Instruments for Assessing the Impact of Periodontal Disease on Oral Health-Related Quality of Life: A Narrative Review

Abstract

Introduction: Considering the damage caused by periodontal disease to dental tissues and its impact on the quality of life of patients, the objective of this study was to carry out a narrative review of the instruments for assessing quality of life in periodontal patients, as well as to detail their characteristics, main and specific purposes, and limitations. Method: An electronic search was conducted in the PubMed, VHL, and Web of Science databases from July to September 2021. Using specific descriptors, the search included observational studies that evaluated the quality of life in adult periodontal patients (ages 18 to 60), dentate and without comorbidities. Each instrument was reviewed, and its main psychometric

characteristics were highlighted. Results and Discussion: According to the eligibility criteria, the search identified 3,670 studies, among which 126 were selected for this literature review. The most used instrument to assess the impact of periodontal disease on quality of life was the OHIP-14 (n=83, 60.48%), followed by a combination of instruments (n=10, 12.6%) and the modified OHIP (n=9, 11.34%). Conclusion: The OHIP-14 is the most used instrument to assess the quality of life of periodontal patients; however, as it is a generic instrument, the need to develop a specific tool for periodontal diseases is substantial for better understanding and increased validity of findings in these studies.

Keywords: Narrative review, Periodontal diseases, quality of life

Introduction

Periodontal disease affects the supporting dental tissues and encompasses a wide range of inflammatory presentations, which, gradually, can lead to tissue destruction and consequently, tooth loss[1,2]. Various risk factors influence the development and progression of the disease[3], with the clinical consequences of this gradual damage to periodontal tissues having an impact on the physiological, psychological, and social aspects of an individual[3], directly affecting their quality of life, as well as negatively impacting both general and oral health[4].

The concept of quality of life (QoL) is currently defined as 'an individual's perception of their position in life, within the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards, and concerns[5].' Based on the principles that oral health does not exist in isolation and is incorporated into the broader and multidimensional structure of general health, we now encompass the concept of oral health-related quality of life (OHRQoL). This conception includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions confidently and without pain, discomfort, or diseases of the craniofacial complex[6].

The relationship between periodontal health and quality of life has been extensively discussed[7,8,9,10], and several studies have examined the impact of this disease and its

severity on individuals' quality of life[7,11,12]. In these studies, various non-specific instruments have been used to assess the impact of periodontal disease on the quality of life of these patients, such as the Oral Health Impact Profile (OHIP), Oral Health Related Quality of Life in the United Kingdom (OHQoL UK), and Oral Impacts on Daily Performance (OIDP).

Considering the large number of non-specific instruments used to assess the impact of periodontal disease on the quality of life of adult individuals and the possibility of inappropriate use or interpretation in measuring this impact, the main objective of this study was to conduct a narrative review of the most commonly used instruments for this purpose, as well as to review their main characteristics.

Methodology

This study is a narrative literature review conducted from December to March 2023. An electronic search (TMMC and LDAS) was performed to identify and select relevant studies in the following databases: PubMed, VHL, and Web of Science.

The descriptors used for retrieving the articles were: (quality of life) AND (periodontal disease OR periodontitis OR gingivitis) AND (oral health), according to the search specifications of each database.

There were no limitations regarding the date or language of publication. Observational epidemiological studies that aimed to assess the impact of periodontal disease on the quality of life of adult individuals (aged 18 to 60 years), dentate, and without comorbidities or systemic impairments were included. Studies comparing post-treatment (surgical or non-surgical) impact, theses, reviews, and opinion articles were excluded. The relevant articles were obtained and read in full. The bibliographic references of the selected articles were also consulted.

From the studies selected according to the eligibility criteria, a simple survey was conducted to identify the percentage of use and the most frequently used instruments among the studies included in this work. The most commonly used instruments had their main characteristics and properties elucidated.

Results

The search resulted in 3,670 articles, and 147 studies were duplicates. Of the 3,523 articles, 126 were selected for this review (Figure 1).

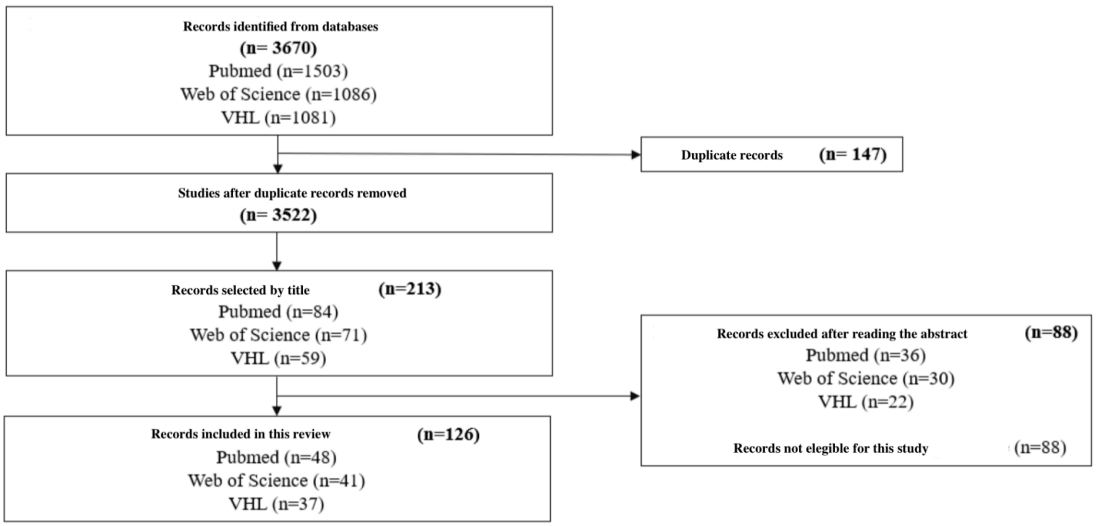

Figure 1: Flowchart based on the PRISMA model with article selection results.

It was observed that the most commonly used instrument to assess the impact of periodontal disease on the quality of life of adult patients was the OHIP-14 (n=83, 60.48%), followed by the combination of instruments (n=10, 12.6%), the OIDP (n=10, 12.6%), and the modified OHIP (n=9, 11.34%).

Literature Review

Oral Health Impact Profile (OHIP)

The Oral Health Impact Profile (OHIP) is one of the most popular questionnaires and was developed by Slade and Spencer[13] in 1994 as a generic, patient-centered self-assessment tool that comprehensively addresses dysfunction, discomfort, and disability potentially attributed to oral conditions[14].

Its primary goal is to complement traditional epidemiological indicators of diseases by providing information on the “burden of illness” within populations and the effectiveness of health services in its reduction, as well as to develop a self-perceived measure of oral health status. Thus, it evaluates the “social impact” of oral disorders[14] rather than impacts attributable to specific oral problems or syndromes.

Originally, it was designed with 49 questions associated with 7 domains based on Locker's model: functional limitation, pain, psychological discomfort, physical disability, psychological disability, social disability, and physical incapacity[13]. The frequency of impact is calculated by summing the impacts reported by the patient, according to a Likert scale (0=never, 1=hardly ever, 2=sometimes, 3=fairly often, and 4=very often)[15]. This way, the repercussions of oral conditions are categorized hierarchically from internal symptoms, through the individual, represented by the functional dimension, and finally reaching the incapacity dimension, which can interfere with the individual's social roles[16].

Desai et al. (2014)[17] investigated whether the mode of administration of the OHIP-49 would influence the results if applied in two different ways: self-administration or by telephone interview. To do this, they recruited 84 patients with chronic periodontitis and randomly divided them into these two groups. The authors concluded that manual completion yielded significantly higher scores than completion by telephone interview.

According to OHIP-49, chronic periodontitis seems to have the greatest impacts on the domains of functional limitation, psychological discomfort, and physical incapacity, regardless of the administration method[17,18,19,20], causing a direct and causal negative impact on the quality of life and periodontal disease[21].

To compensate for some of the limitations found with the original OHIP-49, such as its length and items that only applied to edentulous patients using dentures, or to eliminate items with a non-response rate (left blank or marked as "don't know"), the OHIP-14[22] was developed by G. Slade in 1997, using a controlled stepwise regression process. Of the 49 original questions, 14 were retained, maintaining 2 items for each of the 7 dimensions.

Various versions of the OHIP are described, with OHIP-14 being the most common, likely due to its shorter format that requires less time to administer[23,24,25]. The OHIP-14 questionnaire has been validated and translated into multiple languages, allowing its scores to be compared among specific populations. This instrument allows the relationship between clinical parameters from an oral health exam or sociodemographic factors and the scores related to the impact of oral health on patients' quality of life to be assessed[3].

Ng & Leung (2006)[26] aimed to evaluate the impact of periodontal disease on the quality of life of 767 adult patients with or without periodontal disease, using the mean clinical attachment level (CAL) as the assessment criterion. After completing a checklist on their periodontal condition, participants answered the Chinese version of OHIP-14 regarding their perceptions of oral health over the past 12 months. The results showed an association between OHIP-14 scores and 6 of the 7 self-reported periodontal disease symptoms by these patients.

Using OHIP-14, Araújo et al. (2006)[27] conducted a study with 278 adult patients diagnosed with chronic and aggressive periodontitis, assessing the impact of the disease on their quality of life. In addition to applying the questionnaire, the researchers collected sociodemographic variables of the participants (gender, education, and income). The scores revealed that the worst condition in terms of perceived quality of life was more prevalent in cases where the disease was more severe. Regarding socioeconomic variables, the highest OHIP-14 scores, indicating a high impact of the disease on quality of life, were associated with individuals with incomplete secondary education, income less than two minimum wages, and the male gender. The least perceived aspect was physical limitation, including eating and interruption of meals due to oral problems. In contrast, psychological discomfort/nervousness related to awareness of oral health status was the most detected impact by the researchers.

To assess and compare oral health-related quality of life (OHRQoL) in patients with chronic periodontitis living in rural or urban areas of India, Grover et al. (2016)[28] used the OHIP-14 alongside an evaluation of the gingival parameters of these patients. It was found that the rural population was more exposed to periodontal problems. Additionally, among the rural population, the most affected domain was functional

limitation, while in the urban population, the most affected dimension was psychological discomfort. Periodontal parameters and OHIP-14 scores showed a positive correlation in both groups studied.

Specific oral condition instruments have also been developed, as they may have higher discriminant validity and responsiveness, as well as greater sensitivity to the disease of interest compared to a generic instrument[15]. Based on the original OHIP questionnaire, various attempts have been made to create these specific condition questionnaires, such as OHIP-EDENT (for edentulous patients)[29], OHIP-TMD (for patients with temporomandibular disorders)[30], OHIP-PD (for patients with periodontal disease)[31], and OHIP-CP (for patients with chronic periodontitis)[32]. Additionally, OHIP has been used in association with other instruments[33,19,12].

In this review, an association was observed among some instruments, such as OHIP-49, OHIP-14, GOHAI, or OHQoL UK, for assessing the impact of periodontal disease on patients' quality of life, referred to in this review as the “modified OHIP.” The purpose of these associations generally includes comparing the instruments used or investigating convergent validity between dimensions (and the questions within each), as combining generic and specific instruments could yield broader results than when applied individually[34,35].

To compare the responses to OHIP-49 and OHQoL UK, and to identify which items or domains were most specific to the disease, 89 patients with periodontitis and 89 healthy patients, matched by age and gender, were evaluated by Durham et al. (2013)[19]. The authors found that, regardless of the instrument, periodontally compromised patients had greater impacts on OHRQoL compared to their healthy peers. In OHIP-49, only 14 out of 49 items had statistically significant scores, which may suggest that due to the high number of items, OHIP-49’s potential to detect items with low prevalence (floor effects) was reduced. Conversely, most items in OHQoL UK showed significant differences between healthy and non-healthy patients, and according to the authors, this instrument could be a strong candidate as a short, easily applicable questionnaire. Furthermore, this instrument was able to correlate the social and psychological domains of patients with a periodontal pocket depth of 5 mm.

Caglayan et al. (2009)[33], aiming to evaluate the nature of dental complaints in patients seeking clinic services and how these complaints could influence the quality of life of these patients, conducted an observational study with 1,090 patients (220 healthy) at a university in Turkey. The researchers applied and compared the results of the OHIP-14 and OHQoL UK questionnaires, both translated into that language, in addition to collecting sociodemographic variables. In terms of complaints, in this study, patients who sought services only for routine checkups (20.2%) had a better quality of life compared to those with complaints (79.2%). In these patients, OHIP-14 scores were lower, while OHQoL UK scores were higher, including in periodontal patients. The researchers concluded that, in addition to oral disorders negatively impacting quality of life, sociodemographic factors, such as gender, education, and tobacco and alcohol consumption, can also have this influence.

Although OHIP is the most widely used instrument to measure the impact of oral health on the quality of life of the population, it is not without faults and criticism. Locker and Allen (2002)[14] and Allen e Locker (2002)[29] highlighted concerns about this questionnaire, basically stating a lack of suitability for use in some populations, which may show significant floor effects and weak response capacity. Additionally, the sample population corresponded to patients in private dental clinics, where attention was focused on patients with basic, prosthetic, or stomatological needs[13]. Thus, patients needing specialized care did not participate in the survey.

Another critical point about OHIP is that the instrument excludes questions about satisfaction with oral health, changes, or self-reported prognosis of the disease. Therefore, all impacts measured in OHIP are conceptualized as negative (adverse) outcomes, meaning the instrument would not measure any positive aspects related to oral health[14].

Thus, specific condition instruments have been developed, as they present greater discriminant validity, responsiveness, and sensitivity to the disease of interest compared to a generic instrument[15]. He et al. (2017)[32] developed and validated in China the OHIP-CP, a specific instrument for assessing the quality of life of patients with chronic periodontitis. The authors based this instrument on the OHIP-49 items and developed an 18-item questionnaire using a combined method of semi-structured interviews with patients and consultation with a panel of experts.

Rodriguez & Moral (2017)[31], in turn, sought to adapt and validate OHIP-14 for patients with periodontal disease and then developed OHIP-14 PD through the content validity and expert judgment method proposed by Escobar and Cuervo (2008)[36].

OIDP (Oral Impact on Daily Performances)

Developed by Adulyanon and Sheiham[37] in 1996, the OIDP is a flexible, quick-to-administer instrument composed of 8 items, originally in English. This generic questionnaire focuses on assessing the significant impacts that oral conditions can have on an individual's ability to carry out daily activities. Its approach provides advantages not only in terms of evaluating the impact of disease on these activities but also due to its ease of application and small number of items[37].

Based on Locker's[38] conceptual model, which is grounded in the WHO classification, the OIDP assesses the frequency and severity of the impacts of oral conditions on daily activities, such as eating, speaking, hygiene, smiling without embarrassment, and experiencing emotional, social, or professional problems. It encompasses three dimensions: physical, psychological, and social[37].

Designed to complement the clinical assessment of treatment needs in adults and in cross-sectional studies[39], the OIDP has been tested and validated in several countries with adult populations across a wide age range[40], and it has been used among periodontal patients[41,42,43].

A cross-sectional study by Gouvea et al. (2018)[44] in the state of São Paulo, Brazil, evaluated the impact of oral conditions (toothache, need for prosthetics, and periodontal disease) on adults' daily activities (n=17,560) and their association with sociodemographic characteristics. The OIDP quality of life questionnaire was used. In this study, it was observed that toothache, bleeding, and the presence of periodontal pockets had the greatest impacts on participants' daily performance. Additionally, being female, of mixed/Black race, having a low family income, and having less than 8 years of education also influenced daily activities similarly.

Another Brazilian cross-sectional study by Chalub et al. (2017)[45] aimed to investigate how oral health and functional dentition could influence satisfaction with oral health

and the daily activities of young Brazilian adults. The study used the OIDP, and to assess dentition functionality, the authors analyzed the number of teeth in the mouth, their distribution, aesthetic classification, occlusal status, and periodontal status (by clinical attachment level). The authors concluded that satisfaction with oral health and the impacts on daily performance among these adults were significantly associated with the different definitions of functional dentition used in this study, highlighting the need to establish a broader, less subjective definition of what constitutes functional dentition.

OHQoL UK (Oral Health-Related Quality of Life in the United Kingdom)

The OHQoL UK is a generic questionnaire, originally developed and validated in British English by McGrath and Bedi (2001)[46]. This instrument incorporates both positive and negative dimensions of health perception and assesses individual perceptions of the impact of oral health on the quality of life of adults living in England, Wales, and Scotland, although it has been widely used in other populations and has been validated for use in Brazil[47].

It consists of 16 questions within 4 domains—symptoms, psychological, social, and physical dimensions—producing scores that range from 16 (best quality) to 80 (worst quality)[48]. As a short, easy-to-administer tool, it is suitable for assessing the impact of periodontitis on quality of life[19]. However, the OHQoL UK has been used in a limited number of studies evaluating this effect[19,49,50].

To investigate the impact of periodontitis, its signs and symptoms, and sociodemographic factors on OHQoL UK scores, Kutsal et al. (2021)[51] evaluated 50 healthy patients and 50 periodontal patients. All patients underwent periodontal evaluation and completed the OHQoL UK quality of life questionnaire, as well as another survey on sociodemographic characteristics, medical history, smoking, and hygiene habits. The authors reported that diseased patients had a greater impact on quality of life, with the most significantly affected dimension being the physical, while the symptom category was the least affected.

In a comparative study by Needleman et al. (2004)[49] with 205 periodontal patients seen in a private clinic, participants completed the OHQoL UK questionnaire to assess the impact of periodontal disease on quality of life. The authors found that

statistically significant scores were associated with swelling, pain, gum recession, mobile or painful teeth, and bad breath. Additionally, it was observed that the impact on these patients' quality of life was considerable in the physical and social aspects. Regarding physical state, individuals reported impacts on their comfort or appearance. Social impacts were also noted, including financial strain and hindrance to socialization.

Discussion

A research strategy was applied in this literature review, utilizing indexed MeSH terms. The evaluation of the impact of periodontal disease on the quality of life of children was excluded, as periodontal involvement is less commonly observed in this age group. Additionally, studies involving systemic diseases (such as cardiovascular diseases, diabetes) or conditions that could lead to periodontal consequences (pregnancy, institutionalized or non-institutionalized adults or elderly) were also excluded. Thus, the studies included in this review sought to subjectively evaluate the impact that periodontal disease has on the quality of life of adults of different genders and sociodemographic statuses, using various instruments designed for this purpose.

Several studies have reported a significant deterioration in the quality of life of periodontal patients[49,19,52,7,4], as well as a negative impact on their self-perception of oral health[26,53]. This impact is clearly explained by the symptoms of periodontal disease, and according to patients, the most significant problems include psychological discomfort, stress, interpersonal relationship issues, and even difficulties in daily activities[3,19]. Furthermore, this impact increases with the severity and extent of the periodontal disease[54,52,7]. The primary reasons individuals seek treatment involve functional, psychological, and social limitations[55,56], with one study indicating that patients with probing depths greater than 5 mm experience impacts in these referred domains[10].

While the impact of periodontal disease is being estimated, there is a lack of knowledge about which psychometric domains actually affect quality of life, as oral diseases manifest different levels of impact across different domains of Oral Health-Related Quality of Life (OHRQoL)[10]. Additionally, some studies may not have

adjusted their analyses for confounding factors, such as dental caries or missing teeth, which could alter the results[7]. Identifying the impact on specific domains is important to direct health interventions to specific areas.

Different instruments contain different evaluation domains, and their discriminative abilities can vary considerably depending on the disease of interest[57]. Therefore, specific instruments may perform better than generic ones, as they assess the impact of a specific condition on an individual's daily activities and quality of life[58]. This may encourage the development of a health status measure specifically for periodontal conditions that can impact an individual's quality of life. Consequently, the development or modification of existing instruments is encouraged to further the design of a specific and appropriate tool for periodontal disease to capture its impact on an individual's quality of life.

Thus, it is evident that the use of instruments to measure oral health-related quality of life is widely accepted in the scientific field. Their application has increasingly extended to population surveys to determine the impact of multiple variables on a population's quality of life, guiding public health policies. Clinically, these instruments are useful for assessing the effectiveness of treatments and aiding professionals in evaluating and selecting the best therapeutic options[59].

Conclusion

It is concluded that different generic instruments are used to assess Oral Health-Related Quality of Life (OHRQoL) in patients with periodontal disease, with the OHIP-14 still being the most traditionally used instrument in scientific studies for this purpose.

Given the importance of understanding the impact of periodontal diseases on patients' quality of life, the development of specific instruments is essential for enhancing understanding and increasing the validity of studies in this field.

References

1 Armitage GC. Clinical evaluation of periodontal diseases. Periodontol 2000; 1995; (7):39-53.

2 Kinane DF, Stathopoulou PG, Papapanou, PN. Periodontal diseases. Nat Rev Dis Primers. 2017; 22(3):17038.

3 Paśnik-Chwalik B, Konopka T. Impact of periodontitis on the Oral Health Impact Profile: A systematic review and meta-analysis. Dent Med Probl. 2020;57(4):423-431.

4 Wong LB, Yap AU, Allen PF. Periodontal disease and quality of life: Umbrella review of systematic reviews. J Periodontal Res. 2021;56(1):1-17.

5 World Health Organization. Preamble to the constitution of the World Health Organization as adopted by the International Health Conference, New York, 119-22
June, 1946.

6 Hescot P. The New Definition of Oral Health and Relationship between Oral Health and Quality of Life. Chin J Dent Res. 2017;20(4):189-192.

7 Ferreira MC, Dias-Pereira AC, Branco-de-Almeida LS, Martins CC, Paiva SM. Impact of periodontal disease on quality of life: a systematic review. J Periodontal Res. 2017;52(4):651-665.

8 Eltas A, Uslu MO. Evaluation of oral health-related quality-of-life in patients with generalized aggressive periodontitis. Acta Odontol Scand. 2013; 71: 547- 552.

9 Llanos A H et al. . Impacto da periodontite agressiva e da periodontite crônica na qualidade de vida relacionada à saúde bucal. Brazilian Journal of Implantology and Health Sciences. 2020; 2(8), 37-49.

10 Masood M, Younis LT, Masood Y, Bakri NN, Christian B. Relationship of periodontal disease and domains of oral health-related quality of life. J Clin Periodontol. 2019; 46(2):170-180.

11 Fuller J, Donos N, Suvan J, Tsakos G, Nibali L. Association of oral health-related quality of life measures with aggressive and chronic periodontitis. J Periodontal Res. 2020; 55(4):574-580.

12 Ustaoğlu G, Göller Bulut D, Gümüş KÇ, Ankarali H. Evaluation of the effects of different forms of periodontal diseases on quality of life with OHIP 14 and SF-36 questionnaires: A cross-sectional study. Int J Dent Hyg. 2019 Nov;17(4):343-349.

13 Slade GD, Spencer AJ. Development and evaluation of the Oral Health Impact Profile. Community Dent Health 1997;11:3-11.

14 Locker D, Allen F. What do measures of 'oral health-related quality of life' measure? Community Dent Oral Epidemiol. 2007;35(6):401-11.

15 Allen PF. Assessment of oral health related quality of life. Health Qual Life Outcomes. 2003;1:40.

16 Locker D. Measuring oral health: a conceptual framework. Community dental health. 1988; 5(1): 3–18.

17 Desai R, Durham J, Wassell RW, Preshaw PM. Does the mode of administration of the Oral Health Impact Profile-49 affect the outcome score? J Dent. 2014;42(1):84-9.

18 Cunha-Cruz J, Hujoel PP, Kressin NR. Oral health-related quality of life of periodontal patients. Journal of Periodontal Research. 2007; 42: 169-76.

19 Durham J, Fraser HM, McCracken GI, Stone KM, John MT, Preshaw PM. Impact of periodontitis on oral health-related quality of life. J Dent. 2013; 41: 370- 376.

20 O'Dowd LK, Durham J, McCracken GI, Preshaw PM. Patients' experiences of the impact of periodontal disease. J Clin Periodontol. 2010 Apr;37(4):334-9.

21 Teeuw WJ, Abhilakh Missier AV, Hartman M, Ton M, Schuller AA, Verrips GHW et al. Parodontitis en levenskwaliteit. Nederlands tijdschrift voor tandheelkunde. 2011; 118(4):199-201.

22 Slade GD, Spencer AJ. Development and evaluation of the Oral Health Impact Profile. Community Dent Health 1994;11:3-11.

23 Mckenna G et al. The impact of rehabilitation using removable partial dentures and functionally orientated treatment on oral health-related quality of life: a randomised controlled clinical trial. Journal of dentistry. 2015; 43(1): 66–71.

24 Perea C et al. Oral health-related quality of life in complete denture wearers depending on their socio-demographic background, prosthetic-related factors and clinical condition. Medicina oral, patologia oral y cirugia bucal. 2013; 18(3): 371-80.

25 Ikebe K et al. Comparison of GOHAI and OHIP 14 measures in relation to objective values of oral function in elderly Japanese. Community dentistry and oral epidemiology. 2012;40(5):406–414.

26 Ng S K, Leung W K.Oral health-related quality of life and periodontal status. Community Dent Oral Epidemiol. 2006; 34: 114-122.

27 Araújo ACS, Gusmão ES, Jovino-Silveira RC. Impacto das periodontites na qualidade de vida. Periodontia. 2006;16(1):83- 7.

28 Grover V, Malhotra R, Dhawan S, Kaur G. Comparative Assessment of Oral Health Related Quality of Life in Chronic Periodontitis Patients of Rural and Urban Populations in Punjab. Oral Health Prev Dent. 2016;14(3):235-40.

29 Allen F, Locker D. A modified short version of the oral health impact profile for assessing health-related quality of life in edentulous adults. The International Journal of prosthodontics. 2002; 15 (5): 446–450.

30 Murray H et al. Pain and the quality of life in patients referred to a craniofacial pain unit. Journal of orofacial pain. 1996; 10 (4): 316–323.

31 Rodríguez NI, Moral J. Adaptation and content validity by expert judgment of the Oral Health Impact Profile applied to Periodontal Disease. J Oral Res. 2017;6(4):92–96.11.

32 He S, Wang J, Wei S, Ji P. Development and validation of a condition-specific measure for chronic periodontitis: Oral health impact profile for chronic periodontitis. J Clin Periodontol. 2017;44(6):591-600.

33 Caglayan F, Altun O, Miloglu O, Kaya MD, Yilmaz AB. Correlation between oral health-related quality of life (OHQoL) and oral disorders in a Turkish patient population. Med Oral Patol Oral Cir Bucal. 2009;14(11):e573-8.

34 Santos CM, Hugo FN, Leal AF, Hilgert JB. Comparison of two assessment instruments of quality of life in older adults. Revista Brasileira de Epidemiologia. 2013; 16, 328–33.

35 Fayers PM, Machin D. Quality of life assessemnet, analysys and interpretation. England: Jonh Wiley & Sons LTD; 2000.

36 Escobar-Pérez J, Cuervo-Martínez Á. Validez de contenido y juicio de expertos: una aproximación a su utilización. Rev Av Medición. 2008;6(1):27–36.

37 Adulyanon S, Sheiham A. Oral Impacts on Daily Performances. In: Slade GD, editor. Measuring Oral Health and Quality of Life. Chapel Hill: University of North Carolina; 1997. p. 151-160.

38 Locker d. Measuring oral health: a conceptual framework. Community dental health. 1988; 5(1): 3–18.

39 Mohebbi SZ, Sheikhzadeh S, Batebi A, Bassir SH. Oral Impacts on Daily Performance in 20- to 50-yearolds Demanding Dental Care in Tehran, Iran: Association with Clinical Findings and Self-reported Health. Oral Health Prev Dent. 2014;12(1):29-36.

40 Aslund M, Pjetursson BE, Lang NP. Measuring oral health-related quality-of-life using OHQoL-GE in periodontal patients presenting at the University of Berne, Switzerland. Oral Health Prev Dent. 2008;6(3):191–197.

41 Andersson P, Kavakure J, Lingström P. The impact of oral health on daily performances and its association with clinical variables in a population in Zambia. Int J Dent Hyg. 2017;15(2):128-134.

42 Åstrøm AN, Smith ORF, Sulo G. Early-life course factors and oral health among young Norwegian adults. Community Dent Oral Epidemiol. 2021 ;49(1):55-62.

43 Lawal FB, Taiwo JO, Oke GA. Impact of Oral Health on The Quality of Life of Elementary School Teachers. Ethiop J Health Sci. 2015 ;25(3):217-24.

44 Gouvêa GR, Bulgareli JV, David LL, Ambrosano GMB, Cortellazzi KL, Guerra LM, Frias AC, Meneghim MC, Pereira AC. Variables associated with the oral impact on daily performance of adults in the state of São Paulo: A population-based study. PLoS One. 2018;13(9):e0203777.

45 Chalub LLFH, Ferreira RC, Vargas AMD. Influence of functional dentition on satisfaction with oral health and impacts on daily performance among Brazilian adults: a population-based cross-sectional study. BMC Oral Health. 2017;17(1):112.

46 McGrath C, Bedi R. An evaluation of a new measure of oral health related quality of life--OHQoL UK(W). Community Dent Health. 2001; 18(3):138-43

47 Dini EL, McGrath C, Bedi R. An evaluation of the oral health quality of life (OHQoL) instrument in a Brazilian population. Community Dent Health. 2003 ;20(1):40-4.

48 Cortelli SC, Costa FO, Gargioni-Filho A, Aquino DR, Cota LOM, Scherma AP, Miranda TB, Cortelli JR. Impact of gingivitis treatment for diabetic patients on quality of life related to periodontal objective parameters: A randomized controlled clinical trial. Arch Oral Biol. 2018 ;86:80-86.

49 Needleman I, McGrath C, Floyd P, Biddle A. Impact of oral health on the life quality of periodontal patients. J Clin Periodontol. 2004;31(6):454-457.

50 Eltas A, Uslu MO. Evaluation of oral health-related quality-of-life in patients with generalized aggressive periodontitis. Acta Odontol Scand. 2013; 71: 547- 552.

51 Kutsal D, Bilgin Çetin M, Durukan E, Bulut Ş. Evaluation of the effect of periodontitis on quality of life using Oral-Dental Health-Related Quality of Life-United Kingdom scale. Int J Dent Hyg. 2021 ;19(3):305-312.

52 Buset SL, Walter C, Friedmann A, Weiger R, Borgnakke WS, Zitzmann NU. Are periodontal diseases really silent? A systematic review of their effect on quality of life. J Clin Periodontol. 2016 ;43(4):333-44.

53 Bernabé E, Marcenes W. Periodontal disease and quality of life in British adults. J Clin Periodontol. 2010;37(11):968-72.

54 Bhargava N, Jadhav A, Kumar P, Kapoor A, Mudrakola DP, Singh S. Oral Health-Related Quality of Life and Severity of Periodontal Disease. J Pharm Bioallied Sci. 2021;13(Suppl 1):S387-S390. doi:10.4103/jpbs.JPBS_588_20

55 Borges TF, Regalo SC, Taba M Jr, Siessere S, Mestriner W Jr, Semprini M. Changes in masticatory performance and quality of life in individuals with chronic periodontitis. J Periodontol. 2013; 84: 325-331

56 Al Habashneh R, Khader YS, Salameh S. Use of the Arabic version of Oral Health Impact Profile-14 to evaluate the impact of periodontal disease on oral health-related quality of life among Jordanian adults. J Oral Sci. 2012;54(1):113-20.

57 Streiner D L, Norman G R, Cairney J. Health Measurement Scales: A practical guide to their development and use. 2008. 5th. ed. Oxford.

58 Streiner D L, Norman G F. Devising the items. In D. L. Streiner & G. F. Norman (Eds.), Health measurement scales: A practical guide to their development and use (pp. 17–36). 2008. New York: Oxford University Press.

59 Fitzpatrick R, Fletcher A, Gore S, Jones D, Spiegelhalter D, Cox D. Quality of life measures in health care. I: Applications and issues in assessment. BMJ. 1992;305(6861):1074-1077.