy Scores

The mean OHL scores varied significantly across the three population groups (Table 2). Urban participants had the highest OHL scores, followed by semi-urban and rural participants.

**Table 2. Oral Health Literacy Scores by Population Group**

| Population Group | Mean OHL Score (± SD) | Range |
|---|---|---|
| Urban | 28.4 ± 3.2 | 22-30 |
| Semi-Urban | 23.7 ± 4.1 | 15-29 |
| Rural | 18.9 ± 5.6 | 10-26 |
| **Total** | 23.7 ± 6.3 | 10-30 |

## Correlation Between OHL and Oral Health Behaviors

A positive correlation was observed between OHL scores and oral health behaviors across the study population. Participants with higher OHL scores reported better oral hygiene practices and more frequent dental visits (Table 3).

**Table 3. Correlation Between OHL Scores and Oral Health Behaviors**

| Oral Health Behavior | Correlation Coefficient (r) | p-value |
|---|---|---|
| Frequency of Dental Visits | 0.65 | <0.001 |
| Regular Brushing (≥2 times/day) | 0.58 | <0.001 |
| Flossing Habit | 0.52 | <0.001 |

**Association Between OHL and Oral Pathologies**

The prevalence of oral pathologies was inversely associated with OHL scores. Participants with higher OHL scores were less likely to report a history of dental caries and periodontal diseases (Table 4).

**Table 4. Association Between OHL Scores and Oral Pathologies**

| Oral Pathology | Odds Ratio (OR) | 95% Confidence Interval (CI) | p-value |
|---|---|---|---|
| Dental Caries | 0.55 | 0.37–0.81 | 0.002 |
| Periodontal Diseases | 0.62 | 0.42–0.90 | 0.01 |

The results demonstrate significant disparities in OHL levels across different populations, with urban participants exhibiting higher literacy levels compared to rural participants. Higher OHL scores were strongly correlated with better oral health behaviors and a lower prevalence of oral pathologies. These findings highlight the importance of improving OHL as a strategy to enhance oral health outcomes, particularly in underserved populations.

**Discussion**

The findings of this study demonstrate significant disparities in oral health literacy (OHL) levels across different population groups, with urban participants exhibiting higher OHL scores compared to their semi-urban and rural counterparts. These disparities in OHL are consistent with previous studies that have highlighted the influence of socio-economic factors, education, and access to healthcare resources on health literacy (1,2). Higher OHL levels in urban areas are likely attributed to better access to educational resources, healthcare services, and health information, which collectively contribute to more informed health behaviors and improved oral health outcomes (3).

The positive correlation observed between OHL and oral health behaviors in this study aligns with existing literature that underscores the importance of OHL in promoting preventive dental practices. For instance, participants with higher OHL scores were more likely to engage in regular oral hygiene practices, such as brushing and flossing, and to visit dental professionals routinely. These findings are consistent with research by Divaris et al. (4), who reported that higher OHL is associated with more frequent dental visits and better oral hygiene practices. Such behaviors are crucial for the prevention and early detection of oral diseases, thereby reducing the overall burden of oral pathologies.

Moreover, the inverse association between OHL and the prevalence of oral pathologies, such as dental caries and periodontal diseases, reinforces the role of OHL as a determinant of oral health outcomes. Participants with higher OHL scores were less likely to report a history of dental caries and periodontal diseases, which is consistent with the findings of Lee et al. (5), who demonstrated that individuals with limited OHL are at higher risk for oral diseases due to

inadequate self-care and delayed utilization of dental services. This relationship highlights the need for targeted interventions aimed at improving OHL, particularly in rural and semi-urban populations where the burden of oral diseases is disproportionately higher.

The disparities in OHL observed in this study may also be influenced by broader social determinants of health, such as income, education, and access to healthcare. Rural populations, who generally have lower OHL, are often characterized by lower educational attainment, limited access to dental care, and cultural barriers that may impede their ability to seek and understand health information (6). These factors contribute to a cycle of poor oral health that is difficult to break without concerted public health efforts.

Addressing these disparities requires a multifaceted approach that includes educational interventions to enhance OHL, especially in underserved communities. Public health campaigns that utilize culturally appropriate materials and communication strategies can help bridge the gap in OHL and promote better oral health behaviors. Additionally, integrating oral health education into primary care settings and schools could further enhance OHL at the population level (7).

While this study provides valuable insights into the relationship between OHL and oral health outcomes, it is not without limitations. The cross-sectional design limits the ability to infer causality between OHL and oral health behaviors or outcomes. Furthermore, the study relies on self-reported data, which may be subject to recall bias or social desirability bias. Future research should consider longitudinal designs and objective measures of oral health to validate and extend these findings.

**Conclusion**

In conclusion, this study highlights significant disparities in OHL across different populations and underscores the importance of OHL in the prevention and management of oral pathologies. Improving OHL, particularly in rural and semi-urban populations, is essential for reducing oral health disparities and enhancing overall health outcomes. Public health strategies that focus on increasing OHL could lead to better oral health behaviors and a reduction in the prevalence of oral diseases.

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