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ORIGINAL ARTICLE

# Assessing Dentists' Awareness and Practices in the Interplay Between Obesity and Periodontitis in Primary Health Care: A Questionnaire-Based Survey

Valeska Maria Souto Paiva Duarte[1], Vanessa Feitosa Alves[1], Edson Hilan Gomes de Lucena[1], Yuri Wanderley Cavalcanti[1], Sabrina Garcia de Aquino[1]

[1]School of Dentistry, Federal University of Paraíba, João Pessoa, PB, Brazil.

**Corresponding author:** Vanessa Feitosa Alves **E-mail:** vanessafalves@hotmail.com

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**ABSTRACT**

**Objective:** To assess the comprehension of dentists in Primary Health Care (PHC) regarding the interplay between obesity and periodontitis and evaluate the presence of practical approaches for managing these patients. **Material and Methods:** For this cross-sectional study, 187 general dental practitioners from different regions of Brazil were selected by convenience. A specific instrument was developed to assess the knowledge and practices of PHC dentists concerning this topic. The data underwent descriptive and analytical statistical analyses, followed by Poisson regression analysis with robust variance to test associations. **Results:** Regarding knowledge, most dentists have a limited understanding of the link between obesity and periodontitis, despite 43% recognizing the higher susceptibility of individuals with obesity to oral issues. About 20% of professionals considered their knowledge "adequate." Better knowledge was observed among dentists who worked only in the public sector, which has concluded some post-graduation ($p<0.05$). Regarding the professional's practical conduct, around 57% of the dentists do not diagnose obesity, and 64% of the professionals do not refer these patients to a nutritionist. **Conclusion:** The study's outcomes underscore the prevailing lack of awareness among this sampled group of dental practitioners concerning the association between obesity and periodontitis. Furthermore, it was observed that multidisciplinary treatment for obese patients within the realm of PHC is generally underperformed.

**Keywords:** Periodontitis; Obesity; Periodontal Diseases.

## Introduction

Along with dental caries, periodontitis is the leading cause of tooth loss in adults worldwide [1]. A silent inflammatory disease associated with a dysbiotic biofilm, periodontitis chronically affects the supporting tissues of the teeth, ultimately leading to tooth loss. Severe periodontitis has been reported as the sixth most common chronic disease worldwide, contributing to chewing impairment that can affect nutrition, self-esteem, quality of life, and overall health, as well as significant socioeconomic impact and health care costs [2]. In addition, periodontitis is associated with low-grade systemic inflammation that extends beyond the oral cavity [3,4]. Over the past decade, a growing body of evidence has emerged highlighting the complex relationship between periodontitis and various non-communicable chronic diseases (NCDs), including diabetes and obesity [4,5].

Obesity is characterized by multiple organ systemic inflammation [4,6] and represents a significant public health problem due to its high prevalence and associated comorbidities. According to the World Obesity Federation, more than 4 billion people will be obese by 2035 [7]. Recently, obesity has been associated with an increased risk of periodontitis, along with diabetes and smoking [4-6]. Thus, systemic hyperinflammatory conditions increase periodontal inflammation and the destructive processes initiated by oral microorganisms in these patients [4,8]. These findings underscore the importance of dental and periodontal screening and care for individuals with obesity [4,9]. Obesity has been associated with a 31% higher risk of tooth loss compared to normal-weight individuals [10]. It has even been recommended that patients be referred to a dentist by physicians, highlighting the need for dental professionals in the multidisciplinary approach to obesity [9,11].

The Brazilian Unified Health System (SUS), through the Family Health Strategy (FHS), advocates a comprehensive approach to health care, with dental care beginning at the primary health care (PHC) [12]. Within primary health care, the differentiated treatment of individuals is facilitated by collaborating with different professionals and forming multidisciplinary healthcare teams. Dentists are crucial in implementing interprofessional work for a comprehensive approach to patients with obesity and related comorbidities (dyslipidemia, hypertension, hyperglycemia), as oral and general health are closely linked and mutually influential [11,13,14]. Thus, while an overlapping inflammatory state is a central axis explaining this inextricable link, managing common shared risk factors through lifestyle changes is considered an essential approach to overall health [15,16].

However, this remains a challenge because many dentists need more knowledge, training, or confidence to facilitate lifestyle changes in their patients [15]. Therefore, the primary aim of this study is to assess primary care dentists' knowledge of the relationship between obesity and periodontal disease. In addition, it seeks to investigate the existence of practical approaches to caring for these patients. We hope this knowledge will contribute to developing strategies to improve the comprehensive care of patients with obesity in the Brazilian PHC setting.

## Material and Methods

This work followed the STROBE guidelines for cross-sectional studies.

### Ethical Considerations

This study was conducted following the guidelines of the Declaration of Helsinki and was approved by the Human Research Ethics Committee of the Health Sciences Center, Federal University of Paraiba, under CAAE number 43186821.4.0000.5188. All subjects signed an informed consent form.

Study Design

This cross-sectional, exploratory study assessed the knowledge and practices of PHC dentists regarding the relationship between obesity and periodontal disease. The professionals were recruited through e-mails sent to each Brazilian state and capital health directories to distribute the questionnaire to professionals from the region from August 2021 to January 2022. The participants could answer the proposed questions after receiving the e-mail with all the information and the survey link. The survey was also published on social media (e.g., Instagram and WhatsApp) for broader dissemination.

The questionnaire was developed on the Google Forms platform along with the informed consent form to obtain the prior consent of the professionals. The tool designed specifically for this study was used to assess the quality of knowledge and practices of PHC dentists regarding the relationship between obesity and periodontal disease. It consisted of 27 questions, the first part of the questionnaire totaling ten questions related to the sample demographics. The others related to the professionals' knowledge on the subject: oral health in general, periodontal disease, obesity, and the relationship between them. At the end of each questionnaire, the professional was given an information leaflet: "Periodontal Medicine - Oral Health and Multidisciplinary Care of Obesity Patients," which included explanations on the subject and guidelines for the reception of obese patients in the primary health care unit.

First, a pilot study was carried out in João Pessoa with ten dentists who were part of the FHS. During this pilot test, the questionnaire was then subjected to internal consistency validation (Figure 1).

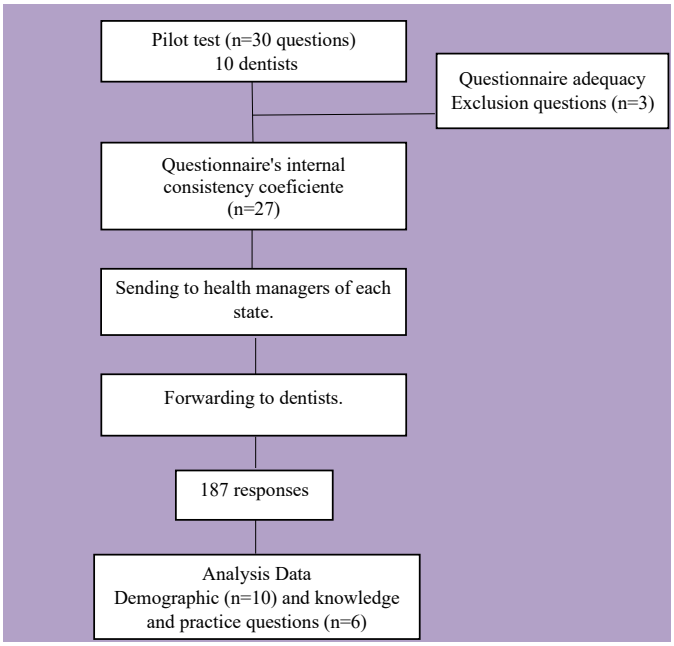


**Figure 1. Flowchart of methodological process: pilot testing, internal validation, data collection, and questionnaire analysis**

Sampling

The sample size calculation considered the variability of the results and the frequency of professionals considered to have adequate knowledge (5 or more points on the scoring scale).

The pilot test showed a mean of 4.1 and a variance of 16.3. The percentage of individuals with knowledge considered adequate was 20%. Therefore, the sample size calculation used an expected frequency of 20%, a precision of 10%, and a design effect 2.5 to estimate a minimum sample size of 154. A loss rate of 20% was added

to this value, resulting in a sample of 187 individuals. As inclusion criteria, the dentists working in the Family Health Strategy who agreed to participate in the research by responding to the questionnaire under informed consent were included. Non-responders were excluded, referring to participants who declined to participate in the study.

Selection of Variables

Using a Delphi group strategy, the authors developed a questionnaire containing the main topics of interest regarding the knowledge and practices regarding the interaction between obesity and periodontal disease. A pilot study was developed with ten general dental practitioners, and suggestions regarding the questions were collected. Then, a factorial exploratory analysis was conducted to assess psychometric parameters and certify the use of a solid construct. Bivariate correlations were used to assess the relationship between the selected questions. The Spearman correlation test measured bivariate correlations between the questions comprising the instrument. Questions that showed statistically significant correlations ($p < 0.05$) with at least two other questions were retained in the instrument. In addition, an internal consistency analysis of the construct was performed using Cronbach's alpha, with a minimum estimated value of 0.7. Sphericity and sample adequacy tests (Kaiser-Meyer-Olkin [KMO] and Bartlett's test) were used to assess the factorability of the sample. Afterward, to create the dependent variable, we selected six questions about the dentists' knowledge and practices category from the questionnaire. Questions 2, 3, 4 and 5 were employed to assess the professionals' comprehension of the subject. The knowledge and practice questions used a Likert-type scale ranging from -2 points to +2 points for evaluation.

**Table 1. Components of the assessment tool: dentists' knowledge and practices regarding the link between obesity and periodontal disease in primary health care.**

| Questions | Answer Options | Punctuation | Category |
|---|---|---|---|
| 1. In PHC, how do you usually diagnose patients with obesity? | Does not participate in the diagnosis | 0 | Practice |
| | Participates in the diagnosis | 2 | |
| 2. Do obese patients have more oral problems? | Strongly disagree | -2 | Knowledge |
| | Partially disagree | -1 | |
| | Indifferent / I don't know about | 0 | |
| | Partially agree | 1 | |
| | I Strongly agree | 2 | |
| 3. Does obesity influence the severity of periodontal disease? | Strongly disagree | -2 | Knowledge |
| | Partially disagree | -1 | |
| | Indifferent / I don't know about | 0 | |
| | Partially agree | 1 | |
| | I Strongly agree | 2 | |
| 4. Can basic periodontal therapy (scaling and root planning) effectively reduce systemic inflammation, potentially leading to decreased body fat levels and improved glycemic control in patients with advanced periodontal disease? | Strongly disagree | -2 | Knowledge |
| | Partially disagree | -1 | |
| | Indifferent / I don't know about | 0 | |
| | Partially agree | 1 | |
| | I Strongly agree | 2 | |
| 5. Can obese patients manage their oral, periodontal, and overall health in the same way as non-obese patients? | Strongly disagree | -2 | Knowledge |
| | Partially disagree | -1 | |
| | Indifferent / I don't know about | 0 | |
| | Partially agree | 1 | |

| | | | |
|---|---|---|---|
| | I Strongly agree | 2 | |
| 6. Do you usually refer obese patients to a nutritionist? | Never | -2 | Practice |
| | Rarely | -1 | |
| | Regularly | 1 | |
| | Almost always/ always | 2 | |

The total score from the responses could range from -10 to 12 points. To simplify the analysis, these points were converted into a categorical variable with four different levels: negative (when the sum of the responses was less than zero), zero (when the sum of the responses was equal to zero), low (when the sum of the responses was between 1 and 5 points), and sufficient (when the sum of the responses was equal to or greater than 6 points). Such classification was also based on a quartile distribution.

The contextual variables were gender (male and female); age group in years (from 20 to 29; from 30 to 39; from 40 to 49; and 50 or more); family income in minimum wages (R$ 1,100) (up to 2; from 3 to 4; from 5 to 8; from 8 to 10; and more than 10); time since graduation in years (less than 1; from 1 to 3; from 4 to 6; from 7 to 10; and more than 10); workplace (public sector only or public and private sector); region of work (capital or interior of the state); time working in PHC (up to 3 years or more than three years); possession of a university undergraduate degree (yes or no).

Data Analysis

Data were first analyzed using descriptive statistics to characterize the sample. Next, Poisson regression analysis with robust variance was used to determine associations between variables. All independent variables were included in the initial model (raw model). Variables with p-value > 0.20 were progressively removed until only variables with p-value ≤ 0.20 remained in the multiple model. Those with a p-value < 0.05 in the various models were associated with the outcome analyzed in the final (adjusted model) model. The magnitude of the effects was verified by calculating the prevalence ratio (PR) and its 95% confidence interval (95% CI). All data tabulations and analyses were performed with the Statistical Package for Social Sciences software (IBM-SPSS, v.24, IBM, Chicago, IL, USA).

## Results

The tool to assess the knowledge and practices of PHC dentists regarding the relationship between obesity and periodontal disease was first evaluated for some psychometric properties. The instrument's internal consistency, according to the standardized Cronbach's alpha value, was 0.739, which was considered adequate. The Bartlett's sphericity test was considered statistically significant (p<0.001), and the KMO sample adequacy measure (0.563) confirmed that the factor analysis for this study was consistent.

Among the states of Brazil, Paraíba and Pernambuco collectively represent the majority of responses obtained in this study, with 27.96% (n=52) and 10.75% (n=20), respectively. Bahia and Tocantins each accounted for 10% of the sample. Other states, including Alagoas, Amazonas, Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso do Sul, Minas Gerais, Paraná, Piauí, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Rondônia, Santa Catarina, São Paulo, and Sergipe, ranged from 0.54% to 4.30%. Unfortunately, Acre, Amapá, Distrito Federal, Mato Grosso, Pará, and Roraima did not yield any responses to the questionnaire. Of the 187 dentists, 141 (75.4%) were female, 66 (35.3%) were between 20 and 29 years of age, 60 (32.1%) had a family income of 3 to 4 minimum wages, 89 (47.6%) had more than ten years of experience, 95 (50.8%) worked only in the public sector, 146 (78.1%) worked in the interior of the states, 114 (61%) had more than three years of experience in primary health care, and 144 (77%) had a postgraduate degree (stricto or lato sensu) (Table 2).

**Table 2. Descriptive analysis of dentists' knowledge and practices concerning obesity and periodontal disease according to contextual variables.**

| Contextual Variables | Level of Knowledge and Practice | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Negative | | Null | | Low | | Adequate | |
| | N | % | N | % | N | % | N | % |
| Gender | | | | | | | | |
| Masculine | 14 | 7.50 | 2 | 1.10 | 22 | 11.80 | 8 | 4.30 |
| Female | 38 | 20.30 | 22 | 11.80 | 49 | 26.20 | 32 | 17.10 |
| Age Range (Years) | | | | | | | | |
| 20 a 29 | 19 | 10.20 | 12 | 6.40 | 22 | 11.80 | 13 | 7.00 |
| 30 a 39 | 17 | 9.10 | 7 | 3.70 | 27 | 14.40 | 13 | 7.00 |
| 40 a 49 | 11 | 5.90 | 3 | 1.60 | 12 | 6.40 | 5 | 2.70 |
| 50 or more | 5 | 2.70 | 2 | 1.10 | 10 | 5.30 | 9 | 4.80 |
| Family Income (in minimum wages[#]) | | | | | | | | |
| Until 2 | 7 | 3.70 | 2 | 1.10 | 5 | 2.70 | 3 | 1.60 |
| 3 a 4 | 15 | 8.00 | 10 | 5.30 | 25 | 13.40 | 10 | 5.30 |
| 5 a 8 | 15 | 8.00 | 6 | 3.20 | 19 | 10.20 | 13 | 7.00 |
| 8 a 10 | 6 | 3.20 | 2 | 1.10 | 11 | 5.90 | 7 | 3.70 |
| More than 10 | 9 | 4.80 | 4 | 2.10 | 11 | 5.90 | 7 | 3.70 |
| Time since graduation (Years) | | | | | | | | |
| Less than 1 | 4 | 2.10 | 2 | 1.10 | 3 | 1.60 | 1 | 0.50 |
| 1 a 3 | 12 | 6.40 | 7 | 3.70 | 15 | 8.00 | 9 | 4.80 |
| 4 a 6 | 8 | 4.30 | 3 | 1.60 | 7 | 3.70 | 6 | 3.20 |
| 7 a 10 | 6 | 3.20 | 3 | 1.60 | 9 | 4.80 | 3 | 1.60 |
| More than 10 | 22 | 11.80 | 9 | 4.80 | 37 | 19.80 | 21 | 11.20 |
| Workplace | | | | | | | | |
| Only in the public sector | 19 | 10.20 | 13 | 7.00 | 40 | 21.40 | 23 | 12.30 |
| In the public and private sector | 33 | 17.60 | 11 | 5.90 | 31 | 16.60 | 17 | 9.10 |
| Work region | | | | | | | | |
| Capital | 9 | 4.80 | 5 | 2.70 | 14 | 7.50 | 13 | 7.00 |
| Interior of state | 43 | 23.00 | 19 | 10.20 | 57 | 30.50 | 27 | 14.40 |
| Time working in the PHC | | | | | | | | |
| Up to 3 years | 22 | 11.80 | 10 | 5.30 | 22 | 11.80 | 19 | 10.20 |
| More than 3 years | 30 | 16.00 | 14 | 7.50 | 49 | 26.20 | 21 | 11.20 |
| Postgraduate degree | | | | | | | | |
| No | 14 | 7.50 | 8 | 4.30 | 16 | 8.60 | 5 | 2.70 |
| Yes | 38 | 20.30 | 16 | 8.60 | 55 | 29.40 | 35 | 18.70 |
| Total | 52 | 27.8 | 24 | 12.8 | 71 | 38.0 | 40 | 21.4 |

[#]Brazilian Minimum Wage = R$1.100.00; PHC: Primary Health Care.

Regarding the knowledge and practice related to obesity and periodontal disease, 38% (n=71) were classified as having a low level, followed by negative knowledge (27.8%), meaning they missed more questions than answered correctly. Just over 20% of respondents scored on all questions and were classified as having "adequate knowledge."

Regarding the questions about the professional's practical behavior, it was found that about 57% of dentists do not diagnose obesity, and 64% of them do not refer these patients to a nutritionist. When asked about their knowledge of the subject, there was partial agreement: "Do obese patients experience more oral health issues?" (43%) and "Is obesity associated with increased general inflammation and its potential impact on the severity of periodontal disease?" (38.5%). Already, 34.7% fully agreed with the question: "Can basic periodontal therapy, such as scaling and root planning, reduce inflammation in the body, subsequently decreasing fat levels and improving glycemic control in patients with advanced periodontal disease?".

After adjustment for potential confounders, only a workplace and having a graduate degree were associated with the outcome. Professionals who worked in a dual shift (i.e., in both the public and private settings) were 14% less likely to have the appropriate level of knowledge (PR=0.86; 95% CI: 0.76-0.97) compared to

those who worked only in the public sector. Dentists with a postgraduate degree (stricto or lato sensu) were 1.16 times more likely to have the appropriate level of knowledge and practice regarding the relationship between obesity and periodontal disease (PR=1.16; 95%CI: 1.01-1.34) compared to those without a postgraduate degree (Table 3).

**Table 3. Crude and adjusted prevalence ratios (PR) and 95% Confidence Intervals (95% CI) for the association between dentists' higher knowledge and practices related to obesity and periodontal disease and contextual variables.**

| Contextual Variables | N (%) | Crude Model | | | | Adjusted Model | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | β | PR | CI 95% | p-value | β | PR | CI 95% | p-value |
| Gender | | | | | | | | | |
| Female | 141 (75.4) | -0.043 | 0.96 | (0.82-1.12) | 0.586 | | | | |
| Masculine | 46 (24.6) | | 1 | | | | | | |
| Age Group | | | | | | | | | |
| 20 a 29 years | 66 (35.3) | | 1 | | | | | | |
| 30 a 39 years | 64 (34.2) | 0.048 | 1.05 | (0.88-1.25) | 0.741 | | | | |
| 40 a 49 years | 31 (16.6) | -0.106 | 0.90 | (0.70-1.15) | 0.404 | | | | |
| 50 or more | 26 (13.9) | 0.040 | 1.04 | (0.82-1.32) | 0.598 | | | | |
| Family Income (in minimum wages = R$1.100,00) | | | | | | | | | |
| Until 2 | 17 (9.1) | | 1 | | | | | | |
| 3 a 4 | 60 (32.1) | 0.096 | 1.10 | (0.85-1.43) | 0.476 | | | | |
| 5 a 8 | 53 (28.3) | 0.082 | 1.09 | (0.83-1.42) | 0.548 | | | | |
| 8 a 10 | 26 (13.9) | 0.158 | 1.17 | (0.86-1.59) | 0.314 | | | | |
| More than 10 | 31 (16.6) | 0.065 | 1.07 | (0.79-1.43) | 0.667 | | | | |
| Time since graduation (Years) | | | | | | | | | |
| Less than 1 year | 10 (5.3) | | 1 | | | | | | |
| 1 a 3 years | 43 (23.0) | 0.155 | 1.17 | (0.83-1.64) | 0.373 | | | | |
| 4 a 6 years | 24 (12.8) | 0.115 | 1.12 | (0.74-1.71) | 0.593 | | | | |
| 7 a 10 years | 21 (11.2) | 0.144 | 1.16 | (0.75-1.78) | 0.512 | | | | |
| 10 or more | 89 (47.6) | 0.277 | 1.25 | (0.81-1.93) | 0.305 | | | | |
| Workplace | | | | | | | | | |
| Only in the public sector | 95 (50.8) | | 1 | | | | 1 | | |
| In the public and private sector | 92 (49.2) | -0.157 | 0.85 | (0.75-0.97) | 0.018 | -0.151 | 0.86 | (0.76-0.97) | 0.017 |
| Work region | | | | | | | | | |
| Capital | 41 (21.9) | | 1 | | | | | | |
| Interior of state | 146 (78.1) | -0.064 | 0.94 | (0.81-1.09) | 0.407 | | | | |
| Time working in the PHC | | | | | | | | | |
| Up to 3 years | 73 (39.0) | | 1 | | | | | | |
| More than 3 years | 114 (61.0) | -0.100 | 0.91 | (0.72-1.14) | 0.398 | | | | |
| Postgraduate degree | | | | | | | | | |
| No | 43 (23.0) | | 1 | | | | 1 | | |
| Yes | 144 (77.0) | 0.130 | 1.14 | (0.96-1.35) | 0.137 | 0.148 | 1.16 | (1.01-1.34) | 0.049 |

Variables included in the adjusted model (p<0.20 in crude) / AIC: 611.973.

## Discussion

The importance of dentists' knowledge of the relationship between obesity and periodontal disease and other oral health disorders in obese individuals cannot be overemphasized. This knowledge plays a crucial role in improving their attitudes and behaviors in managing these patients within a multi-professional team. To our knowledge, this study is the first in Brazil to evaluate dentists' understanding and practice of the relationship between these two chronic diseases.

The role of the dentist in the care of patients with obesity is crucial, extending beyond oral health to address aspects related to overall health. In addition to conducting crucial oral health assessments, including diagnosing periodontal diseases and dental caries and preventing tooth loss, the dentist actively advises lifestyle changes [4,10]. This involvement includes referring the patient for nutritional and medical assistance and demonstrating an integrated approach [17]. This perspective underscores the significant importance of the dentist in the comprehensive care of patients with obesity, contributing to health promotion and holistic condition management.

Our results showed that only about 20% of the participants demonstrated "adequate knowledge" on this topic. Professionals with a postgraduate degree were more likely to have adequate knowledge (RP=1.16; IC95%: 1.01-1.34) than those working in both the public and private sectors (RP=0.86; IC 95%: 0.76-0.97). This dual path, which is a common practice among health professionals (especially dentists), may reflect the work process of private care into the public sector, focusing on individual and curative actions.

In contrast to many regions of the world where dentists work primarily in private practice, Brazil has experienced a significant integration of dental professionals into the public health system since 2000 through the oral health teams in the FHS. PHC in Brazil emphasizes the integration of interventions and services to protect, promote, and restore health in a hierarchical and regionalized manner. This integration of dentists into PHC has led to significant changes in their approach to dentistry. Whereas previously, the focus was on technical aspects and patient symptomatology during face-to-face consultations, the new paradigm of FHS prioritizes preventive care for families through home visits and school-based interventions. This approach aims to improve overall health and promote shared responsibility for health [12]. Dentists are now actively encouraged to prevent systemic diseases such as diabetes, hypertension, cancer, and obesity, as well as to support smoking cessation programs [4,5,18]. Studies show that these FHS initiatives have a significant impact on reducing the incidence of disease in the community [19,20], potentially helping curb the obesity epidemic.

However, our results show that most professionals are not dedicated to diagnosing obesity (57%) or referring patients to a nutritionist (64%). These practices are guided by consensus guidelines that emphasize the dentist's role in the early diagnosis of obesity. In addition, it is recommended that physicians investigate the history of periodontal disease and consider referring patients for dental treatment when appropriate [11].

Therefore, dentists should be aware of the early signs of obesity and its oral manifestations and effectively counsel their patients with comprehensive knowledge. However, addressing obesity during dental visits is uncommon [21]. The treatment plan should include counseling on healthy behaviors to improve weight loss and oral health, reducing common systemic and oral health risk factors [22]. This is consistent with the priorities and strategies of the World Health Organization and the United Nations in addressing common non-communicable diseases through the common risk factor approach [23]. Although these tasks may seem straightforward, many health professionals need more knowledge, training, or confidence to facilitate lifestyle changes [15]. Therefore, a multi-professional treatment approach should be promoted in clinical practice, followed by interprofessional education and training. Such initiatives can improve teamwork in the management

of periodontitis, obesity, and other non-communicable diseases [13,21] and improve access, integration, and efficiency of both oral and general health services, which should be considered as part of a unified context [24].

However, our study shows that many dentists are unaware of the high incidence of oral problems in obese patients (57%), including an increased risk and severity of periodontitis (61.5%). This may result in fewer referrals to periodontists in the SUS specialty care network, leading to undertreatment. In addition, just over one-third of dentists believe that periodontal therapy can help control blood glucose levels in advanced periodontal disease. However, there is a lack of practical implementation regarding dentists diagnosing obesity early or referring patients to dieticians, as evidenced by the lack of concrete practices.

The relationship between obesity and periodontitis, however, may be confounded by the high incidence of diabetes in obese individuals [4]. The well-documented interconnection between diabetes and obesity [5] raises the pertinent question of whether diabetes might mediate the relationship between obesity and periodontitis.

Consequently, PHC dentists need clarity on the relationship between obesity and periodontitis for preventive oral and obesity treatment, with the goal of an early multidisciplinary approach. Changing physician behavior requires training and time. Ideally, it should begin during their undergraduate studies. In the meantime, evidence-based updates from these professionals are essential to improve the integrated management of these patients in primary care.

It is important to acknowledge this study's limitations, particularly the potential lack of representativeness in its sample for certain regions of the country. To extend the reach of our findings, we recommend that future research be more broadly based and include different professionals from the multidisciplinary team. This approach will not only deepen our understanding of the relationship between obesity and periodontology but also improve the quality of care provided to this specific population.

## Conclusion

These results indicate that most dentists surveyed have limited knowledge of the relationship between obesity and periodontal disease. Moreover, the evaluation reveals an unsatisfactory incorporation of practical approaches for managing obese patients by dentists. This underscores the urgent need to increase awareness and understanding of this relationship among dental professionals. Investing in continuing education for PHC professionals and graduate programs is essential. Because of the well-established association between obesity and periodontitis, continuing education to update professionals and the adoption of a multidisciplinary approach to the management of obese patients in PHC are critical. Comprehensive educational programs involving the entire healthcare team are essential to disseminate information, promote integration, and guide a holistic approach to patient care.

## Authors' Contributions


| | | |
|---|---|---|
| VMSPD | https://orcid.org/0000-0001-5856-2928 | Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Project Administration and Funding Acquisition. |
| VFA | https://orcid.org/0000-0002-6676-9037 | Investigation, Writing - Original Draft and Writing - Review and Editing. |
| EHGL | https://orcid.org/0000-0003-3431-115X | Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Writing - Review and Editing and Supervision. |
| YWC | https://orcid.org/0000-0002-3570-9904 | Methodology, Formal Analysis, Writing - Original Draft and Writing - Review and Editing. |
| SGA | https://orcid.org/0000-0002-3988-1939 | Conceptualization, Methodology, Formal Analysis, Writing - Original Draft, Writing - Review and Editing and Funding Acquisition. |

All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.


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## Conflict of Interest

The authors declare no conflicts of interest.

## Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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