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Evaluation of the Impact of Different Stages of Periodontitis on Quality of Life with Oral Health Impact Profile-14 (OHIP-14): A Systematic Review

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ABSTRACT

Objective: Periodontitis is a chronic, multifactorial inflammatory disease that leads to the progressive destruction of the supporting tissues of the teeth, ultimately affecting patients' quality of life. Oral health-related quality of life (OHRQoL) can be assessed using the Oral Health Impact Profile (OHIP-14) questionnaire. This systematic review aims to provide a comprehensive understanding of the relationship between quality-of-life perceptions and periodontal disease, categorized according to the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions.

Materials and Methods: Electronic searches were conducted in the PubMed, Scopus, and LILACS databases for studies published from 2017 to September 2024. The search initially identified 1,765 titles. Two independent reviewers conducted the study selection and data extraction processes. Eight studies met the inclusion criteria, comprising seven longitudinal studies and one cohort study.

Results: Three studies highlighted a correlation between increasing severity of periodontitis (i.e., higher stages) and higher OHIP-14 scores, indicating a reduction in OHRQoL. This effect was particularly pronounced in patients classified with Stage III or IV periodontitis.

Conclusion: This systematic review underscores the impact of periodontal diseases on OHRQoL. As the severity and extent of periodontitis increase, patients experience greater declines in quality of life. All studies included in the review shared a common and significant limitation: none used a questionnaire specifically designed for periodontal diseases. A modified quality-of-life scale tailored to periodontitis should be considered for future research.

Keywords: Oral health-related quality of life, periodontal disease, periodontitis, quality of life, Quality of Life with Oral Health Impact Profile – 14-Item Version (OHIP-14).

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INTRODUCTION

Periodontitis is a chronic, multifactorial inflammatory disease that leads to the progressive destruction of the tooth-supporting tissues due to the accumulation of a dysbiotic biofilm. Diagnosis is typically based on clinical measures such as clinical attachment loss (CAL), radiographically assessed alveolar bone loss, periodontal pocket, and gingival bleeding. Continued loss of supporting structures may ultimately result in tooth loss, adversely affecting both masticatory function and aesthetics.[1]

Over the past 30 years, the classification of periodontitis has undergone several revisions to incorporate new scientific findings. A major update was introduced during the 2017 workshop.[2] In this new system, the previously distinct categories of chronic and aggressive periodontitis were unified under a single category—periodontitis. Furthermore, the updated classification of periodontitis incorporates additional concepts such as staging and grading systems.[3]

It has been reported that halitosis,[4] gingival recession, hypersensitivity,[5] and higher levels of CAL are associated with more frequent patient complaints.[6] As CAL increases, the diagnosis shifts to more advanced stages. With progression to higher stages, effective management of periodontitis requires a high level of clinical competence, experience, and a multidisciplinary approach. Additionally, a significant proportion of edentulism and masticatory dysfunction contributes to increased dental care costs and negatively impacts general health.[3] Missing teeth directly affect appearance and social well-being, leading to reduced enjoyment of food, reluctance to laugh in public, diminished confidence, and unwillingness to form close relationships. These issues may ultimately result in a loss of self-confidence[7]or changes in smiling patterns.[8]

The current biomedical paradigm of health focuses on addressing disease by assessing its presence or absence.[9] Similarly, diagnostic evaluations are based on this concept. For example, if there is a deep pocket or bleeding on probing, the clinician concludes that disease is present. This treatment and diagnostic model centers exclusively on the presence of disease. However, any comprehensive measure of health should also account for the social and emotional dimensions of well-being, in addition to assessing the presence or absence of disease.[10] Healthcare should aim to reduce symptoms, minimize disability, and improve quality of life—factors that only patients can truly evaluate.[11]

A renewed perspective recommends shifting from the traditional approach toward one that prioritizes the patient's awareness and perception, rather than focusing solely on treatment administration and outcomes as understood only by clinicians. This new approach emphasizes that treatment is considered to be successful only to the extent that it benefits the patient. The management of oral diseases, therefore, should be evaluated jointly by both the patient and the clinician. The treatment-centric approach is shifting toward a patient-centric model, offering a more holistic form of care.[12]

Well-known symptoms of periodontal diseases, such as tooth loss, lead to difficulties with speaking, eating, social interaction, and self-esteem. These problems can be significant and are often linked to social disadvantage and inequality.[13] Temporary employment is negatively associated with oral health, and the aesthetic and social impact of visibly missing teeth can significantly reduce a person's chances of finding a job.[14] Oral health plays a critical role in overall well-being and self-esteem. Poor oral health conditions can severely impact quality of life, productivity, workability, and social participation.[15] In addition to causing pain and discomfort, poor oral health leads to reduced well-being and increased absenteeism from school and work, resulting in lost learning opportunities and decreased productivity.[16]

Different questionnaires have been developed for both adults and children to gather information on self-assessed oral health status, oral health habits, risk behaviors, quality of life, and social position.[15] The Oral Health Impact Profile (OHIP) was designed to provide a comprehensive assessment of self-reported dysfunction, discomfort, and disability associated with oral conditions.[17] Developed by Slade and Spencer,[18] OHIP also serves as a scaled index for assessing care priorities, understanding oral health behaviors, and documenting the social impact of oral disorders. However, OHIP-49, which is based on Locker's conceptual model of oral health, has certain limitations. Some items apply only to denture wearers, and others have a nonresponse rate (left blank or marked "don't know") of 5% or more.[19] As a result, a shorter version, OHIP-14, was developed by Gary Slade[20] to address these issues. The OHIP-14 includes seven domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. Responses are structured using a 5-point Likert scale, indicating how often the issues described in each question have occurred, from 0 (never) to 4 (very often). The total score ranges from 0 to 56, with higher scores indicating a more negative perception of the impact of oral health on the patient's quality of life.

Well-known periodontal indices are standard clinical measures used by dentists to diagnose conditions, determine treatment needs, and monitor improvements in health. While these measures provide valuable information for clinicians, they may hold little meaning for patients beyond representing scientific data. In contrast, data collected through the OHIP-14 questionnaire reflects the patient's perception of specific complaints and helps in monitoring symptoms of periodontal disease from their perspective. This systematic review aims to comprehensively examine the relationship between periodontal diseases and the impact of their severity or extent on oral health-related quality of life (OHRQoL) using the OHIP-14.

There are systematic reviews that include studies evaluating periodontitis based on different levels of CAL and pocket

depth.[21–23] However, to date, no review has exclusively included studies that categorize participants according to the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions. Additionally, no previously published systematic review has used a non-standardized definition of periodontitis as an exclusion criterion.

This systematic review aims to provide a clearer understanding of quality-of-life perceptions and disease-related concerns, as measured by the OHIP-14, in patients categorized according to the current classification system.[1] Studies involving adults with any systemic disease, regardless of whether the condition may affect periodontal status, were excluded from the outset. It is well established that periodontitis is significantly associated with other health conditions, such as diabetes and cardiovascular diseases.[24,25]

MATERIALS AND METHODS

This systematic review was conducted in compliance with the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The inclusion criteria for studies were as follows:

(i) Original studies involving patients with periodontal diseases.

(ii) Studies conducted between January 2017 and September 2024.

(iii) Studies using OHIP-14 results as the primary measure of OHRQoL.

(iv) Case series, cohort studies, and cross-sectional studies.

(v) Studies diagnosing periodontal diseases according to the current classification system.[1]

The exclusion criteria were:

(i) Studies using OHRQoL tools other than OHIP-14.

(ii) Articles published in a language other than English.

(iii) Studies involving surgical or non-surgical periodontal therapy (NSPT).

(iv) Studies using any classification system other than the current one.

Search Strategy

Electronic searches were conducted in the PubMed, Scopus, and LILACS databases. The search period was set from January 2017 to September 2024. The year 2017 was selected as the starting point because the new classification and case definition for periodontal diseases were introduced that year.[1] This systematic review offers a distinct and updated perspective compared to previous reviews, as it includes patient groups classified according to the new system.

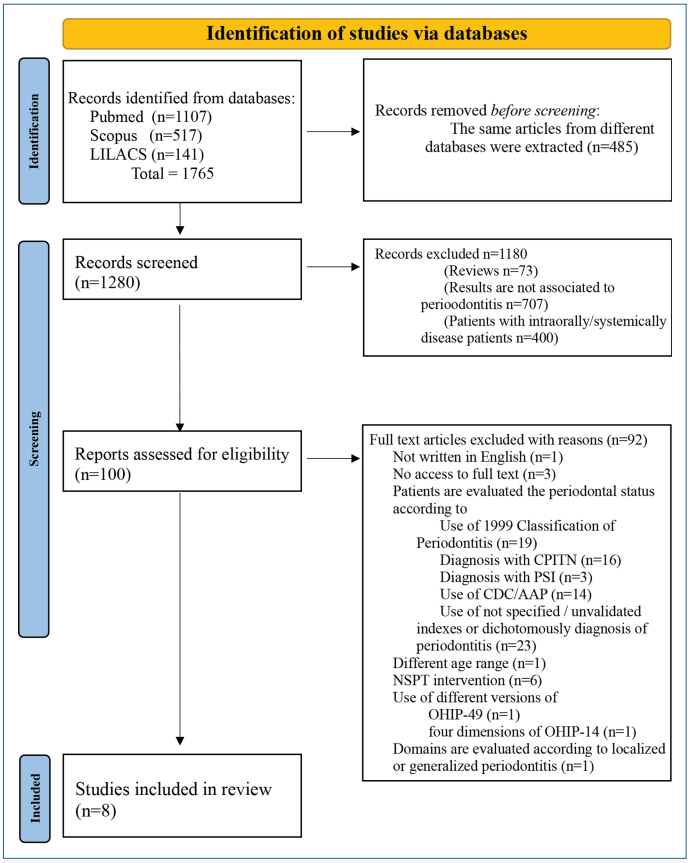

Figure 1. Selection process for study inclusion.

CDC/AAP: Centers for disease control and prevention and the American Academy of Periodontology; CPITN: Community Periodontal Index of Treatment Needs; NSPT: Non-Surgical Periodontal Theraphy; OHIP: Oral Health Impact Profile; PSI: Periodontal Screening Index.

The search included the terms: Periodontitis OR "Periodontal Diseases", AND "Quality of Life" OR "Quality of Life" OR "Health-Related Quality of Life" AND OHIP. Study selection was carried out according to predetermined inclusion and exclusion criteria by two trained authors. Titles and/or abstracts were independently screened and selected. Full texts that appeared to meet the inclusion and exclusion criteria were assessed and confirmed through mutual agreement. Data extraction was also performed independently by both authors. All records identified from the databases were categorized according to the disease or condition for which OHIP assessed quality of life. Any disagreements were resolved through discussion.

Selection of Studies

Figure 1 shows the flow of study selection. A total of 1,765 titles were identified through electronic searches. Of these, 485 studies were excluded as duplicates. Another

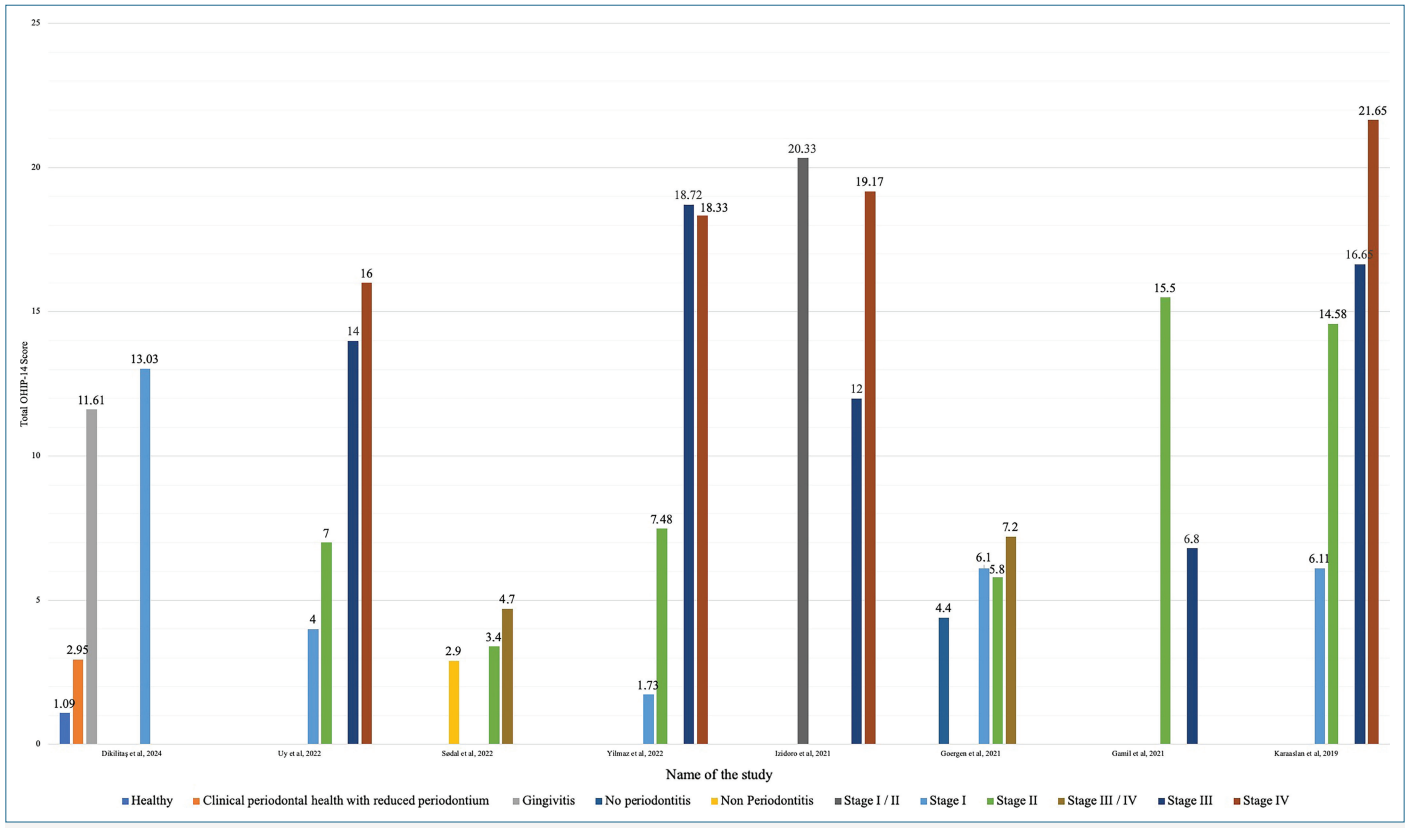

Figure 2. Comparison of total OHIP-14 scores across periodontal health status categories and studies.

1,180 studies were excluded for the following reasons: review articles (n=73), results not related to periodontitis (n=707), and studies involving participants with intraorally or systemic diseases (n=400). A total of 100 studies were considered eligible for full-text screening. Of these, 91 studies were excluded due to use of the 1999 Classification system, Centers for Disease Control and Prevention/ American Academy of Periodontology (CDC/AAP) definitions, Periodontal Screening Index (PSI), Community Periodontal Index of Treatment Needs (CPITN), or other reasons detailed in the flowchart. Eight studies were found to be eligible for inclusion in the systematic review, comprising seven longitudinal studies and one cohort study. The inclusion of only systemically healthy individuals was a deliberate methodological choice to minimize potential bias. Periodontitis can progress more severely in patients with systemic conditions, and the quality-of-life impairments they experience may not be solely attributable to periodontitis. By focusing exclusively on studies involving systemically healthy individuals, this review aimed to ensure that the reported effects on OHRQoL were specifically associated with periodontitis, rather than influenced by confounding effects from systemic diseases.

Extracted data from the studies included the following information: article title, author(s), year of publication, country, journal of publication, study design, number of participants, participant characteristics, details of periodontal examination, sociodemographic and confounding variables, quality-of-life (QoL) measurement and questionnaire used, significance of QoL findings in relation to periodontal outcomes, specific results concerning OHIP-14 domains, other findings unrelated to OHRQoL, and study limitations. Two trained authors independently extracted all data and reached consensus on all aspects. Any disagreements were resolved through discussion.

The primary outcome of this review was to include and evaluate patient-centered health-related quality of life outcomes across different stages and/or grades of periodontitis.

RESULTS

Appendix summarizes the methodologies and main findings of the included studies. Three studies were conducted in Türkiye,[26–28] while the remaining five were conducted in Norway,[29] China,[30] Portugal,[31] Egypt,[32] and Brazil.[33] Sample sizes ranged from 97 to 750 participants. Among the studies, those conducted in Egypt, Brazil, and Norway[29,32,33] are noteworthy.

The study with the broadest age range included participants aged 14 to 103 years,[33] while one study focused exclusively on 65-year-old patients.[29] Three studies were university-based,[26,30,32] and two were conducted with patients attending a periodontology department.[28,31] In all studies, the questionnaire and periodontal examinations were performed by different researchers. In four studies, periodontal measurements were taken prior to administering the questionnaire,[26–28,31] whereas five studies followed the opposite sequence.[29,30,32,33]

The most frequently assessed confounding variables were age (n=7), gender (n=7), and smoking status (n=6). All studies employed periodontal indices or parameters. Four studies included patients representing all stages of periodontitis.[27,28,30,32] Only one study included participants with periodontal health (both with an intact periodontium and with a reduced periodontium).[26] Two studies examined both gingivitis and periodontitis within the same sample.[26,32] One study included individuals classified as non-periodontitis but did not specify the cause of the reduced periodontium (e.g., crown lengthening or gingival recession).[29,33] Three studies also applied the grading system,[27,28,30] and two of these demonstrated a relationship between grades and QoL outcomes.[27,31] Most studies reported a correlation between higher stages of periodontitis and increased OHIP-14 scores.[27–30,33] Six studies also highlighted the impact of periodontitis on specific OHIP-14 subdomains.[26–29,31,33]

DISCUSSION

Figure 2 illustrates the relationship between OHIP-14 scores and various periodontal conditions reported in the eight included studies. A strong positive correlation was observed between the total OHIP-14 score and both the stage and grade of periodontitis. These findings support the trend of declining OHRQoL with increasing severity of periodontitis.[22] Among the stages, individuals with Stage IV periodontitis showed the greatest impairment in quality of life.[30] As an exception, one study reported a higher average OHIP score for Stage II patients than for those with Stage III periodontitis. However, OHIP results were not specified for each patient group, and the distribution of participants across stages was unbalanced. Specifically, OHIP scores for Stage II were based on 153 patients, while only 12 patients contributed to the Stage III scores, limiting the generalizability of the results.[32] Two of the reviewed studies exhibited a clear imbalance in the distribution of patient groups.[31,32] Notably, in the study conducted by Gamil et al.,[32] 297 gingivitis patients and 285 patients with Stage I periodontitis were included, compared to only 12 patients with Stage III and three patients with Stage IV periodontitis. This imbalance in group sizes limits the comparability between disease severity groups and may affect the reliability of the findings.

Total OHIP scores in patients with Stage I periodontitis and gingivitis were found to be higher compared to those with a healthy periodontium or a reduced but healthy periodontium. These results indicate that the onset and progression of inflammation and periodontal loss are associated with a decline in individuals' quality of life.[26]

A significant increase in OHIP scores was especially evident in Stages III and IV, where tooth loss due to periodontitis typically begins.[28,30] Patients in Stages I and II may be less aware of ongoing periodontal changes due to the silent nature of early periodontitis. However, as the severity or extent of the disease increases, patient awareness tends to rise, likely due to discomfort in the gums and teeth, as well as noticeable tooth mobility.[23] Contrary to the findings of other studies, one study reported higher OHIP scores in Stage I/II patients than in Stage IV patients. This result is likely due to the small sample size, as only six patients were included in the Stage I/II group. The limited number of participants makes it difficult to generalize the findings.[31]

A study examining masticatory function and quality of life across different stages of periodontitis found that positive responses to chewing difficulty were associated with decreased food intake. Changes in food type increased with the severity of periodontitis, while masticatory function declined in the more advanced stages. Individuals with Stage IV periodontitis experienced a more significant reduction in quality of life, reported greater changes in food intake, and showed both subjective and objective signs of masticatory dysfunction compared to those in earlier stages of the disease.[30]

In a study conducted in Norway involving only 65-year-old participants, the total OHIP-14 score was found to be relatively low, even among patients with periodontitis. This may be explained in part by the high socioeconomic status of the participants, their geographic advantages, and the inclusion of only 65-year-old individuals, which may account for the low OHIP-14 scores indicating better perceived quality of life. This could also be related to the development of coping mechanisms for symptoms such as pain or tooth loss in older age, as well as a decreased awareness of oral tissue deficiencies.[29]

Patients with periodontitis from Stage III onward tend to become more aware of their condition, likely due to discomfort in the gingiva and teeth, as well as noticeable tooth mobility.[34] Tooth loss or mobility resulting from severe periodontal destruction can lead to chewing difficulties, potentially restricting nutrition. Gingival recession causes sensitivity, and the loss of interdental papillae negatively affects aesthetics. These aesthetic concerns may contribute

to social isolation. Additionally, the prolonged and often costly treatment process required for advanced stages of periodontitis can create financial stress and reduce patients' motivation to seek treatment. The findings of this review emphasize the importance of integrating patient-reported outcome measures, such as the OHIP-14, into clinical practice. Clinicians can use OHIP-14 as a tool to monitor treatment effectiveness over time and to better understand patients' perceptions. By systematically tracking changes in OHRQoL, clinicians can personalize treatment plans, address patient-specific concerns, and enhance overall patient-centered care. Therefore, it is essential to recognize that periodontitis has significant consequences that negatively impact quality of life.

Limitations

Two studies were conducted with particularly small sample sizes, which limits the generalizability of their findings. The low number of participants may not accurately represent the broader population, making it difficult to draw definitive conclusions from these studies.[27,31]

Convenience sampling was used in six of the studies, which introduces potential selection bias and limits generalizability, as it often reflects the characteristics of a specific group rather than the broader target population.[26–28,30–32] This can result in skewed estimates due to imbalanced participant representation. One cohort study included participants from a previous study conducted in southern Brazil (Porto Alegre cohort). In 2001, a representative sample of over three million residents from 14 major municipalities in the Porto Alegre metropolitan area was obtained using a multistage probability sampling method.[35] The sampling method of this cohort study, which involved retrieving participants from a previous study, supports the generalizability of the findings in that particular study.[33] Another study included randomly selected participants aged 65 and residing in Oslo.[29] However, because the sample was limited to a single city and predominantly Western participants, the external validity of the findings may be limited for populations in non-Western countries or those with different healthcare systems.

Tendentiousness can influence how a researcher conducts a study.[22] To minimize this risk in studies using a quality-of-life questionnaire administered through interviews, the evaluator should be blinded to the participants' periodontal status. This helps prevent the interviewer from unintentionally influencing responses, thereby reducing the risk of evaluation bias. Therefore, when the same researcher is responsible for both the questionnaire and the clinical examination, the questionnaire should be administered prior to the examination. In one of the reviewed studies, this recommended order was followed, with both tasks carried out by the same examiner.[32]

A major limitation of this review is the predominance of cross-sectional studies, which restricts the ability to establish a causal relationship between periodontitis severity and its impact on OHRQoL. Since study designs capture data at a single point in time, they offer no insight into disease progression or long-term treatment outcomes. Future research should prioritize prospective cohort studies with extended follow-up periods to better assess the long-term effects of periodontitis on QoL.

All studies included in the review shared a common and significant limitation: none used a questionnaire specifically designed for periodontal diseases. During the database search, it was notable that the OHIP-14 questionnaire was widely used across various countries and dental disciplines, including implant surgery, prosthodontics, orthodontics, oral surgery, pediatric dentistry, restorative dentistry, and endodontics, as well as in studies involving various intraoral conditions and lesions. Although OHIP-14 is one of the most widely used tools globally for assessing OHRQoL, it may not adequately capture the specific symptoms associated with periodontal disease. For instance, the item addressing "pain in the mouth, teeth, or dentures" encompasses a wide range of discomfort sources, such as prosthetic trauma or pulpal pain, without isolating pain specifically related to gingival inflammation or periodontal tissue destruction. Similarly, difficulties with eating or speaking due to problems with the mouth, teeth, or dentures, as assessed in the OHIP-14, may arise from various conditions, including tooth loss, ill-fitting dentures, or faulty restorations. Therefore, the underlying cause of impairment may not be directly related to periodontitis. As such, the current OHIP-14 questionnaire lacks condition-specific sensitivity. To more accurately evaluate the impact of periodontal diseases on quality of life, a more targeted tool that specifically assesses the gingiva and surrounding periodontal structures is needed.

Given its 14-item structure, the OHIP-14 is not specifically designed to comprehensively capture the unique challenges associated with individual dental disciplines. This may limit its applicability in studies focusing on disease-specific aspects of quality-of-life assessments. Therefore, more condition-specific instruments, such as the Oral Health Impact Profile-14 for Periodontal Diseases (OHIP-14-PD), may provide a more accurate reflection of the periodontal patient's experience. This tailored questionnaire includes items that specifically address complaints related to the periodontal tissues.[36] However, this questionnaire should be compared with the OHIP-14, and its use should be more widely adopted.

CONCLUSION

Periodontitis is a chronic, silently progressing disease that patients are often unaware of. During treatment, clinicians should not only aim to eliminate the infection but also adapt

the treatment approach to address the patient's quality-of-life concerns. Oral health is not merely the absence of disease; it reflects overall well-being, enabling individuals to eat, communicate, and smile, while actively participating in society. Tools such as the OHIP-14 can be used to assess patient needs, helping clinicians prioritize and personalize the treatment process accordingly.

Online Appendix File: https://jcpres.com/storage/upload/appendix/2743.pdf.

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