

A Cross-sectional Comparative Study on Perception of Oral Hygiene of the Patients Visiting the Dental OPD of a Dental College of Khyber Pakhtunkhwa

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Abstract

Background: The Oral Hygiene Index (OHI) and its simplified version (OHI-S) are critical in dentistry for providing a standardized, quantitative method to evaluate oral cleanliness.

Objective: To find out how patients who attend Sardar Begum of Dental College, Peshawar, for treatments perceive their oral hygiene practices, while utilizing the OHI-S.

Material and methods: This cross-sectional study was carried out at Sardar Begum Dental College in Peshawar, KPK, for a full year (February 2023–2024). The age range was 15 to 40 years. To determine the OHI-S, an oral examination was conducted using a dental explorer on anterior and posterior teeth. A sample size of 185 participants was determined. The frequency for every numerical variable was determined using SPSS version 16.0. The significant statistical link between the OHI-S for both genders and various age groups was discovered using the chi-square test.

Results: The male-to-female ratio across 185 cases was 1.3:2, with a statistically significant relation with a p-value of 0.001. The majority of the patients (75.1%) were from urban areas. The mean age was 27.36±7.187 years. The majority of patients did not adhere to the frequency of tongue (66.50%) and interdental cleaning (54.10%). According to the OHI-S score, 62.70% of patients had their dental examination more than a year ago, and 42.2% had fair hygiene, followed by poor hygiene (30.3%). For OHI-S, the Kappa-statistics for both genders were higher than 0.87.

Conclusion: Compared to men, women were more aware of dental health. For both genders, OHI-S was found to be a fair type.

Keywords: Oral Hygiene, Oral Hygiene Index-Simplified, Cleaning, Dentrifice

Introduction

The Oral Hygiene Index-Simplified (OHI-S) is a clinical tool used to objectively quantify a person's oral cleanliness, and research shows it significantly correlates with an individual's self-perception of their oral health.¹ It is simple to use, often with great reproducibility. It describes the specific condition of teeth and their supporting apparatus in objective terms (maximum-minimum limits), also graded as good, fair, and poor based on scoring. It uses certain criteria and methods to compare a specific variable in an individual sample or population.^{2,3} OHI-S includes the surfaces of four posterior and two anterior teeth. The global burden of oral diseases is a massive public health

challenge, currently affecting nearly 3.7 billion people—approximately half of the world's population. This burden is greater than the combined prevalence of diabetes, cardiovascular disease, cancer, and chronic respiratory disorders.⁴ A conceptual framework for oral hygiene perception across genders is typically built around the KAP Theory (Knowledge, Attitudes, and Practice).² This framework maps how an individual's internal understanding (knowledge) and feelings (attitudes) drive their physical oral care routines (practices), with gender acting as a primary moderating factor.³ However, the Oral health perception is a subjective assessment. It is a critical indicator of overall well-being,² as it reflects the value a person places on their oral health and directly influences their likelihood of seeking professional care.^{3,4}

The influencing factors or variables, both external and internal can shift oral hygiene perceptions among both genders, including biological factors (hormonal changes), Sociodemographic factors (education level), lifestyle and risk factors (smoking, Naswar taking, etc.).⁵ The current study was also able to discuss the above-mentioned variables that influence the oral hygiene perception among both genders in our sample. In many countries, oral illnesses such as periodontal disease, dental decay, tooth loss, cancer, sores, thrush, dry mouth, etc., are major health problems that cause pain, discomfort, and deformity throughout a person's life.⁴ Two However, untreated dental decay in permanent teeth is the

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most common health issue, according to the Global Burden of Diseases 2019 report.⁵ The study makes it abundantly evident that dental health is a major global issue that needs to be addressed right away.⁶ Nonetheless, even though these illnesses present global health concerns, the medical community usually ignores and underfunds them.⁷

Dental treatment is also very expensive and not included under Universal Health Coverage.⁸ Low- and middle-income populations lack sufficient resources to prevent oral health problems.⁹ Oral hygiene refers to safeguarding your oral cavity and making it disease-free. It encompasses dental cleaning procedures like brushing, tongue cleaning, dental flossing, and routine or scheduled dental visits for inspections, radiography and cleanings.¹⁰ It is frequently a modest, inexpensive, and economical method of treatment to prevent severe oral disorders.¹¹

The OHI-S is useful in predicting disease risk; a high score, which indicates worse hygiene, is closely linked to an increased risk of gingival bleeding and periodontal disease.¹ Males are a greater-risk category for periodontitis because they frequently have higher mean OHI-S scores than females, according to clinical research.^{2,3} In a similar vein, it assesses behavioural impact and quantifies the direct influence of gender-specific behaviours on clinical status, such as brushing frequency and duration. Women often clean their teeth more frequently every day and utilise interdental devices more frequently than men, which is why they have a good rating.⁴

In addition to identifying knowledge gaps, OHI-S uses the data to demonstrate that women typically have higher oral health literacy and more proactive attitudes toward preventive treatment than men, even in varied areas like Saudi Arabia, Japan, and Pakistan. To narrow the gender gap in cleanliness, many experts suggest focused, gender-specific teaching initiatives.^{12,13}

Self-reported data, which is vulnerable to social desirability bias (participants reporting what they believe to be the "right" response), is frequently used in research. By providing a more precise method of using OHI-S in our population, our research report was able to address this bias. The purpose of this study was to ascertain how patients who visit the outpatient department of Sardar Begum of Dental College, Peshawar for routine dental examinations and treatments perceive their oral hygiene practices using the Oral Hygiene Index-Simplified (OHI-S). This study was used to confirm OHI-S's repeatability in a sample drawn from the KP Peshawar population.

The relationship between oral health and its perception, which is usually characterized in subjective rather than objective terms, is not well understood by the general public. This was the large gap found in the majority of the literature. Therefore, the rationale for employing the OHI-S is to strike a balance between the requirement for speed and efficiency in large-scale evaluations, clinical accuracy, and impartiality among both genders.

Materials and Methods

This cross-sectional study was conducted for a period of one year (Feb 2023-Feb 2024), after the acceptance of the research proposal from the ethical board committee (ERB No GU/2023/590) at Sardar Begum Dental College, Peshawar, KPK. The outpatient department of Sardar Begum Dental College received patients seeking dental care and treatment on a daily basis. The patients went through routine dental check-ups and referrals for the appropriate dental treatments. The demographic details (residence, age, gender, occupation) etc. were recorded on a specially designed form. The age limit was

from 15 to 40 years. The patient was interviewed properly for oral hygiene habits and level of education in oral health and hygiene. The oral examination was performed with a dental explorer on the surfaces of posterior and anterior teeth to calculate the OHI-S which consisted of debris and calculus scores; the scores were added and the total score was calculated. The score was awarded as good, fair, or poor according to the scoring criteria. After fulfilling the inclusion criteria, written informed consent was taken from every participating individual. The anticipated population proportion, using the study of Yu¹¹ is 0.86 with a confidence level of 95% and a margin of error of 0.05. The sample size calculated was 185 subjects. The convenience sampling technique (non-probability) was used to collect the sample. Third molars and incompletely erupted teeth (incisal/ occlusal level) were not selected for scoring. Teeth with crown restoration, and dentition with tooth surface loss due to caries, trauma, and bruxism, were also excluded from the study.

The data from clinical recording forms for demography, oral perception, influencing factors, and OHI-S were entered in SPSS version 16.0 (IBM, SPSS) to derive the frequency and percentages for all numeric variables (genders, urban/rural areas, age distribution, oral hygiene habits, influencing factors). The categorical data were entered for the OHI-S after scoring. An independent t-test was used to compare mean scores between genders, often finding statistically significant differences ($p < 0.05$). To examine the association between gender and qualitative hygiene categories (Good, Fair, Poor), the Pearson Chi-square test was utilised. All statistical tests were two-tailed, and a p-value of < 0.05 was considered statistically significant. Results are reported with 95% Confidence Intervals (CI) to indicate the precision of the estimates. The data was displayed as tables and graphs.

Results

The male-to-female ratio was found to be 1.3:2, with more female patients ($n= 101, 54.6\%$) visiting for oral health problems compared to men. The gender differences in visiting were statistically significant ($p = 0.001$; chi-square = 22.507, $df = 1$). The majority of patients who were seen for oral health problems are from urban areas (75.1%) as opposed to rural areas (24.9%) as given. The difference was found to be statistically significant (P value = 0.001). This demonstrated the healthier attitude and conduct of urban dwellers regarding dental hygiene compared to rural areas due to a lack of oral education.

The most common age group presenting oral health issues belonged to 21-25 years ($n=50, 27.0\%$), followed by 36 years (25.40%). The Mean/SD for the age group was 27.36 ± 7.187 years. The details of which are given in figure 1. The most common dentifrice used by both genders was toothpaste (148, 80.0%), of fluoridated type (133, 89.86%) compared to non-fluoridated type (10.13%). The P- value was also found to be significant (0.001, chi-Sq value of 1.863/ $df=4$) among both genders. The frequency of tongue cleaning (123, 66.50%) and interdental cleaning (100, 54.10%) was not observed among the majority of patients. On the other hand, the P-value for tongue cleaning (0.001, chi-sq value=103.21/ $df=2$) and interdental cleaning (0.001, chi-sq value=118.15/ $df=2$) was highly significant among both genders. The last dental check was completed more than a year ago for the majority of patients (116; 62.70%). All other details are shown in Table 1.

The influencing factors like smoking, naswar taking, or other habits (10.11%) affecting overall oral health and OHI-S

scoring were displayed in Figure 2. It showed 52.54% patients were associated with smoking habits for more than 5 years (67.75%), followed by snuff dipping (37.45%). A statistically significant relationship with the p-value of 0.001 between influencing factors (naswar taking, smoking, other habits) and oral health overall affects the OHI-S scoring as given in table 2. Among 185 patients, the OHI-S scoring recorded that the majority of patients had fair oral hygiene (78, 42.2%), followed by poor oral hygiene (30.3%) among both genders. The p-value was also significant among both genders for overall OHI-S scoring and indexing (p-value 0.03). The Student's t-test compared the mean OHI-S scores between genders; 84 males had a mean score of 2.00 ± 0.694 , and 101 females had 2.05 ± 0.817 ($t = -139$, $df = 183$, $p = 0.001$). The inter-examiner and intra-examiner Kappa statistics were greater than 0.87 (Substantial Agreement) for OHI-S recorded in all subjects, which is satisfactory for this type of oral health evaluation for both genders.

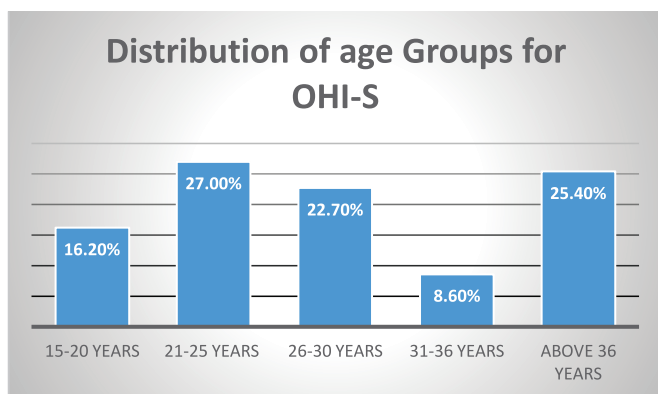


Figure 1: Age Group distribution among both Genders

Table 1: Oral Hygiene Habits Recorded in Patients

Dentifrices	Paste	Tongue cleaning	Interdental cleaning	Last dental checkup
Tooth Paste	Fluoridated 133(89.86%) Non-Fluoridated 15(10.13%)	Once=50(27.0%)	Once =82(44.3%)	Less than 6 month=69(37.3%)
Powder	28(15.1%)	Twice= 12(6.5%)	Twice=3(1.6%)	
None of the dentifrices used	9(4.9%)	None=123(66.12%)	None= 100(54.1%)	More than year=116(62.7%)
Total	185	148	185	185

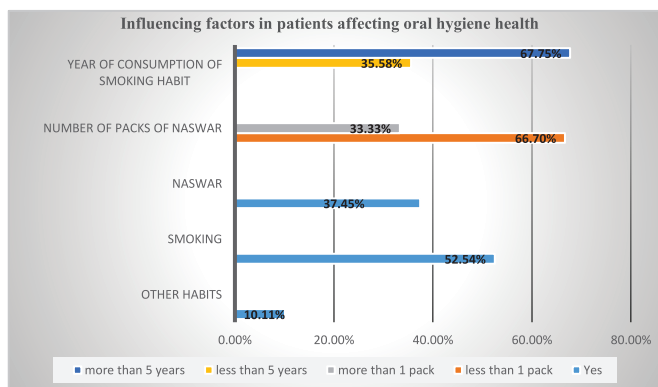


Figure 2: Influencing factors in patients affecting oral hygiene health

Table 1: Oral Hygiene Habits Recorded in Patients

Test Statistics	Other Habits	Smoking	Number of Years Smoking	Naswar/ Snuff Dipping	Humber of Packs of Naswar
Chi-Square	1.589a	14.278a	14.53a	21.48a	13.874a
df	2	1	1	4	4
Asymp. Sig.	0.04	0.02	0.01	0.01	0.001

a: 0 cells (0%) have expected count less than 5, df: degree of freedom

Discussion

The current study was conducted to measure oral health perception with OHI-S in the sample taken from the population of Khyber Pakhtunkhwa. The present study has shown a more female to male ratio, showed more conscious female patients, seeking dental care than males. This was coherent with the study of Xue et al.¹⁴ According to their study, although women were more connected to poor oral health, but exhibited more positive attitudes about dental care than males, which was also seen in our study. However, the finding in Jar et al.,¹⁵ was different from the present study where males were more active participants in routine dental check-ups and treatment. The Vasquez et al.,¹⁶ has shown statistically significant result when comparing the differences between females and males which correlates well with the findings in this study.

Jar et al.'s study¹⁵ claimed that discrepancies existed among urban and rural areas, which was consistent with the findings in this study. Thus, the present research emphasised the necessity of routine dental check-ups and oral health education in rural locations to achieve a satisfactory oral health conditions. Similar results were drawn from the studies of Indrian¹⁷ and Khamrin et al.¹⁸ Both investigations have shown that urban populations generally have higher awareness and use modern hygiene aids. On the other hand, rural populations often rely on traditional methods and perceive dental care as a reactive rather than preventive necessity, was coherent with the findings of the current study. The present study showed that the majority of patients' choice of dentifrice for cleaning was fluoridated toothpaste, and nylon-bristle toothbrushes were similar to the findings of Indrian et al. Globally, toothpaste is the most popular option and is considered the gold standard for contemporary dental care.³ According to Watt et al.'s study,³ tooth powder is still a major substitute in some areas, especially rural areas of developing countries and among environmentally aware customers in the West.

According to the current study, it is possible to characterise the significance of fluoridated toothpaste in comparison to the usefulness of tooth powder among the KPK population. Both genders in our study prefer to use fluoridated toothpaste in comparison to powder dentifrices. This was in contrast to the interesting findings provided by Xue et al.¹⁴ majority of patients had used tooth-powered dentifrice (78.36%) rather than toothpaste (41.23%) using the finger for brushing instead of a toothbrush. This discrepancy in views can be directed towards low socioeconomic background and aptitude for understanding oral care. In line with the results of Janrak et al.¹⁹ and Serumsuti,²⁰ the majority of the participants in our study, regardless of gender, did not follow a routine of tongue and interdental cleaning. Even Xue et al.'s study¹⁴ recognised the significance and robust correlation between oral hygiene practices such as brushing, flossing, interdental cleaning, and tongue cleaning in both sexes.

The current study's main clinical conclusion was to highlight the importance of tongue and interdental cleaning as essential but frequently overlooked aspects of oral hygiene in our population. The next stage is raising knowledge of these behaviours among urban and educated people and putting them into practice to prevent gum disease, halitosis (bad breath), and other periodontal illnesses. According to the study of Peterson et al.,⁵ tooth brushing cleans only 60% of tooth surfaces, leaving interdental areas uncleaned, leading to various diseases. This highlights a limitation of the present study: it lacks the actual correlation between gum and periodontal diseases and neglected oral and interdental care in our population. Thus, it is recommended to conduct the

correlational or comparative research project between interdental and tooth brush cleaning versus only tooth brush cleaning to correlate the prevalence of dental, gum, and periodontal diseases in the selected sample.

The study by Alhozgi,²¹ has also shown that 47% of patients attended their last dental appointment more than 2 years ago, while 32% had their last appointment in the past year, findings similar to the present study. Janrak et al.¹⁹ showed the importance of routine dental checkups, monthly and yearly and proclaimed that dental check-ups are essential for long-term oral health. In their study, a six-month interval (twice yearly) was conclusively recommended for most people due to certain health conditions which require more frequent attention. The majority of the participants in our research, however, had their regular dental examinations more than a year ago. This research may have other therapeutic implications, such as educating individuals about the importance of routine dental checkups every six months for long-term oral health.

A statistically significant relation was found in the investigation by Marchesan et al.,²² between oral health issues and habits like snuff dipping and smoking affecting the overall OHI-S scoring among both genders and was also coherent to the present study. The results of our study were also consistent with those of Zaheer et al.,²³ who said that smoking, gutka, pan, smokeless tobacco, and other practices were significant influencing factors affecting oral and dental health among both

genders. According to Ahmad et al.²⁴, in Pakistan, habits such as snuff dipping (naswar), cigarette smoking, and betel nut chewing significantly worsen Oral Hygiene Index-Simplified (OHI-S) scores, primarily by increasing the accumulation of dental plaque and calculus, was congruent to this study.

It is recommended to conduct research in Pakistani populations, which shows that tobacco users, especially those using both smoking and smokeless forms, consistently exhibit higher (poorer) OHI-S scores compared to non-users. They were able to show that the oral hygiene status in 81.4% of participants was poor when compared to 16.2% with good and fair status. This was in contradiction to this study, with the majority of patients having fair oral hygiene status. However, by assuming the same OHI-S score, Scannapieco²³ found that the majority of their population had good oral status, again contradicting our investigation. This inconsistency can be defined in light of the oral hygiene perception perceived in their population when compared to our sample. The results of this investigation were comparable to those of the Broomhead,²⁵ and Bashirian et al.,²⁶ found very excellent intra- and inter-examiner agreements. As a result, the validity of OHI-S was both accurate and transferable to other research.

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Author Contributions

1. **Zafar Iqbal:** Conceptualization of the study, Study design, Data analysis, and Article writing.
2. **Sheraz Alam:** Data collection, Literature review, and Contribution to methodology.
3. **Jamal Nasir Khan:** Supervision, Critical review of the manuscript, and Interpretation of results.
4. **Asmatullah Khattak:** Data collection, Data processing, and Assistance in analysis.
5. **Manzar Anwar:** Literature review, Article writing, and Proofreading.
6. **Nida Murad:** Data collection, Study design support, and Critical review of the manuscript.