34 - ASSOCIATION OF PERIODONTITIS AND OBESITY IN YOUNG ADULTS OF A MUNICIPALITY OF ALAGOAS, BRAZIL

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INTRODUCTION

Overweight and obesity are portrayed as an unreasonable or abnormal accumulation of fat that affects health. The root cause is an imbalance between the calories consumed and spent, resulting from inadequate eating patterns, with the consumption of very energetic foods, commonly fat rich and associated with physical inactivity, known as sedentary lifestyle, according to WHO[1].

Obesity is signaled as one of the most prevalent risk factors in heart disease, hypertension, hyperlipidemias, type II diabetes and certain cancers that make up the most common chronic diseases in the world Heyward, Stolarczyk2.

By associating obesity with other pathologies, Morita et al. 3 suggested that obesity may be associated with periodontitis due to increased susceptibility to bacterial infection.

Periodontitis is an infectious disease that affects the structures of protection and support of teeth, and is associated with an imbalance of the microbiota, related mainly to Gram-negative microorganisms. The microorganisms involved in chronic and aggressive periodontitis are predominantly Gram-negative anaerobic rods, as well as some anaerobic cocci and a large number of spirochetes, according to Pataro et al.4.

These bacteria produce several cytotoxic molecules such as lipopolysaccharides (LPS), proteases, among others and, directly and indirectly, and can lead to the destruction of periodontal tissue. The role of periodontopathogens in the etiology of periodontitis is extensively studied and seeks to minimize or control the effect of the disease on loss of periodontal insertion, according to a study by Pataro et al.4.

Periodontal disease, which is a general term used to describe specific diseases affecting gum and supporting connective tissue and alveolar bone, which anchor the teeth in the mandibles Williams5, is multifactorial, expressed through environmental, behavioral characteristics , social and host, which can affect and modify the expression of the disease. These factors are also direct determinants in the control of periodontal diseases and, consequently, promote the success of periodontal therapy Newman et al.6.

As studies point to the existence of the association of periodontitis and obesity, it is fundamental to seek evidence of the relationship between them, which may be an important finding for the health community. In this context, it was decided to verify the association of periodontitis and obesity in young adults of a Municipality of Alagoas, Brazil.

THE OBESITY

The World Health Organization (WHO) estimates that obesity will reach 1.7 billion people worldwide, which leads to growing interest in studies and greater understanding of the harm they can cause. Obesity is defined as a state of excessive accumulation of body fat to a degree where the health and well-being of individuals may be affected (WHO, 2003).

Obesity is a growing public health issue around the world. Its prevalence is high in both developed and underdeveloped countries. In the United States, 32.2% of adult men and 35.5% of adult women were obese, according to the NHANES 2007-2008 (National Center for Disease Control and Prevention). last national survey (PATARO et al., 2012). It is defined as the excessive condition of crowded fat in adipose tissue (GARROW, 1988).

According to the World Health Organization (WHO, 1997), the consequences of health damage caused by obesity are influenced by body mass, body fat location, body mass gain range and sedentary lifestyle.

The prevalence of obesity has increased in both developed and underdeveloped countries. This increase is a result of the transformation of modern society's lifestyle, such as altered eating habits, increased consumption of processed foods and discouragement for physical activities. Thus, caloric excess and sedentary lifestyle favored obesity (BRIANEZZI et al., 2013).

Santos et al. (2013) revealed that the obesity epidemic was the predominant reality of rich and developed countries. As low- and middle-income countries became more globalized, there was a considerable shift in the pattern of nutrition and living habits. This resulted in a significant increase in the prevalence of this disease.

Batista Filho et al. (2003) affirm that, at the same time that the existence of malnutrition in children and adults declines in an accelerated way, it raises the appearance of obesity in our population. The studies carried out lately are indicative of the clearly epidemic behavior of the problem and, in this way, a divergence of transient trends between malnutrition and obesity, which defines one of the outstanding characteristics of the process of nutritional change of the country, is established.

Surveys of national amplitude show that the prevalence of overweight and obesity increased in the population in a diversified way between the sexes (GIGANTE et al., 2004). Between the years 1974-1975, obesity in men almost tripled, with greater significance at the beginning of the period. There was a 50% increase in 2002-2003 and the increase in the prevalence of obesity in women was concentrated in the period from 1974-1975 to 1989, when the surveys were conducted (National Family Expenditure Survey and National Health and Nutrition Survey) (GIGANTE et al., 2004).

According to Deitel (2003), 1.1 billion people worldwide were in the overweight or obesity range in 2003 and that in

recent years, several evidences have documented a progressive increase in the prevalence of obesity worldwide. It was estimated that 500 million adults were obese in 2008, accounting for 10-14% of the world's population (KELLY et al., 2008). In the next two decades, a large increase in the number of overweight or obese adults in low- and middle-income countries is still expected (MALIK, V.S., WILLETT, W.C., HU, F.B, 2013).

Body mass index (BMI) is defined as the ratio between body weight and square of body height, and is considered normal when BMI is 20 to 24.99 kg / m², overweight from 25 to 29.99 kg / m², obesity grade I from 30 to 34.99 kg / m², grade II obesity from 35 to 39.99 kg / m² and obesity grade III or morbid obesity ≥ 40 kg / m² (WHO, 1997).

Jacques Quetelet was the first researcher to observe that adult body weight is proportional to height and, because of this pioneer discovery among anthropometrists, weight / height ratio was counted as BMI (PITANGA, 1998).

Some studies indicate that visceral fat is metabolically more active in relation to subcutaneous fat and causes more damage to health. In addition to being a major risk factor for cardiovascular disease, BMI has some limitations, since it does not evaluate the body's fat distribution, becoming a subjective measure (SOUZA et al., 2010).

For the use of BMI, some issues must be observed, such as the relationship with height; the correlation with lean mass and the influence of leg / trunk size ratio. These questions could jeopardize the use of BMI, mainly as an indicator of body fat (GARN, S.M; LEONARD, W.R; HAWTHORNE, V.M, 1986).

In order to measure fat mass and fat distribution, several other features can be used: computed tomography, magnetic resonance imaging, bioimpedance analysis, and the measurement of abdominal circumference (AB) and abdominal / hip circumference (ABESO, 2009).

Many studies have indicated that measurement of AC or waist hip ratio (WHR) may be better predictors of disease risk, such as cardiovascular disease and metabolic syndrome than BMI. Research is under way to determine whether body mass index (BMI), waist circumference (BW), or both, should be used to assess disease risk (SANTOS et al., 2014).

The waist circumference (AC) better reflects the visceral fat content than the waist hip ratio (WHR) and is also strongly associated with total body fat. It was established as a cut-off point, for cardiovascular risk, increased the AC measurement equal to or greater than 94 cm in men, and 80 cm in women (ABESO, 2009).

According to Bray (2004), there is an association between obesity and several noncommunicable diseases, such as coronary disease, systemic arterial hypertension, diabetes mellitus, dyslipidemia, osteoarthritis, among others.

The pathology of obesity resides in increased fat cells and the pathophysiology lies in changes in the secretion of products from these increased fat cells, including cytokines, procoagulants, inflammatory peptides and angiotensinogen. These fat cell secreting products and increased fat mass are responsible for associated metabolic diseases such as diabetes, hypertension, heart disease, sleep apnea and some cancers. Treatments consist of techniques to alter the balance between energy intake and energy expenditure. This constellation of factors leads to the conclusion that obesity should be called disease (BRAY, 2004).

PERIODONTITIS

The periodontopathogenic dental biofilm is composed mainly of anaerobic, gram negative and proteolytic bacteria. These microorganisms, first, trigger the inflammatory process in the periodontal protective tissue, the gingiva, in the disease called gingivitis. When the process affects the supporting tissues of the teeth, we are facing the frame of periodontitis (ARMITAGE, 1999).

The association of obesity with periodontitis has been studied in order to verify the role of obesity as an indicator and possible risk factor for periodontal diseases, the term used to describe diseases that affect the gingiva and cause damage to the supporting connective tissues and bone, which anchor the teeth to the jaws (WILLIAMS, 1990).

In the first study on the association between obesity and periodontitis, published in 1977. The objective of this investigation was to evaluate to what extent obesity and / or hypertension can modify the rat periodontal response to chronic gingival irritation. Forty-four normal, spontaneously hypertensive, obese, and obese hypertensive rats were used. The histopathological evaluation of the periodontal structure showed hyperplasia and hypertrophy of the walls of the blood vessels that supply the periodontium in the hypertensive and obese-hypertensive animals. The results also indicated that obesity contributed significantly to the severity of periodontal disease. Isolated hypertension was not a significant factor. Obesity-hypertensive rats showed the most severe periodontal response to local irritation (PERLSTEIN, M.I; BISSADA, N.F, 1977).

According to Endo et al. (2010), the increase of periodontitis-induced low-grade systemic inflammation may alter the effects of obesity on the production of inflammatory molecules, including C-reactive protein (CRP), interleukin (IL) -6, and tumor necrosis factor alpha (TNF-alpha), liver and white adipose tissue (WAT). The authors investigated the effects of periodontitis on the expression of proinflammatory cytokines in the liver and WAT in obese Zucker rats. Low-grade systemic inflammation after experimental periodontitis was associated with increased gene expression for hepatic levels of TNF-alpha and CRP and adipose tissue levels of IL-6 and CRP in the obese mouse model.

Moderate daily exercise associated with dietary control restores the cytokine response in obese mice by reducing free fatty acids and tumor necrosis factors (TNF-α), in addition to improving the resolution of induced periodontitis. The investigation of this association arose based on the hypothesis that the systemic inflammation present in the obese can increase the susceptibility to chronic infectious diseases such as periodontitis (ZHOUA, Q; LEEMANB, S.E; AMAR, S., 2011).

The literature has sought to prove this relationship and finds difficulties in several aspects that involve evaluation criteria used as parameters of disease definition, population to be studied and methodology to be used (SANTOS, 2014).

Saito et al. (2001) conducted a study to clarify the relationship between obesity and periodontitis in a study of 643 apparently healthy and toothed Japanese adults who participated in programs at the Fukuoka Health Promotion Center. The waist-hip ratio, body mass index (BMI) and body fat were significant risk indicators for periodontitis after adjustment for known risk factors ($p < 0.002$). Individuals were divided into four categories of body mass index (BMI) or body fat. In only subjects with high waist-to-hip ratio and in the higher categories of BMI (or body fat) significantly increased the adjusted risk of periodontitis compared to individuals with low waist-to-hip ratios and the lowest category of BMI.

Al-zahrani, Bissada and Borawski (2003) evaluated the participants of the third National Health and Nutrition Survey (NHANES III) aged ≥ 18 years and submitted to periodontal examination were selected for analysis (n = 13,665). BMI and waist circumference (WC) were used as measures of total and abdominal fat, respectively, and the diagnosis of periodontal disease was performed by obtaining the insertion level, being diagnosed with periodontitis with 1 or more sites with depth of PS probe ≥4mm and PNI ≥3mm. Significant interactions with age were found and analyzes were stratified by age: younger than 18 to 34 years, middle-aged adults (35-59 years) and older (60-90 years).

Dalla-Vechia et al. (2005) evaluated the association of overweight and obesity with periodontitis in Brazilian adults, with a sample composed of 706 individuals aged between 30 and 65 years, which was clinically examined and structured

interview. In this population, 60% and 65% of men and women, respectively, were overweight or obese. Periodontitis was observed in 50.7% and 35.3% of men and women, respectively. Overweight and obesity were assessed by body mass index (BMI). Subjects with ≥ 30% of teeth with insertion loss ≥ 5 mm were classified as periodontitis. There was a positive correlation between the BMI index and the occurrence of periodontitis, with a significantly higher prevalence (P <0.05) of periodontitis in obese women than in women of normal weight.

Da Silva, Gun and Simone (2009) conducted a study to diagnose the association of periodontitis, obesity and overweight among 214 Brazilians and concluded that high waist circumference (WC) and high fat percentage were statistically significant when associated with the increase to have periodontitis. In the study, the authors used as diagnostic parameters of periodontitis the presence of 4 or more teeth with 1 or more areas of PS ≥ 4 mm and PIC ≥ 3 mm.

Pataro et al. (2012) verified the association between periodontal status and overweight / obesity in the populations that performed bariatric surgery in the pre and post-surgical stages. Three hundred and forty-five participants aged 18-60 years of both sexes underwent a complete periodontal examination and the presence of 4 or more dental units with one or more sites with probing depth (PS) ≥ 4 mm and clinical insertion level (CIN) ≥ 3 mm at the same site or the presence of proximal CIN ≥ 4 mm. Differences in the periodontal condition were observed in individuals at different moments of bariatric surgery, showing a high prevalence of periodontitis in both preoperative and postoperative follow-up.

Khader et al. (2009) evaluated the relationship between periodontitis and overweight / obesity among Jordanians using a systematic random sample of 340 people between 18 and 70 years. All participants underwent periodontal examination, anthropometric measurements and completed the questionnaire. Periodontitis was defined as the presence of four or more teeth with one or more sites with probing cavity depth ≥4 mm and loss of clinical insertion ≥3 mm. It was found in the study 14% of participants with normal weight and periodontitis, while 29.6% of overweight and 51.9% of obese were diagnosed with periodontitis.

Morita et al. (2011) conducted a longitudinal study and tested whether body mass index (BMI) was related to the development of periodontal disease in a sample of Japanese participants employed. The authors tested the relationship between BMI and the incidence of periodontal disease over 5 years in a sample of 2787 men and 803 women. The risk ratios for the development of periodontal disease after 5 years were 1.30 (p <0.001) and 1.44 (p = 0.072) in men and 1.70 (p <0.01) and 3.24 (p <0.05) in women with a BMI of 25-30 and ≥ 30 kg / m², respectively, compared to those with BMI <22 kg / m², after adjustment for age, smoking, and clinical history of diabetes mellitus. These findings demonstrate a relationship between BMI and the development of periodontal disease in a population studied.

The association between obesity and periodontal disease is based on the effect of pro-inflammatory cytokines released by adipose tissue. It suggests that similar mechanisms are involved in the pathophysiology of obesity and periodontitis, and that the secretions of these substances may induce hyperinflammatory response in periodontal disease (Ritchie et al., 2003).

The levels of these proinflammatory cytokines are proportional to the BMI, particularly in individuals with visceral obesity, so that the increase in fat mass may induce a hyperinflammatory response in periodontal disease, since obesity can affect the immune and vascular response of the due to decreased blood flow (PATARO et al., 2012).

To evaluate the pathogenic mechanisms involved in obesity and periodontal disease, Khanna and Mali (2010) evaluated 40 Nordic subjects who were divided into two groups: group A (non-obese) included individuals with a body mass index (BMI) of 18.5 at 27 kg / m2 and group B (obese) included subjects with BMI> 27 kg / m2. The levels of BMI, TNF-α in plasma and periodontal disease index (PDI) were assessed, compared and correlated. Significantly higher PDI and TNF-α scores were in the obese group compared to those in the non-obese group. There was also a significant and positive correlation between BMI and TNF-α, TNF-α and PDI, as well as BMI and PDI. The results indicated that the increase of plasma TNF-α and the increase in the severity of periodontal disease can be verified in individuals with a higher body mass index.

Despite several reports of the association between obesity and periodontal disease, the data are conflicting. It was also observed the need for additional clarification about this association, mainly in relation to the severity of BMI, which has not been reported so far (PATARO et al., 2012).

Regarding the measurement of periodontal clinical parameters, the pluriteness of the parameters used to determine the periodontal disease reflects in the difficulty both in the choice of classification for disease and in the way of comparing the results obtained from scientific studies in the area of periodontics (GOMES FILHO et al., 2006).

In addition to the diagnosis of periodontal disease, the literature tends to indicate the use of the measure of loss of clinical insertion for the diagnosis of periodontitis as the most accurate within the existing clinical descriptors (GOMES FILHO, 2006).

The association of obesity and periodontal disease, described in surveys of different populations, can be attributed to the lack of uniformity to define periodontitis. The cut criterion used to identify it in several studies of the effects of obesity, includes 3.5 mm shallow pockets, which could resemble periodontal destruction at very low levels (DIAS et al., 2011).

Regarding the clinical insertion level (NIC), in the study by Dalla Vecchia et al. (2005), the presence of more than 30% of the sites with loss of insertion level (PNI) ≥ 5mm in the South - Brazilian population was observed. There was a positive relationship between periodontitis and obesity in the group of women only. Through the multivariate analysis, it was observed that obese women have a significantly greater odds ratio (oddsratio - OR) (OR = 2.1) to be affected by periodontitis than women with normal BMI. In a separate analysis of the subgroup of obese and nonsmoking women, it was observed that this group was 3.4 times more likely to be affected by periodontitis than the group with normal BMI and nonsmokers.

In the case-control study performed by Buhlin et al. (2002), 50 patients with six or more sites with loss of insertion level (PNI) ≥6mm were compared to 47 healthy patients. Men weighing 26 Kg / m2 and women with a BMI ≥ 25 kg / m2 were considered as overweight. Multiple regression analysis revealed that overweight and high cholesterol patients had a 4.5 times greater risk of presenting severe periodontitis than the control group (OR = 4.54). Both studies had a large positive relationship between high body mass index (BMI) and loss of insertion level.

In an observational study conducted in the Danish population with 1,597 participants aged 20 to 95 years, Kongstadet al. (2009) insertion level (PNI) ≥3mm and bleeding at the probing (SS) ≥25%. However, they did separate analysis of these two variables with body mass index (BMI). The study concluded that there is an inverse relationship between obesity and PNI (OR = 0.6) disagreed with the studies shown previously. The authors analyzed insertion level losses (PNI) ≥3 mm and bleeding at probing (SS) ≥25%. However, they did separate analysis of these two variables with body mass index (BMI). The study concluded that there is an inverse relationship between obesity and PNI (OR = 0.6).

Regarding the exclusion criteria proposed in this study, diabetes mellitus is a known risk factor for periodontal disease and obesity is a risk factor for insulin resistance. Thus, diabetes may be considered a confounding factor in studies between obesity and periodontitis (DALLA VECCHIA et al., 2005).

Smoking is recognized as a risk factor for the development and progression of periodontitis, as it affects cell function,

aggravates the destruction of periodontal tissues, and has a dose-effect relationship (MALTA et al., 2010).

It was observed, through a cross-sectional study, that in smokers the increase in smoking intensity was associated with an increase in BMI and waist circumference, and that increasing cessation of smoking implies a reduction in BMI and of waist circumference in ex-smokers (TRAVIER, N.; AGUDO, A.; MAY, AM, 2009).

These same authors suggest that smoking may influence patterns of adipose tissue distribution but that the differences observed between smokers and nonsmokers may be more related to lifestyle factors and personality particularities.

Dental loss can also be considered as a determinant factor for periodontal assessment, since the loss of dental elements generates a difficulty in chewing. Inadequate chewing, together with inadequate swallowing, contributes to the patient's choice of easy-to-chew foods, such as carbohydrates, sugars and fats, all with a high calorie density (PATARO et al., 2012).

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JUSTIFICATION

It was decided, in this study, to verify the prevalence of periodontitis in obese and non-obese young adults in a federal public school in the municipality of Marechal Deodoro, Alagoas, considering the increase in obesity in recent years, which is a health concern public. Also because it is a risk factor in the development of several inflammatory diseases, such as periodontitis. The aim of this study was to characterize the sociodemographic profile, oral hygiene habits and general health conditions, as well as to perform periodontal assessment and assessment of anthropometric measurements through body mass index (BMI) and waist circumference (WC).

OBjECTIVES

To verify the association of periodontitis and obesity in young adults in a city of Alagoas, Brazil.

Specific

Evaluate the demographic profile, oral hygiene habits and general health conditions;

Check the BMI - body mass index, AC - Abdominal Circumference and the relationship with periodontal clinical parameters of gingival index, depth at probing and clinical insertion level

METHODOLOGY

It is a cross-sectional, observational, analytical and quantitative approach. The research was carried out in the post-graduate sector of the CESMAC University Center and the data were collected at the Federal Institute of Alagoas (IFAL), at the Campus of Marechal Deodoro, and approved by the consubstantiated opinion, protocol # 1,580,524 of the Ethics Committee in Research of the University Center CESMAC.

The population of this study was represented by all the young adult students enrolled in the technical courses of PROEJA, of the Federal Institute of Alagoas (IFAL), of the Campus of Marechal Deodoro, in the academic year of 2016, made up of 108 students.

The selection of the sample for the present study was carried out in three stages: the first one, of communication and dissemination of the research, through posters and direct contact with the 108 students enrolled in the National Program of Integration of Professional Education with Basic Education in the Modality of Youth and Adults (PROEJA), followed by holding a meeting for detailed explanation of the research; the second, the selection of volunteers who presented themselves spontaneously after the previous meetings and the third, of applying the inclusion and exclusion criteria of the research. The inclusion and exclusion criteria were applied and, subsequently, the free and informed consent form (TCLE) was signed with the enrolled students, who presented themselves to participate in the research, as recommended by Resolution 466/12 of the Ministry of Health.

Those included in the survey were all students regularly enrolled in the technical courses of PROEJA, Federal Institute of Alagoas (IFAL), Campus de Marechal Deodoro, with at least 14 teeth, or 50% of the total teeth to be considered, from now on , the exclusion of third molars.

Those excluded from the survey were students who received periodontal treatment in the last six months, those with orthodontic appliances, smokers, patients with diabetes, those who used antibiotics in the last three months, and pregnant and nursing students.

CONCLUSION

Of the 108 students enrolled in technical courses, 68 accepted to participate in the research. After exclusion criteria 5 were excluded, 1 (one) in the breastfeeding period, 1 (one) diabetic, 1 (one) who used an orthodontic appliance and 2 because they had less than 14 teeth, third molars.

The sample consisted of 63 students, 51 (80.94%) female participants and 12 (19.06%) male participants (Graph 1). Regarding the marital status of the participants, 44 (69.84%) said they did not have a marital company. As for age, 20 (31.75%) participants are in the age group up to 25 years. 42 participants (66.67%) are between 25 and 45 years of age and 1 (one) participant (1.58%) is over the age of 46 years. The mean age was 28.90 (± 7.03).

Graph 1: Sex of the participants (n = 63) Source: Research data

Among the participants, 41 (65.08%) did not have any paid activity. Regarding health data, 55 participants (87.30%) were not submitted to any medical treatment and 53 (84.13%) did not use any continuous medication. Asked about the frequency of visits to the dentist, 52 (82.53%) stated that they have not visited the dentist for more than six months. Only 8 participants (12.70%) had complete dentition, except for molars, with 5 participants (7.93) males and 3 (4.76%) females. In the study, 6 participants (9.53%) were hypertensive, 9 with anemia, 2 with gastric ulcer and 45 (71.42%) did not use alcoholic beverages. Of the 51 female participants, 16 (31.37%) used oral contraceptives (Table 1).

Table 1. Sociodemographic and health characteristics of the study population.

n = 63; n * = 51 Women Source: Research data.

According to information on the demographic characteristics of the study, when the variables presented were related to the prevalence of obesity, there was a statistically significant difference between the groups: civil status, paid activity and dental units (Table 2).

Table 2. Prevalence of obesity according to the sociodemographic and general health characteristics of the studied population.

Variáveis	n	%
I -DAD SÓCIODEMOGRÁFICOS		
Sexo		
Masculino	12	19,06
Feminino	51	80,94
Estado Civil		
Companhia	19	30,16
Sem Companhia	44	69,84
Idade		
< 25	20	31,75
25 – 45	42	66,67
≥46	01	1,58
Atividade Remunerada		
Sim	22	34,92
Não	41	65,08
II - DADOS DE SAÚDE		
Em Tratamento Médico		
Sim	08	12,69
Não	55	87,30
Visitas Dentista (meses)		
<6 m	11	17,47
>6 m	52	82,53
Unidades Dentárias		
De 28/32	08	12,70
Abaixo de 28	55	87,30
Uso de contraceptivo oral*		
Sim	16	31,37
Não	35	68,62
Uso de medicamento		
Sim	10	15,87
Não	53	84,13
Consumo de Bebida Alcolic		
Sim	18	28,57
Não	45	71,42
Hipertensão		
Sim	06	9,53
Não	57	90,47
Anemia		
Sim	09	14,29
Não	54	85,71
Úlcera Estomacal		
Sim	02	3,18
Não	61	96,82

Variável	Sem obesidade n = 30		Com obesidade n = 33			
	n	%	n	%	RP	p
Estado Civil						
Companhia n=19	13	68,42	6	31,57	1,80	0,029**
Sem Companhia n=44	17	38,63	27	61,36		
Atividade Remunerada						
Sim	15	66,18	7	31,81	1,88	0,016**
Não	15	36,58	26	63,41		
Tratamento médico						
Sim	5	62,50	3	37,50	1,38	0,461*
não	25	45,50	30	54,54		
Uso de medicamento						
Sim	6	60,00	4	40,00	1,33	0,497*
não	24	45,28	29	54,71		
Uso de contraceptivo oral***						
Sim	10	62,50	6	37,14	1,69	0,091
não	13	37,50	22	62,85		
Consumo bebida alcoólica						
Sim	10	55,55	8	44,44	1,25	0,425
Não	20	44,44	25	55,55		
Hipertensão arterial						
Sim	2	33,33	4	66,66	0,49	0,674*
não	28	49,12	29	50,87		
Visita ao dentista						
Até 6 meses	8	72,72	3	27,27	1,71	0,066
+ de 6 meses	22	42,30	30	57,69		
Unidades dentárias						
De 28 a 32	7	87,50	1	12,50	2,31	0,022* **
Abaixo de 28	23	41,81	32	58,18		

Pearson's X^2 test and Fisher's exact test *. PR: Prevalence ratio. Statistically significant difference between groups ** ($p < 0.05$). n = 51 (Women) ***. Source: Research data.

Given the results found and according to sociodemographic data, oral hygiene habits and general health conditions, as well as periodontal clinical parameters and anthropometric evaluation of the study, it can be concluded that 30,30% of the participants who were in the obesity range, the presence of periodontitis was present, while 23.33% presented periodontitis in the non-obese group.

It can be concluded that there was little association between periodontitis and obesity and the evidence is not established, nor is it possible to state that this association exists. However, obesity was prevalent in the studied population, becoming a health concern, which makes new studies necessary with different methodologies.

Body mass index (BMI) was used as a parameter for the anthropometric evaluation. Individuals underweight (BMI below 18.55 kg / cm²), normal weight (BMI between 18.5 and 24.95 kg / cm²), overweight (BMI between 25.0 and 29.95 kg / cm²), obesity (BMI from 30 kg / cm²). It was observed that 30 participants (47.61%) were normal weight and 33 participants (52.39%)

presented with overweight and obesity, being (28) 44.44% female. The mean BMI of all participants was 27.44 ± 5.83 (Mean ± standard deviation).

In the assessment of abdominal circumference (AC), the cut-off points adopted were: increased risk for women (CA> 80 cm) and for men (CA> 94 cm), and increased risk for women (CA> 88 cm) and for men (CA> 102 cm). There were 29 participants (46.04%) without visceral obesity, 34 participants (53.96%) with visceral obesity, and 33 (52.38%) were female. The mean CA of all participants was 90.98 ± 11.93 (Mean ± standard deviation).

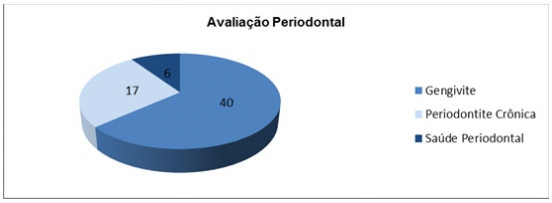
In relation to the measures of BMI and CA, the presence or absence of periodontitis was observed a statistically significant difference between the groups evaluated by the AC, with p <0.0294 (Table 3).

Table 3. Prevalence of obesity according to anthropometric evaluation through BMI and CA

Variável (n =63)	Sem obesidade		Com obesidade		P
IMC	N=30	%	N=33	%	
Sem periodontite	23	76,66	23	69,69	0,5337
Com periodontite	7	23,33	10	30,30	
CA	N=29	%	N=34	%	
Sem periodontite	25	86,20	21	61,76	0,0294*
Com periodontite	4	13,79	13	38,23	

BMI: Body mass index. CA: Abdominal girth. Statistically significant difference between groups * (p <0.05). Test Pearson's X^2. Source: Research data.

Regarding the periodontal evaluation, 17 (26.98%) participants with chronic periodontitis were found, being 58.82% obese. Of the participants with periodontitis, we found 13 (20.63%) female and 4 (6.35%) male. With periodontal health 6 (9.52%) and with chronic gingivitis 40 (63.49%) participants, (Graph 2).



Graph 2: Periodontal evaluation according to clinical parameters. Source: Research Data

Regarding the sex of the participants, where the female sex presented n = 51 (80.94%), the prevalence of obesity did not show statistically significant differences after the application of Fisher's Exact Test (Table 4).

Table 4. Prevalence of obesity according to sex.

Variável	Sem obesidade		Com obesidade		P
	n	%	n	%	
SEXO					
Feminino	23	45,09	28	54,90	0,408
Masculino	7	58,33	5	41,66	

Sex of participants (n = 63). Fisher exact test. Value of p <0.05. Source: Research data.

The mean and standard deviation of continuous variables that were related to obesity (Table 5), there was a statistically significant difference in relation to bleeding at the probing (p <0.036).

Table 5. Mean and standard deviation of the continuous variables and obesity of the study population.

Variável (n =63)	Sem obesidade		Com obesidade		P
	média	Dp	Média	Dp	
Sem periodontite	22,78	2,72	31,31	4,78	0,0001*
Com periodontite	23,90	1,98	31,58	5,88	0,028*
Idade	28,03	7,25	29,69	6,73	0,247
Profundidade de sondagem (PS)	1,69	0,41	1,80	0,50	0,338
Sangramento a sondagem (SS)	16,55	14,06	25,52	18,59	0,036*
Nível de inserção clínica (NIC)	1,77	0,67	1,78	0,54	0,933

Mean of the variables with Student's T test. Dp (standard deviation). Statistically significant difference between groups * (p <0.05). Source: Research data.

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Abstract

Studies point to the association of periodontitis and obesity in young adults, and the clinical parameters in the anthropometric and periodontal evaluation diversify the results. Objective: To evaluate the association of periodontitis and obesity in young adults in a city of Alagoas, Brazil. Material and method: The sample (n = 63) of young adults with mean age of 28.90 (± 7.03), with at least 14 teeth and excluded the users of orthodontic appliance, smokers, diabetics, those who made use of antibiotic in the last three months, pregnant and lactating. Body mass index (BMI) and waist circumference (WC) were anthropometric parameters and for evaluation of periodontitis, probing depth (PS), clinical insertion level (NIC) and bleeding probing (SS). The study was divided into two groups, that is, those without obesity and those with obesity. Descriptive analysis was used, and in the inferential statistics, the Chi-square test and Student's T test were used. Differences were considered significant with p value <0.05. Results: 53.96% obese were found using CA and 52.39% obese with BMI. In the periodontal evaluation of the group with obesity, the depth of probing (PS) = 1.80 ± 0.50, clinical insertion level (NIC) = 1.78 ± 0.54 associated with bleeding at the probing (SS) = 25, 52 ± 18.59, p value <0.05. The study found (73.02%) individuals without periodontitis, 61.76% in the obesity group (31.31 ± 4.78). With periodontitis (26.98%), 76.47% were in the obesity group (31.58 ± 5.88), the difference being statistically significant p <0.05. Conclusion: In view of the results, it is possible to affirm that there is association of periodontitis and obesity in obese young adults.

Palavras-chave: Obesidade; periodontitis; body mass index.

Résumé

Les études montrent l'association de parodontite et d'obésité chez les jeunes adultes et les paramètres cliniques de l'évaluation anthropométrique et parodontale diversifient les résultats. Objectif: Évaluer l'association de la parodontite et de l'obésité chez les jeunes adultes dans une ville d'Alagoas, au Brésil. Matériel et méthode: L'échantillon (n = 63) de jeunes adultes de 28,90 ans en moyenne (± 7,03 ans), d'au moins 14 dents et excluant les utilisateurs d'appareils orthodontiques, les fumeurs, les diabétiques, les utilisateurs antibiotiques au cours des trois derniers mois, enceintes et allaitantes. L'indice de masse corporelle (IMC) et le tour de taille étaient des paramètres anthropométriques et permettaient d'évaluer la parodontite, la profondeur de sondage (PS), le niveau d'insertion clinique (NIC) et le sondage de saignement (SS). L'étude a été divisée en deux groupes, à savoir ceux sans obésité et ceux souffrant d'obésité. Une analyse descriptive a été utilisée et, dans la statistique inférentielle, le test du chi carré et le test T de Student ont été utilisés. Les différences ont été considérées comme significatives avec une valeur p <0,05. Résultats: 53,96% d'obèses ont été trouvés avec CA et 52,39% d'obèses avec IMC. Dans l'évaluation parodontale du groupe obèse, la profondeur de sondage (PS) = 1,80 ± 0,50, le niveau d'insertion clinique (NIC) = 1,78 ± 0,54 associé à un saignement au sondage (SS) = 25, 52 ± 18,59, valeur p <0,05. L'étude a révélé (73,02%) des personnes sans parodontite, 61,76% dans le groupe obésité (31,31 ± 4,78). Avec la parodontite (26,98%), 76,47% appartenaient au groupe obésité (31,58 ± 5,88), la différence étant statistiquement significative p <0,05. Conclusion: Au vu des résultats, il est possible d'affirmer qu'il existe une association de parodontite et d'obésité chez les jeunes adultes obèses.

Palavras-chave: Obesidade; parodontite; indice de masse corporelle.

Resumen

Los estudios apuntan a la existencia de la asociación de periodontitis y obesidad en adultos jóvenes, siendo que los parámetros clínicos en la evaluación antropométrica y periodontal diversifican los resultados. Objetivo: Evaluar la asociación de la periodontitis y obesidad en adultos jóvenes de un municipio de Alagoas, Brasil. La muestra (n = 63) de adultos jóvenes con media de edad 28,90 (± 7,03), con al menos 14 dientes y excluidos los usuarios de aparato ortodóntico, tabaquistas, diabéticos, los que hicieron uso de antibiótico en los últimos tres meses, gestantes y lactantes. El índice de masa corporal (IMC) y circunferencia abdominal (CA) fueron parámetros antropométricos y para la evaluación de la periodontitis, la profundidad de sondeo (PS), nivel de inserción clínica (NIC) y sangrado al sondeo (SS). El estudio fue dividido en dos grupos, es decir, los sin obesidad y los con obesidad. Se utilizó análisis descriptivo y en la estadística inferencial la prueba Chi-cuadrado y T de Student. Las diferencias se consideraron significativas con un valor de p <0,05. Resultado: Encontrado 53,96% obesos utilizando la CA y 52,39% obesos con IMC. En la evaluación periodontal del grupo con obesidad, la profundidad de sondeo (PS) = 1,80 ± 0,50, nivel de inserción clínica (NIC) = 1,78 ± 0,54 asociados al sangrado al sondeo (SS) = 25, 52 ± 18,59, valor de p <0,05. El estudio encontró (73,02%) individuos sin periodontitis, siendo 61,76% en el grupo de obesidad (31,31 ± 4,78). Con periodontitis (26,98%), el 76,47% se encontraba en el grupo de obesidad (31,58 ± 5,88), siendo la diferencia estadísticamente significante p <0,05. Conclusión: Ante los resultados, es posible afirmar que existe asociación de periodontitis y obesidad en adultos jóvenes obesos.

Palabras clave: Obesidad; periodontitis; Indice de Masa Corporal.

Resumo

Estudos apontam para a existência da associação de periodontite e obesidade em adultos jovens, sendo que os parâmetros clínicos na avaliação antropométrica e periodontal diversificam os resultados. Objetivo: Avaliar a associação da periodontite e obesidade em adultos jovens de um município de Alagoas, Brasil. Material e método: A amostra (n=63) de adultos jovens com média de idade 28,90 (±7,03), com no mínimo 14 dentes e excluídos os usuários de aparelho ortodôntico, tabagistas, diabéticos, os que fizeram uso de antibiótico nos últimos três meses, gestantes e lactantes. O índice de massa corporal (IMC) e circunferência abdominal (CA) foram parâmetros antropométricos e para avaliação da periodontite, a profundidade de sondagem (PS), nível de inserção clínica (NIC) e sangramento à sondagem (SS). O estudo foi dividido em dois grupos, ou seja, os sem obesidade e os com obesidade. Utilizou-se análise descritiva e na estatística inferencial o teste Qui-quadrado e T de Student. Diferenças foram consideradas significantes com valor de p < 0,05. Resultado: Encontrados 53,96% obesos utilizando a CA e 52,39% obesos com IMC. Na avaliação periodontal do grupo com obesidade, a profundidade de sondagem (PS)=1,80±0,50, nível de inserção clínica (NIC)=1,78±0,54 associados ao sangramento à sondagem (SS)=25,52±18,59, valor de p < 0,05. O estudo encontrou (73,02%) indivíduos sem periodontite, sendo 61,76% no grupo de obesidade (31,31±4,78). Com periodontite (26,98%), 76,47% se encontravam no grupo de obesidade (31,58±5,88), sendo a diferença estatisticamente significante p< 0,05. Conclusão: Diante dos resultados, é possível afirmar que exista associação de periodontite e obesidade em adultos jovens obesos.

Palavras-chave: Obesidade; periodontite; índice de massa corporal.