



## Oral Health Literacy and its Relationship with Oral Health among Nursing Professionals Working in a Tertiary Care Hospital

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### KEYWORDS

Dietary Supplements; Oral Health; Dental Caries; Dental Plaque; Dental Calculus; Periodontal Pocket

### ABSTRACT:

**Introduction:** Oral health is an integral part of general health and wellbeing. Nursing professionals account for most of the healthcare workforce and are at the forefront of promoting personal hygiene of patients.

**Objective:** To assess and compare the oral health literacy and oral health of nursing professionals working in tertiary care hospital.

**Methodology:** A cross-sectional study was conducted among 120 working nursing professionals of tertiary hospital of Indore. The participants were asked to respond to a 17 item pre-validated Oral health literacy questionnaire Hindi questionnaire (OHL-HQ). ADA Type III Clinical examination of the oral cavity was carried and data was recorded on WHO oral health assessment form 2013 proforma.

**Result:** The mean OHL-HQ score of study participants was 7.93(SD-3.22) on the scale of 0 to 17. The mean reading, numeracy and decision-making domain of OHL-HQ indicated a score of 3.12(SD-1.9), 2.38(SD-1.07) and 1.49(SD-1.3) respectively. The caries prevalence was 58.3% with mean DMFT of 1.4(SD-1.4). The bleeding and periodontal pockets were seen in 47.5% and 19.1% of study participants respectively.

**Conclusion:** The oral health literacy among nursing professionals was low. The subdomains of the questionnaire also indicated a low reading, numeracy and listening skills on oral health literacy. The caries and periodontal conditions were comparable to disease levels of general population.

### Introduction

Oral disease affects approximately 3.5 billion individuals across all age groups.<sup>1</sup> The prevalence of

oral disease is continuing to increase with increasing urbanization and sedentary lifestyles, resulting in remarkable health and economic burdens.<sup>2</sup> The impact of oral disease extends beyond oral pain and discomfort,



often affecting the functioning and quality of life of the affected individuals.<sup>3</sup> Oral health is an integral part of general health and wellbeing.<sup>4</sup> Evidence suggests that oral health status and oral hygiene practices have a significant role in improving overall health.<sup>5</sup> Nursing professionals account for most of the healthcare workforce and are at the forefront of promoting oral hygiene. Studies have emphasized that nursing professionals do have a prominent role in creating awareness about oral health and imparting integrated oral care.<sup>6-7</sup> However, poor oral health literacy levels, i.e., lack of knowledge, negative attitudes towards oral healthcare, and inadequate training of nursing professionals, have been identified as the major barriers to quality oral healthcare.<sup>8</sup> Oral health literacy (OHL) refers to an individual's ability to understand, process, and use information related to oral health in a way that promotes good oral health behaviors and outcomes.<sup>9</sup> It is a critical component of overall health literacy, which influences individuals' health decisions, especially in professional settings. For nursing professionals, who are often the first point of contact for patients in healthcare settings, adequate oral health literacy is paramount, as they not only need to care for patients' general well-being but also promote oral health awareness and practices. Nurses working in tertiary care hospitals play an essential role in promoting health education, including oral health, among patients.<sup>10</sup> However, their own oral health literacy could affect their ability to educate patients effectively and take the necessary preventive measures in their own health. Studies suggest that inadequate OHL among healthcare workers, especially nurses, can contribute to poor oral health outcomes among patients, as they may lack the knowledge or resources to educate others properly.<sup>11</sup> Incorporating oral health education into the training programs for nursing professionals would enable them to enhance patient care and alleviate the challenges associated with oral health issues. Previously, systematic reviews have indicated that the integration of oral health education into nursing practice improves the quality of oral health and reduces inequities associated with oral health.<sup>7,12</sup> The incorporation of oral health education into nursing curricula (via interprofessional education) could be useful to increase the awareness of nurses, and to improve access to and the ability to provide quality oral care to the elderly population.<sup>7</sup>

Similarly, another systematic review assessed the effectiveness of integrating maternal and children's oral health promotion into nursing and midwifery practice.<sup>12</sup> The findings suggest that the incorporation of oral health promotion had the potential to reduce oral health disparities and expand access to preventive dental care within poor and disadvantaged communities. Furthermore, nursing professionals with low oral health literacy may be less likely to seek professional dental care for themselves or their families. They may also have difficulty in advising patients on proper oral hygiene practices, oral health risks, or the importance of routine dental check-ups.<sup>11</sup> For these reasons, understanding the relationship between oral health literacy and oral health among nursing professionals is crucial for improving not only their own health outcomes but also the care they provide to patients.

## Materials and Method

A cross-sectional study was conducted among 120 Nursing professionals working in a tertiary care hospital of Indore city. Both BSC Nursing and GNM Nursing graduates aged between 18–40 years who are on regular payroll were considered for the study. Ethical clearance was obtained from Institutional Review Board of Sri Aurobindo Institute of Medical Sciences, Indore. (SAIMS/RC/IEC/53/24). Written informed consent for voluntary participation was obtained from the study participants. Nurses who have been exposed to any dental treatment or oral health education in past 6 months were not included.

## Sample Size

The sample size was estimated considering 50 percent of estimated Oral Health Literacy level among the Nursing professionals. Considering a power of 80% and 95% confidence interval, the required sample size was 96 participants. The final sample was adjusted to 120 nursing professions considering the non-response rate of 20 percent.

## Sampling Procedure

Stratified random sampling was employed to select the study sample. The study population was stratified according to the graduation - BSC Nursing and GNM Nursing. A lottery method was employed to select the study participants from the list obtained from the Superintendent of Nursing. The nursing professional



selected if not willing to participate or not providing the informed consent was replaced by the next random selection.

### Measurement Tools

A structured proforma was used to record the basic demographic details and the oral hygiene practices. WHO oral health assessment form for Adults – 2013 was used to record the oral health status data through complete clinical examination of the study participant.<sup>13</sup> All the codes and criteria as stated in the WHO Basic Oral Health Survey procedures -2013 was followed. *Oral Health Literacy Adult Questionnaire (OHL-AQ-H)* is a Hindi language validated tool designed to assess oral health literacy levels among adults.<sup>14</sup> It evaluates an individual's ability to obtain, process, and understand basic oral health information and services necessary to make appropriate health decisions. The OHL-AQ-H consists of 17 items divided into four key domains: reading comprehension, numeracy, listening, and decision-making. These domains collectively assess functional, communicative, and critical health literacy skills in the context of oral health. The oral health literacy was evaluated on a scale of score 0-17, with score 0-9 signifying as Low, 10-11 as moderate and 12-17 as High oral health literacy. The questionnaire includes practical scenarios, such as interpreting prescription instructions, appointment slips, and understanding oral health advice, making it contextually relevant and applicable across various populations. It has been used internationally and adapted in multiple languages, including in Indian settings, to identify gaps in oral health literacy and design targeted educational interventions.

### Data Collection

The selected nurse were provided with study proforma and self-administered *Oral Health Literacy Adult*

*Questionnaire- Hindi (OHL-AQ-H)* questionnaire. An instruction to complete the questionnaire was explained in the ward and the doubts of nurses were clarified. Sufficient time was given to complete the questionnaire without interference from the investigator. The nurses were assured of confidentiality of their responses. A single trained and calibrated investigator carried out all the clinical data (Kappa 0.84). The clinical examination involved an inspection of the oral cavity with plane mouth mirror and community periodontal (CPI) probe under good illumination. ADA Type III examination was followed.

### Statistical Analysis

Data collected was entered into Microsoft Excel data sheet and analyzed using Statistical Package for Social Sciences (SPSS, IBM Version20.0). Descriptive statistics was employed and checked for normal distribution. Level of significance was fixed at 5 percent. Student t test was employed to compare mean OHI-s, plaque, DMFT and Oral health literacy scores among the groups. Chi square test was employed to compare the frequencies of bleeding on probing, periodontal pocket and loss of attachment among the study and control group.

### Results

The results are based on the clinical oral examination and the responses received for the Oral Health Literacy Adult Questionnaire- Hindi (OHL-AQ-H) questionnaire by 120 nursing professionals. The oral health data was recorded on WHO oral health assessment form for Adults, 2013. The present study was carried out to assess the Oral health literacy and its relationship with oral health among nursing professionals working in tertiary care hospital.

**Table: 1 Demographic details of study participants**

Variable		Frequency / SD	
Age in years	Mean (SD)	28.1(4. 7)	
Gender	Male	22	(18.4 %)
	Female	98	(81.6 %)



<b>Education</b>	<b>GNM Nursing</b>	64	(53.4 %)
	<b>BSc Nursing</b>	56	(46.6 %)
<b>SES</b>	<b>Upper</b>	8	(6.1%)
	<b>Upper middle</b>	46	(35.1%)
	<b>Lower middle</b>	56	(42.7%)
	<b>Upper lower</b>	18	(13.7%)
	<b>Lower</b>	3	(2.3%)

The demographic characteristics of the 120 study participants are shown in **Table 1**. The average age of the participants was 28.1 (SD=4.7) years, indicating that the sample predominantly consisted of young adults. In terms of gender distribution 81.6% were females. Majority of participants had completed General Nursing and Midwifery (GNM) diploma (53.4%), while the

remaining 46.6% had completed a Bachelor of Science in Nursing (BSc Nursing). The socio-economic status (SES) indicated that majority belonged to the lower middle (42.7%) and upper middle (35.1%) socio-economic groups, followed by 13.7% from the upper lower category.

**Table: 2 Comparison of Oral Health Literacy Score (OHL-AQ-H) between nursing professionals**

<b>BSc Nursing</b>		<b>GNM Nursing</b>		<b>Overall</b>	
<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>
<b>7.73</b>	<b>3.32</b>	<b>8.09</b>	<b>3.16</b>	<b>7.93</b>	<b>3.22</b>
<b>p = 0.579 (Non Significant) Test: Unpaired t-test</b>					

**Table 2** summarizes the oral health literacy scores, as measured by the OHL-AQ-H tool, among participants from different educational backgrounds. The mean score for BSc Nursing participants was 7.73 (SD=3.32), while participants with a GNM Nursing qualification had a slightly higher mean score of 8.09 (SD=3.16).

The difference in OHL AQ-H between the two groups was observed, although this difference was not statistically significant ( $p > 0.05$ ). When considering the entire group of participants, the overall mean oral health literacy score was 7.93 (SD=3.22) indicating a low oral health literacy among the study participants.

**Table: 3 Domain-wise OHL-AQ-H score indicating the difficulty level among the nursing professionals**

<b>Domain</b>	<b>BSc Nursing</b>		<b>GNM Nursing</b>		<b>Overall</b>		<b>Percentage of Difficulty</b>
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>	
<b>Reading (6)</b>	2.98	1.59	3.23	2.22	3.12	1.96	48%
<b>Numeracy (4)</b>	2.41	1.06	2.36	1.09	2.38	1.07	40.5%
<b>Listening (2)</b>	1.02	0.51	0.88	0.60	0.94	0.57	53%



<b>Decision Making (5)</b>	1.32	1.46	1.63	1.18	1.49	1.31	70.2%
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**Table 3** presents the domain-specific scores of the Oral Health Literacy Assessment Questionnaire for Health (OHL-AQ-H), comparing participants from BSc Nursing and GNM Nursing backgrounds, along with overall scores and the percentage of difficulty for each domain. The Reading domain, which contains six items, had a mean score of 2.98 (SD = 1.59) for BSc Nurses and 3.23 (SD = 2.22) for GNM nurses, with an overall mean of 3.12 (SD = 1.96). This domain showed a 48% difficulty level, suggesting moderate challenges in comprehension. In the Numeracy domain (4 items), both groups had comparable mean scores—2.41 (SD = 1.06) for BSc and 2.36 (SD = 1.09) for GNM nurses—with an overall mean of 2.38 (SD = 1.07), reflecting a

40.5% difficulty, the lowest among all domains. The Listening domain (2 items) revealed slightly better performance among BSc nurses (mean = 1.02, SD = 0.51) compared to GNM nurses (mean = 0.88, SD = 0.60), with an overall mean of 0.94 (SD = 0.57) and a 53% difficulty, suggesting room for improvement in understanding oral instructions. The most challenging area was Decision Making (5 items), with a mean score of 1.32 (SD = 1.46) for BSc nurses and 1.63 (SD = 1.18) for GNM nurses. The overall mean was 1.49 (SD = 1.31), and the domain had the highest difficulty percentage at 70.2%, highlighting significant barriers in applying health information to make informed decisions.

**Table: 4 Prevalence of common oral diseases among the nursing professionals**

Prevalence	BSc Nursing (56)		GNM Nursing (64)		Total (120)	
	n	%	n	%	n	%
<b>Dental Caries</b>	26	46.40	24	37.50	70	58.30
<b>Gingival Bleeding</b>	28	50.00	29	45.30	57	47.50
<b>Periodontal Pockets</b>	11	19.64	12	18.70	23	19.16

The prevalence of selected oral health conditions dental caries, gingival bleeding, and periodontal pockets among the study participants are shown in **Table 4**. Among BSc Nurses, 46.4% were found to have dental caries, while 37.5% of GNM Nurses presented with caries. The overall prevalence of dental caries across all participants was 58.3. For gingival bleeding, the prevalence was 50% among BSc nurses and 45.3% among GNM nurses, with an overall rate of 47.5%, showing that nearly half of the participants experienced bleeding gums, a key indicator of gingival inflammation or early periodontal disease. The least prevalent condition was periodontal pockets, found in 19.64% of BSc nurses and 18.7% of GNM nurses, with an overall prevalence of 19.16%. These findings suggest a high

burden of preventable oral health problems among the nurses.

### Discussion

The present study offers critical insights into the oral health literacy and oral health status of nurses, a group that plays an essential role in patient education and preventive healthcare. Despite their professional background, the overall oral health literacy among participants was found to be low, with a mean OHL-AQ-H score of 7.93, falling below the threshold for moderate literacy. Interestingly, there was no statistically significant difference between BSc and GNM nurses, indicating that the level or duration of nursing education may not necessarily correlate with improved understanding or application of oral health



concepts. This finding aligns with earlier studies that report low oral health literacy levels even among healthcare professionals, suggesting a general lack of emphasis on oral health in nursing curricula.<sup>15-17</sup> A domain-specific analysis revealed that decision-making and listening were the most challenging aspects, with difficulty rates of 70.2% and 53% respectively. These domains reflect higher-order skills like interpreting information and applying it in clinical or self-care scenarios. The limited ability to make informed oral health decisions could hinder nursing professionals not only in managing their own oral health but also in effectively counselling patients, especially in rural or underserved communities where access to dental professionals is limited. Furthermore, challenges in the listening domain may suggest potential communication gaps, particularly in understanding oral health instructions or patient concerns, which are vital skills for nursing practice. In contrast, the numeracy domain, which involved understanding numbers and basic calculations (e.g., medication dosages, appointment times), showed relatively better performance, indicating that nursing training does contribute to some functional health literacy. However, even here, over 40% of participants struggled, which raises concerns about their ability to interpret instructions on oral health products like fluoride toothpaste, mouth rinses, or medication labels. The clinical findings further support the literacy data. A high prevalence of dental caries (58.3%), gingival bleeding (47.5%), and periodontal pockets (19.16%) was observed among the participants. These oral conditions are largely preventable with appropriate knowledge and behavior, suggesting that low oral health literacy may be a contributing factor to poor oral health outcomes, even among healthcare workers. Notably, dental caries was more prevalent among BSc nurses, although the difference was not statistically significant. The presence of these conditions in a young, health-literate cohort indicates an urgent need to focus on preventive strategies and behavioral interventions within health professional education. From a public health perspective, these findings have significant implications. Nurses are frontline healthcare providers who engage with a wide spectrum of patients across age groups and settings. Their role in delivering oral health education, especially in maternal and child health programs, school health initiatives, and chronic disease

management, is well recognized. However, without adequate oral health literacy, their potential to serve as oral health promoters remains underutilized. Therefore, there is a pressing need to integrate structured oral health modules within nursing education and offer continuing education programs focused on oral-systemic health links, preventive practices, and patient counselling. The findings of the present study closely align with those reported by Singh et al. (2018)<sup>18</sup>, Miller et al. (2021)<sup>19</sup> and with Santos et al. (2022)<sup>20</sup> which also highlighted insufficient oral health literacy among nursing professionals. Both studies revealed that, despite basic awareness of oral health concepts, there was a considerable gap in deeper understanding and application, particularly in areas such as the connection between oral and systemic health, decision-making, and preventive behavior. Contrary to our study, studies by Al-Ansari et al. (2020)<sup>21</sup> and Kumar et al. (2019)<sup>22</sup> demonstrated a positive correlation between higher oral health literacy (OHL) and regular dental visits among nurses. In present study, the overall low OHL scores among nurses coincided with a high prevalence of untreated dental conditions, such as dental caries and periodontal issues, suggesting limited engagement in preventive oral health care. In Singh et al. (2018) study, a lack of awareness about the link between oral health and systemic conditions like cardiovascular diseases and diabetes was evident, reflecting a narrow perception of oral health's broader health implications. Similarly, in our study, the highest difficulty was observed in the decision-making domain (70.2%), indicating that participants struggled to translate knowledge into actionable behaviors, such as seeking regular dental care or providing accurate patient counseling. This reinforces the urgent need to integrate comprehensive oral health education into the nursing curriculum to ensure nurses are equipped with the necessary knowledge and skills to promote oral health in clinical and community settings. Taken together, these findings provide valuable insights on the oral health literacy levels (i.e., knowledge, attitudes, barriers, oral care and practices, and trainings and resources) among nursing professionals. Considering the magnitude of the burden of oral disease, there is a need to enhance literacy levels and alleviate barriers related to oral health among nursing professionals, expand the workforce, and



integrate oral health programs into nursing curricula to effectively improve the quality of oral care.

### Conclusion

The oral health literacy among nursing professionals as measured using oral health literacy adult Hindi (OHL-AQ-H) questionnaire was low. The subdomains of the questionnaire also indicated a low reading, numeracy and listening skills on oral health literacy. The caries and periodontal conditions were comparable to disease levels of general population. The study emphasizes the importance of integrations of oral health training into nursing curricula to improve basic oral health literacy. Enhancing oral health literacy among nurses is not only essential for their personal well-being but also pivotal in strengthening their role as educators and advocates in community oral health promotion.

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