

## Research Article

# Utilization Pattern of Dental Plaque Indices by Dental Professionals

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### ABSTRACT

**Background:** Dental plaque plays a substantial role in the onset of oral diseases, particularly periodontal conditions. Various plaque indices (PI) have been introduced as valuable instruments for assessing oral hygiene competence. Despite their advantages, dental practitioners, including both dentists and periodontists, often do not fully harness these indices as part of their regular clinical practice. In this study we have evaluated the usage of various plaque indices among dental professionals in clinical practice, dental educational institutions, and research environments.

**Method:** The current cross-sectional study was conducted among 100 dental professionals, aged over 18 years, using a convenience sampling method, with both genders included. The study participants were interviewed about the role, use, purpose, and type of plaque index through nine well-framed multiple-choice questions. Data were collected using Microsoft Excel and analyzed statistically using SPSS version 20.0 software.

**Results:** In the present study, a total of 100 dental practitioners participated; 70% males and 30% females. Their ages ranged from 24 to 47 years, with a mean age of 28.51 years. A significant proportion, 83% and 94%, agreed on the importance of plaque indices in both periodontal practice and periodontal epidemiological studies, respectively. Regarding the frequency of using plaque indices, 44% of participants reported using them very frequently in dental school, 11% in clinical practice, and 38% in epidemiological research.

**Conclusion:** The study found a notable disparity between high awareness (83% and 94%) of plaque indices' significance and their limited practical integration, with only 44% utilizing them frequently during dental school and a mere 11% in clinical practice, highlighting the imperative need for targeted interventions to enhance their routine usage.

## INTRODUCTION

Gingival inflammation and dental caries are significant concerns in oral health and, if left untreated, often lead to tooth loss. Dental plaque, composed of diverse microorganisms, is a recognized causative factor for the initiation and progression of these oral diseases (Jakubovics et al., 2021). When dental plaque accumulates excessively along the gingival margins, it triggers inflammation (Vila-Blanco et al., 2020). The transition from healthy oral tissues to inflammatory conditions like gingivitis and periodontitis is associated with distinct variations in microbial composition and protein profiles (Valm et al., 2019).

Due to its pivotal role in oral disease development, effective management of dental plaque accumulation is essential for maintaining gingival and periodontal health. Regular dental plaque assessment should be integrated into routine periodontal examinations in clinical and research

settings (Carvalho et al., 2023). Various methods are available for plaque scoring that predominantly rely on subjective evaluations. These methods assess plaque coverage, the extent of the deposits, and the specific areas with plaque present. In the context of oral and periodontal health concerns, multiple plaque indices (PI) have been recommended that demonstrate high specificity, sensitivity, reliability, and quality. It is essential to prioritize the use of plaque indices that assess gingival margins and interproximal areas for detecting periodontal inflammation effectively (Van Dyke et al., 2020; Alnouri et al., 2020; Soldo et al., 2020).

Several plaque indices, such as Quigley & Hein modified by Turesky (QHT), Greene & Vermillion (GV), Ainamo & Bay (AB), Silness & Loe (SL), Deinzer (DZ), and O'Leary (OL), are available. Dental professionals and researchers choose the plaque index best suited to their clinical or research needs. These indices aid in diagnosis and treatment planning and are crucial to patient education and motivation.

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Despite their numerous advantages, dentists, and periodontists do not routinely employ dental plaque indices. These indices are underutilized for diagnostic purposes, record-keeping, and patient education. An ideal plaque index should be versatile, simple, and easy to understand and reproduce (Park et al., 2018). The present study aimed to assess dental professionals' utilization of different plaque indices in clinical practice, dental schools, and research settings through a comprehensive questionnaire.

questions focused on various aspects of the role, use, purpose, and types of plaque indices.

All collected data were meticulously recorded and subsequently analyzed using the SPSS version 20.0 software developed by IBM, Chicago, USA. Descriptive statistics were employed to derive meaningful insights from the gathered information and draw relevant conclusions from the study's findings.

## MATERIALS AND METHODS

The present cross-sectional study was conducted in a dental clinic setting. It involved dental professionals aged 18 years and older, utilizing a convenience sampling method that included individuals of both genders. The Institutional Ethics Committee approved the study protocol, ensuring compliance with ethical guidelines.

## RESULTS

In the current research, a total of 100 dental practitioners participated, comprising 70% males and 30% females, with ages ranging from 24 to 47 years and a mean age of 28.51 years. Most respondents acknowledged plaque indices' significance in periodontal practice (83%) and periodontal epidemiological studies (94%). More than half of the participants demonstrated awareness regarding commonly utilised plaque indices. Our findings revealed

**Table 1:** The participant's responses to the survey questions

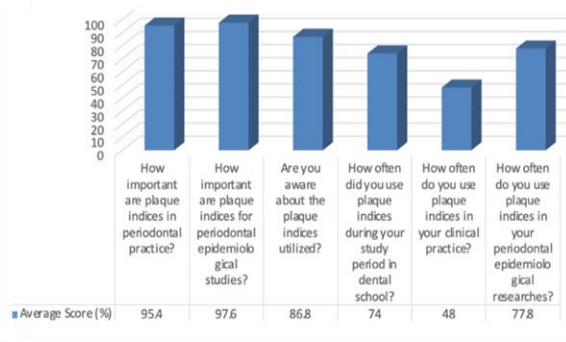
How important are plaque indices in periodontal practice?	Very important 83 % (n=83)	Fairly important 11% (n=11)	Important 6% (n=6)	Slightly important	Not at all important		
How important are plaque indices for periodontal epidemiological studies?	Very important 94% (n=94)	Fairly important	Important 6% (n=6)	Slightly important	Not at all important		
Are you aware of the plaque indices utilized?	Very aware 33% (n=33)	Aware 39% (n=39)	Not Sure 17% (n=17)	Unaware	Very unaware 11% (n=11)		
How often did you use plaque indices during your study period in dental school?	Very frequently 44% (n=44)	Often 17% (n=17)	Sometimes 5% (n=5)	Rarely 33% (n=34)	Never		
How often do you use plaque indices in your clinical practice?	Very frequently 11% (n=11)	Often 5% (n=5)	Sometimes 27% (n=27)	Rarely 27% (n=27)	Never 30% (n=30)		
How often do you use plaque indices in your periodontal epidemiological research?	Very frequently 38% (n=38)	Often 27% (n=27)	Sometimes 21% (n=21)	Rarely 14% (n=14)	Never		
Which plaque index (PI) do you frequently use?	O'Leary PI 17% (n=17)	Silness and Loe PI 50% (n=50)	Lange Ap-proximal PI 5% (n=5)	Turesky PI 11% (n=11)	Ramfjord PI 7% (n=7)	Other 10% (n=10)	None 22% (n=22)
Which plaque index (PI) do you prefer for clinical practice?	O'Leary PI 22% (n=22)	Silness and Loe PI 33% (n=33)	Lange Ap-proximal PI 6% (n=6)	Turesky PI 6% (n=6)	Ramfjord PI 11% (n=11)	Other	None 22% (n=22)
Which plaque index (PI) do you prefer for epidemiological studies?	O'Leary PI 22 (n=22)	Silness and Loe PI 56 (n=56)	Lange Ap-proximal PI	Turesky PI	Ramfjord PI	Other	None 22 (n=22)

Before they participated in the study, all eligible participants provided voluntary written informed consent. The sample size for the present study was determined to be 100 participants, specifically dental surgeons. Detailed demographic information, including gender and age, was collected from all participants. They were then interviewed using a structured questionnaire consisting of nine well-framed multiple-choice questions. These

that 44% of the respondents used the plaque indices very frequently during their time in dental school, while only 11% did so in their clinical practice. When inquired about utilising plaque indices for epidemiological research, 38% of the participants reported using plaque indices very frequently.

Out of 100 participants, 50 reported using the Silness and

Loe index most frequently. The O'Leary and Turesky Plaque indexes were most frequently used by 17% and 11% of respondents, respectively. Interestingly, similar preferences were observed in clinical practice and epidemiological studies, where subjects predominantly favored using the Silness and Loe Plaque Index (33% and 56%, respectively), with the O'Leary Plaque Index also commonly used at 22%. A comprehensive presentation of the participant's responses to the survey questions can be found in Table 1. At the same time, the average scores reflecting dental professionals' perception and utilization patterns are visually depicted in Figure 1.



**Figure 1:** Average score for perception and utilization pattern of dental professionals.

## DISCUSSION

Quantifying dental plaque holds paramount importance in evaluating and maintaining oral health. Dental plaque indices serve as invaluable quantitative tools for assessing the oral hygiene status of individuals and communities. The present study aimed to evaluate dental professionals' utilization of these indices in routine clinical practice and research endeavors. The demographic profile of the study participants was predominantly comprised of young male dentists. While a consensus existed among them regarding the importance of employing plaque indices for periodontal assessment, it was noteworthy that fewer than half of these professionals integrated plaque indices into their daily routines, be it during their time in dental school, clinical practice, or epidemiological research. This reluctance could be attributed to the perceived time constraints associated with using plaque indices to gauge oral health status. Their primary focus appeared to be treatment, with less emphasis on employing indices for assessing periodontal health. Regrettably, the use of plaque indices for patient education and the evaluation of oral health status during follow-ups were also found to be relatively infrequent, particularly within the clinical practice setting as opposed to dental schools and epidemiological research contexts.

Plaque indices are primarily designed to evaluate dental plaque based on its thickness and the extent of the tooth surface covered (Han et al., 2015). Notable examples include the O'Leary index and the Quigley Hein plaque index (QHI), which was later modified by Turesky (Amoo-Achampong et al., 2018). These indices assess the plaque

coverage by measuring the surface area along the gingival margin. To facilitate measurement, disclosing agents are often used to stain the tooth surface, which may cause discomfort and social embarrassment due to the inadvertent staining of oral tissues (Rodríguez Franco et al., 2020). Therefore, indices that evaluate dental plaque without the necessity of disclosing agents tend to be better received by patients. An example of such an index is the Silness & Loe plaque index (SLI), specifically developed to examine the relationship between gingivitis and plaque buildup (Vila-Blanco et al., 2020). This index does not measure the surface area covered by plaque; instead, it focuses on assessing the variations in plaque thickness, which aids in evaluating the maturity and potential pathogenicity of the plaque. However, a notable limitation of this method is the inconsistency in techniques used for visual examination, leading to variations in measurements (Chandrasah et al., 2012; Rosalien et al., 2019). In the current research, we inquired about dental professionals' preference for plaque index. Approximately 50% of the respondents indicated that they predominantly used the Silness and Loe plaque index (SLI), followed by the O'Leary index (17%) and the Turesky plaque index (11%). Similarly, participants in clinical practice and epidemiological studies preferred the Silness and Loe plaque index (33% and 56%, respectively), with the O'Leary index (22%) being the next most commonly chosen option.

The current study provides valuable insights into the underutilization of plaque indices among dental professionals in routine clinical practice and research applications. Despite their awareness of the benefits of plaque indices in assessing periodontal health, professionals are reluctant to incorporate them into their daily practice. This highlights the imperative need to raise awareness about the significance of regular plaque index utilization in evaluating oral health and disease conditions and educating and motivating patients. It is also essential to enhance the knowledge and awareness of plaque index usage among dental students in dental schools to encourage its incorporation into their future clinical practices.

The current study acknowledges several limitations, including a relatively small sample size of 100 dental professionals from a single center. To validate and generalize these findings, it is important to conduct future prospective studies on a larger and more diverse sample across various regions (Zarabadipour et al., 2022). It is worth noting that no studies with similar scope and objectives were identified during our research, which constrained our capacity to draw direct comparisons. Our study highlights the necessity for future research in this domain. Expanding upon our work, future investigations could employ more comprehensive and detailed questionnaires to delve deeper into this subject matter.

## CONCLUSION

The present study's findings indicate that dental professionals are aware of plaque indices' utility in assessing

periodontal health, and they acknowledge their significance in routine clinical practice, dental education, and research endeavors. However, less than 50% of these professionals use plaque indices in their regular practice. The study underscores the need for enhanced awareness among dental students and practitioners regarding the importance of routinely employing plaque indices to evaluate periodontal health, treatment decision-making, and patient education.

## AUTHOR CONTRIBUTION

DA Designed the study, performed experiments, statistically analyzed and wrote the manuscript, and reviewed and submitted it.

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## DECLARATIONS

### Ethical Approval

The Institutional Ethics Committee approved the study protocol, ensuring compliance with ethical guidelines.

### Participants Consent

All participants gave informed consent at the onset of the study. They were assured of confidentiality and their right to withdraw from the study.

### Source of Funding

Not applicable.

### Conflict of Interest

All authors have declared that no financial support was received from any organization for the submitted work. All authors have declared that no other relationships or activities could appear to have influenced the submitted work.

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