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CONDIÇÃO BUCAL E DESNUTRIÇÃO

Porto Alegre, dezembro de 2016

CONDIÇÃO BUCAL E DESNUTRIÇÃO

Linha de pesquisa

Epidemiologia, Etiopatogenia e Repercussão das Doenças da Cavidade Bucal e Estruturas Anexas

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Orientadora: Prof. Dra. Patrícia Weidlich

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“Vá firme em direção à sua meta, porque o pensamento cria, o desejo atrai e a fé realiza. ”

Dedico esta dissertação a meus pais,

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RESUMO

A condição bucal e a falta de condições mastigatórias adequadas têm sido implicadas como indicadores de risco para má alimentação e desnutrição. Indivíduos com um número menor de dentes ou edêntulos são considerados menos propensos a comer alimentos ricos em nutrientes, como vegetais, frutas, carne e grãos integrais. Há evidências que a condição bucal alterada causa restrições dietéticas através da dificuldade em mastigar, comprometendo o estado nutricional e bem-estar dos indivíduos. Esta dissertação é composta por dois estudos, uma revisão sistemática da literatura com meta- análise e um estudo transversal.

A revisão sistemática da literatura com meta-analise avaliou e comparou o estado de saúde bucal (perda de dentes, uso de prótese e DMFT) em idosos bem-nutridos, em risco de desnutrição e indivíduos desnutridos. Dois pesquisadores analisaram a inclusão dos títulos, resumos, leitura completa (MPT e FWMGM), outros dois fizeram a extração de dados dos artigos (PSA e MPT) e se um consenso não fosse possível, um terceiro pesquisador estaria incluído neste processo. De 110 artigos lidos na íntegra, 26 foram incluídos na revisão sistemática, dos quais 23 eram transversais. Foi demonstrado que os sujeitos com estado nutricional normal tinham um número significativamente maior de pares de dentes / Unidades Funcionais de Dentes (FTU) em comparação com aqueles que estavam desnutridos ou em risco de desnutrição. As meta-análises não mostraram associação estatisticamente significante entre edentulismo e uso de prótese, pois o risco

relativo combinado foi de 1,072 (IC 95% 0,957 - 1,200, p = 0,230) e 0,874 (IC 95%: 0,710 - 1,075, p = 0,202). Por outro lado, o desvio padrão médio do número médio de dentes presentes foi de -0,141 (IC 95% -0,278 - 0,005, p = 0,042) em indivíduos com desnutrição / risco de desnutrição.

O estudo transversal avaliou a condição bucal e o estado nutricional de pacientes que se encontravam internados nas enfermarias do Hospital de Clínicas de Porto Alegre (HCPA), no período de dezembro de 2015 e junho de 2016. O presente estudo incluiu 394 participantes com idade média de 63.43±10.76 entre os indivíduos diabéticos (87 mulheres e 110 homens) e 59,85±15,18 entre os não diabéticos (93 mulheres e 104 homens). Os indivíduos diabéticos (18,33±12,79) permaneceram em média mais tempo internados do que os indivíduos não diabéticos (16,53±14,54). As variáveis sexo, número de dentes, tempo de internação e capacidade funcional mastigatória estavam associadas à desnutrição na análise uni-variada. Na análise multivariada, sexo, número de dentes e tempo de internação mantiveram-se associados à desnutrição.

Apresente dissertação conclui que existe associação entre a condição bucal e a desnutrição. Indivíduos com perdas dentárias apresentam maior risco desnutrição, o que foi demostrado tanto na meta análise quanto no estudo transversal.

Palavras chave: Avaliação nutricional; Ciências nutricionais; saúde buca

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ABSTRACT

The oral condition and the lack of adequate masticatory conditions have been implicated as risk indicators for malnutrition and malnutrition. Individuals with fewer teeth or edentulous are considered less likely to eat foods rich in nutrients such as vegetables, fruits, meat and whole grains. There is evidence that altered oral status causes dietary restrictions through difficulty in chewing, compromising the nutritional status and well-being of individuals. This dissertation is composed of two studies, a cross-sectional study and a systematic review of the literature with meta-analysis.

The cross-sectional study evaluated the oral condition and nutritional status of patients hospitalized in the Hospital das Clinicas de Porto Alegre (HCPA), from December 2015 to June 2016. The present study included 394 middle-aged participants Of 63.43 ± 10.76 among diabetic subjects (87 women and 110 men) and 59.85 ± 15.18 among non-diabetics (93 women and 104 men). Diabetic individuals (18.33 ± 12.79) remained on average longer hospitalized than non-diabetic individuals (16.53 ± 14.54). The variables gender, number of teeth, length of hospital stay and functional masticatory capacity were associated with malnutrition in the univariate analysis. In the multivariate analysis, sex, number of teeth and length of stay remained associated with malnutrition.

The systematic review of the literature with meta-analysis evaluated and compared the state of oral health (tooth loss, prosthesis use and FWD) in well-nourished elderly, at risk of malnutrition, and malnourished individuals. Two researchers analyzed the inclusion of

titles, abstracts, full reading (MPT and FWMGM), two others extracted data from articles (PSA and MPT) and if a consensus was not possible, a third researcher would be included in this process. Of 110 articles read in full, 26 were eligible for inclusion. Twenty-six studies were included in the systematic review, of which 23 were cross-sectional. It was shown that subjects with normal nutritional status had significantly more pairs of teeth / functional tooth units (FTU) compared to those who were malnourished or at risk of malnutrition. The meta-analyzes did not show a statistically significant association between edentulism and prosthesis use, since the combined relative risk was 1.072 (95% CI 0.957-1.1200, p = 0.230) and 0.874 (95% CI: 0.710-0.075, p = 0.202). On the other hand, the mean standard deviation of the mean number of teeth present was -0.141 (95% CI -0.278-0.005, p = 0.042) in subjects with malnutrition / risk of malnutrition.

The present dissertation concludes that there is an association between the oral condition and malnutrition. Individuals with dental losses present a greater risk of malnutrition, which was demonstrated both in the meta-analysis and in the cross-sectional study.

Key words: nutritional assessment; nutritional sciences; oral health

SUMÁRIO

1 APRESENTAÇÃO

A presente dissertação intitulada “Condição Bucal e Desnutrição”, está sendo apresentada ao Programa de Pós-Graduação em Odontologia da Universidade Federal do Rio Grande do Sul como parte dos requisitos para obtenção do título de Mestre em Clínica Odontológica/Periodontia.

A temática, de grande importância para a Odontologia e para a Nutrição, carece de estudos tanto no nível preventivo como terapêutico. A presente dissertação contém uma introdução geral ao tema, seguida de dois manuscritos e considerações finais. Foram realizados dois estudos, sendo uma revisão sistemática da literatura com meta-análise já submetido ao periódico *Journal Clinical Nutrition* e um estudo transversal que será traduzido para o inglês e após enviado ao *Journal of Periodontology*. Estes estudos estão descritos com seus respectivos títulos a seguir:

Manuscrito 1: Relationship between nutritional status and oral health in older adults: a systematic review with meta-analysis.

Manuscrito 2: Association between oral health and nutritional status in diabetic and nondiabetic patients hospitalized: a cross-sectional study.

2 INTRODUÇÃO

A condição bucal e a falta de condições mastigatórias adequadas têm sido implicadas como indicadores de risco para má alimentação e desnutrição[1]. Indivíduos com um número menor de dentes ou edêntulos são considerados menos propensos a comer alimentos ricos em nutrientes, como vegetais, frutas, carne e grãos integrais[2]. Há evidências que a condição bucal alterada causa restrições dietéticas através da dificuldade em mastigar, comprometendo o estado nutricional e bem-estar dos indivíduos[3].

O estado nutricional é um importante fator de prognóstico em idosos. A nutrição adequada está associada à redução dos eventos adversos relacionados à imobilização hospitalar: úlceras de pressão, trombose venosa, incontinência e declínio funcional[4]. A função mastigatória e patologias associadas podem ser fatores importantes para a nutrição[5]. Muitos estudos têm sido realizados durante os últimos anos para estudar a relação entre o estado nutricional e a condição bucal[6]. Estudos mostram que o processamento de alimentos é limitado por alterações bucais como a perda dentária[7], reabilitação protética ausente ou inadequada[8], doença periodontal[9] e presença de dor ou desconforto relacionada com cáries, reduzem a mastigação os padrões de consumo alimentar[1; 10].

O diabetes é a principal alteração sistêmica relacionada com a periodontite. Estudos mostraram que indivíduos diabéticos têm doença periodontal em maior prevalência, extensão e gravidade quando comparados com indivíduos não diabéticos[11; 12]. O diabetes, entre outros, é indicado como um possível fator que contribuem para maior ocorrência de desnutrição em pacientes hospitalizados[13]. Do ponto de vista metabólico, a deficiência de insulina e a desnutrição guardam semelhanças. Ambas são estados catabólicos

que levam ao aumento do volume de função celular e demanda subsequente de nutrientes, vitaminas e minerais[14]. Ainda que essa hipótese tente explicar a relação entre diabetes e desnutrição, a presença de outros fatores associados à desnutrição torna difícil a correlação direta entre ambas condições especialmente em pacientes internados.

Pacientes diabéticos com pobre controle glicêmico apresentam além de comorbidades e fatores sistêmicos que predispõem à desnutrição, pior condição bucal. Maior ocorrência de periodontite e perda dentária também estão identificados em portadores de diabetes, o que possivelmente limita a ingesta de alimentos resistentes e fibrosos e contribui para piora da qualidade alimentar nesta população.

Nesse contexto a presente dissertação trabalha com a hipótese que pacientes diabéticos internados apresentam pior estado nutricional e que a condição bucal contribui para desnutrição.

3 OBJETIVOS

OBJETIVO GERAL:

O objetivo geral do presente estudo é estudar associação entre condição bucal e estado nutricional

OBJETIVOS ESPECÍFICOS:

- Avaliar sistematicamente a literatura no que diz respeito à relação entre condição bucal e estado nutricional em indivíduos idosos;

- Descrever a condição bucal de pacientes diabéticos e não diabéticos internados nas enfermarias clínicas e cirúrgicas do Hospital de Clínicas de Porto Alegre;

- Avaliar a relação entre condição bucal e estado nutricional em pacientes diabéticos e não diabéticos internados nas enfermarias clínicas e cirúrgicas do Hospital de Clínicas de Porto Alegre.

4 MANUSCRITO 1

Relationship between nutritional status and oral health in older adults: a systematic review with meta-analysis

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ABSTRACT

Objective: The aim of this systematic review was to compare the oral health and nutritional status in elderly subjects. **Methodology:** Three databases (Medline-Pubmed, Scopus and EMBASE) were searched up to October 28th 2016 for studies that performed the Mini Nutritional Assessment (MNA) or Subjective Global Assessment (SGA) and an oral examination performed by a dental professional, either dentist or a dental hygienist. Both observational and interventional studies were screened for eligibility. Meta-analyses were performed comparing the malnourished/at risk of malnutrition and the normal nutrition subjects with three oral health parameters (edentulism, use of prosthesis and mean number of present teeth). **Results:** Twenty-six studies were included in the systematic review, of which 24 were cross-sectional. It was showed that subjects with normal nutritional status had a significantly higher number of pairs of teeth/Functional Teeth Units (FTU) compared to those who were malnourished or at risk of malnutrition. The meta-analyses showed no statistically significant association between edentulism and use of prosthesis, as the pooled Relative Risk were, respectively, 1.072 (95% CI 0.957 – 1.200, p=0.230) and 0.874 (95% CI 0.710 – 1.075, p=0.202). On the other hand, the pooled Standard Mean Differences of mean number of present teeth were -0.141 (95%CI -0.278 – -0.005, p=0.042) in subjects with malnourished/at risk of malnutrition. **Conclusion:** FTU and mean number of teeth present were significantly associated with nutritional status. Furthermore, more longitudinal studies in this field are needed.

Key-words: nutritional assessment; nutritional sciences; oral health

INTRODUCTION

The elderly population is particularly vulnerable to dietary restrictions, as it tends to have less natural teeth and, possibly, present major nutritional issues[1]. Nutrition and health in general are among the main concerns for the elderly[2]. The most important nutritional disorder seen in the elderly population is malnutrition, which is associated with increased mortality and susceptibility to infections and impaired quality of life[3].

Caries, periodontal disease, poor oral hygiene, and defective or poorly fitting dentures are some of the common problems in this population[4]. The number and distribution of the teeth influence the ease and comfort of mastication, as well as the presence of dental prostheses[5, 6]. Tooth loss may induce the inappropriate selection of food and food texture of the adaptation for the dental condition. As a result, it can produce a decrease in appetite for the loss of pleasure in eating, which also estimated as a risk factor for malnutrition[7-9].

Oral health and poor masticatory function been implicated as risk factors for malnutrition[10]. Many studies describe the relationship between tooth loss and nutritional status in elderly people, who show that the absence of teeth can have negative effects on chewing, dental health and nutrition, suggesting that loss of partial teeth and tooth loss are predictors of nutritional status[1, 7-15].

The Mini Nutritional Assessment (MNA) is a quick and simple tool to assess the nutritional status of the elderly[3]. It reduced form (MNA-SF) has the same sensitivity and validity of the complete form for nutritional assessment in the elderly[16]. Already Subjective Global Assessment (SGA) is a clinical method of assessing nutritional status, able to identify surgical patients at nutritional risk.

This clinical method obtained good correlation with postoperative morbidity and commonly used for nutritional evaluation in hospitalized elderly patients[17, 18].

The purpose of this systematic literature review was to evaluate and compare the oral health status (tooth loss, use of prosthesis and DMFT) in elderly with well-nourished, at risk of malnutrition and malnourished individuals.

METHODOLOGY

The PICO question of this systematic review is:

- Patients: older adults;
- Intervention: Not applicable/None;
- Comparison: Risk of malnutrition/malnutrition subjects and normal nutrition individuals;
- Outcome: tooth loss, number of teeth present, number of edentulous, number of subjects using prosthesis, Decayed, Missing or Filled Index (DMFT), dental plaque, and periodontal disease.

Therefore, this systematic review presented the focused question: “Is the malnutrition or the risk of malnutrition, determined by the MNA or SGA, related with oral health status in elders subjects?”

Search strategy

Three databases, MEDLINE-PUBMED, Scopus, and EMBASE, were searched. In the MEDLINE-Pubmed database, the following search strategy was performed:

#1- Periodontal disease[MeSH Terms] OR Periodontal disease[Text Word] OR [Text Word] OR Oral hygiene[MeSH Terms] OR Oral hygiene[Text Word] OR Dental plaque[MeSH Terms] OR Oral health[MeSH Terms] OR Oral health[Text word] OR DMF Index[MeSH Terms] OR tooth loss[Text Word] OR dental caries[MeSH Terms] OR Dental caries[Text Word] OR Root caries[Text Word] OR Dental prosthesis[MeSH Terms] OR Dental prosthesis[Text Word] OR Dental decay[Text word]

#2 - Nutritional Status[MeSH Terms] OR Subjective global assessment[Title/Abstract] OR Mini nutritional assessment[Title/Abstract] OR

Nutritional Status[Title/Abstract] OR Malnutrition[MeSH Terms]OR Malnutrition[Title/Abstract] OR Nutritional assessment[Text word] OR Nutritional assessment[MeSH Term]

#3 - #1 AND #2

Similar search strategies were performed on both Scopus and EMBASE databases, and the literature was searched up to October 28th2016. To be included in this systematic review, all the following aspects needed to be fulfilled:

- Subjects with at least 60 years old;
- Studies that performed a nutritional evaluation, such as Mini Nutritional Assessment complete or short form (SF) or Subjective Global Assessment;
- Additionally, the studies had to perform an oral examination by a dental professional, either dentist or a dental hygienist.
- The study should include any of the following oral outcomes: tooth loss, number of present teeth, number of edentulous, number of subjects using prosthesis, Decayed, Missing or Filled Index (DMF), caries, any dental plaque index, any gingival index, probing depth or clinical attachment level.

Both observational and interventional studies were screened for eligibility. Only the baseline data of the interventional studies that fulfilled the prior criteria was screened. We imposed no restrictions regarding language or date of publication. A search in the grey literature was not performed. The studies that had one of the following characteristics were excluded:

- Experimental animal, *in vitro* studies, case reports, letters to the editor, and reviews;

- Studies that did not perform nutritional assessment by means of MNA or SGA;
- Self-reported oral health outcomes;

Data extraction

All studies without abstract but whose title suggested a possible relation to the objective of this systematic review were also selected, so the full text could be screened for eligibility. The references of every selected study and related systematic reviews were also screened for eligibility[19, 20]. Titles and abstracts resulting from the search were screened independently by two researchers (MPT and FWMGM), using the criteria previously described. Studies selected for detailed analysis by the two investigators had an agreement (kappa) of 0.87. When a consensus was not possible, a third researcher (PSA) was included in this process.

The data extraction was performed independently by two researchers (MPT and PSA), using a Word spreadsheet specifically developed for this study. Data extracted included author, year of publication, country, number of subjects included, number of subjects at risk of malnutrition/malnourished, number of subjects well-nourished, type of study, follow-up, age, sex, oral outcomes, nutritional scale, number of edentulous, number of teeth present, number of missing teeth, functional tooth units (FTU), occluding pairs, denture use, smoking, mean DMFT, MNA classification and SGA classification.

Quality Assessment

The risk of bias within the studies were assessed independently by two researches (PSA and FWMGM) and used the Agency for Healthcare Research and Quality (AHRQ) scale for cross-sectional studies[21] and by the Newcastle-

Ottawa quality assessment scale for the case-control and cohort studies[22] as recommended by a systematic review previously published[23]. The AHRQ scale is composed of eleven itens. To every item, it was assigned a “yes”, “no” or “unclear” answer to low risk, high risk or unclear risk of bias, respectively. The item “Clarify what follow-up, if any, was expected and the percentage of patients for which incomplete data or follow-up was obtained” was classified as not applicable to all studies.The Newcastle-Ottawa scale assigns a score of zero to nine stars to each article, whereby a greater number of stars indicate a higher-quality study[24].

The corresponding authors were contacted by email to get access to additional information regarding study methodology and results. Only the study that reported the trial main outcome was included when more than one study reported outcomes from a single trial, which means with the same authors, location, patients population, and recruitment dates.

Statistical analysis

Meta-analyses were performed comparing the malnourished/at risk of malnutrition and the normal nutrition subjects with three oral health parameters, i.e, edentulism, use of prosthesis and mean number of present teeth.

Meta-analyses were performed using the standard mean difference (SMD) of present teeth in both malnourished/at risk of malnutrition and the normal nutrition subjects. Regarding the number of edentulous and the use of prosthesis, the relative risk (RR) as assessed to both oral condition.

Heterogeneity was assessed by the Q test and quantified with the I^2 statistic. Publication bias was assessed using the Egger's and Begg's test. When high heterogeneity was detected (I^2>40%), sources of effect modification of the pooled SMD and the RR were investigated using linear meta-regression[24]. Due to the lower number of studies included in the meta-analyses, only age was included in the meta-regression.

The heterogeneity parameter (tau^2), which denotes the standard deviation of the true between-groups variance, it has been calculated using the method of moment and p-values were estimated with Monte Carlo simulation from 1000 permutations. Meta-analyses and meta-regression were conducted using Stata13.1 software[25, 26]

RESULTS

The electronic search retrieved 3288 articles. Three thousand one hundred seventy-eight studies were excluded based on titles and abstracts following the previously described criteria, resulting in 110 articles for full-text evaluation. Twenty-six studies were included in the systematic review and the main reasons for exclusion are showed in Figure 1. Both observational and interventional studies were included, of which 23 were cross-sectional[7, 9, 10, 14, 15, 27-44], one case-control[45], one cohort[46] and one clinical trial[47]. Regarding the clinical trial, the baseline data was considered for analysis.

Overall, 13.257 participants were included in all 26 studies selected in this systematic review and table 1 describes them. Articles were published between 1999 and 2016. Regarding the nutritional diagnosis,18 studies used complete MNA[7, 9, 10, 14, 15, 28, 29, 32, 33, 35-39, 41, 44, 45, 47] and 7 applied MNA-SF[30, 31, 34, 40, 42, 43, 46]. One of the studies[27] performed the MNA-SF for whole sample and the complete assessment was performed when the short form of the instrument resulted in a score of malnourished/at risk of malnutrition.

The cohort study compared the well-nourished/at risk of malnutrition with malnutrition, and showed no significant difference between the groups regarding the number of present teeth and use of prosthesis[46].

Studies included in the systematic review used different outcomes for oral health assessment. Eighteen studies used the mean number of remaining teeth[7, 9, 10, 14, 15, 28, 31-37, 39, 40, 42, 44, 46, 47]. From these, five studies demonstrated that participants at risk of malnutrition or with malnutrition, according to the MNA criteria, had significantly fewer teeth than well-nourished individuals [10, 14, 31, 33, 37]. The other 13 studies did not perform an association between mean number of

remaining teeth and nutritional status according to this nutritional scale [7, 9, 32, 34, 39, 42] or have not found a statistically significant difference between well-nourished subjects and those at risk of malnutrition/malnourished[15, 28, 35, 36, 40, 44, 47].

Sixteen studies assessed the percentage of subjects using prosthesis [7, 9, 14, 15, 28-30, 33, 35, 36, 40, 42, 43, 45-47]. Nine studies did not perform any association between this oral condition and the nutritional status[7, 9, 14, 15, 30, 42, 43, 45, 47]. On the other hand, seven studies found no statistically significant difference between well-nourished and malnourished subjects in relation to prosthesis use[28, 29, 33, 35, 36, 40, 46].

The percentage of edentulous individuals was assessed by 14 studies[7, 9, 10, 15, 28, 31, 32, 35-38, 44, 45, 47]. From these, four found no statistically significant differences between edentulism and nutritional status[28, 35, 36, 47]. Only one study showed that the risk of malnutrition was significantly higher in completely edentulous patients compared to dentate individuals[32]. The percentages of edentulism among malnourished individuals reported by these studies were 13.6%[15],5%[37] and 39%[44]. Four studies did not perform association between edentulism and nutritional status[9, 31, 38, 45]. Two other studies compared the nutritional status with edentulous that used or not prosthesis[7, 10] and both studies showed that edentulous without prosthesis or with prosthesis in only one arch were more likely to be at risk of malnutrition.

Eleven studies presented mean number of occluding pairs or number of FTU[14, 15, 27, 29, 34, 36, 38, 40, 42-44]. From these, 8 studies showed that subjects with normal nutritional status had a significantly higher number of occluding pairs or /FTUs compared to those who were malnourished or at risk of malnutrition[14, 27, 29, 34, 36, 38, 40, 44]. One study showed no significantly difference[15] between the mean

number of occluding pairs/FTU and the nutritional status and the remaining 2 studies did not performed comparisons[42, 43].

Five studies evaluated the mean DMTF[29, 32, 37, 41, 43]. From these, only one study analyzed mean DMFT scores in relation to the nutritional status and demonstrated that the DMFT scores was higher in subjects who were malnourished when compared to well-nourished subjects[41].

Seven studies assessed dental plaque and other periodontal disease parameters, such as probing depth[9, 30, 36, 37, 42, 43]. From these, 3 studies showed that dental plaque was not significantly associated with the nutritional status according to MNA criteria[9, 30, 43]. On the other hand, Mesas et al.[36] demonstrated that there was no significant difference among individuals with periodontitis, defined by probing depth ≥6 mm in relation to nutritional status. The other 2 studies did not associate the nutritional status with periodontal outcomes[37, 42].

Quality assessment was performed with two scales. The case-control[45] and the cohort[46] studies were ranked by the New-Castle Ottawa scale. The case-control study received four out of nine stars and they were referred to the following criteria: case definition, representativeness of the cases, definitions of controls, and comparability of cases and controls. The cohort study received eight out nine stars. Figure 2 shows the risk of bias for the cross sectional studies and the baseline data of the clinical trial by means of the AHRQ scale.

From the 10 criteria evaluated, the answers “Yes” and “No” ranged from two to seven. Only eleven studies received six to seven “Yes” answers[9, 10, 29, 31, 32, 35, 36, 40-42].

The description of how confounding variables were assessed and/or controlled was completely described in 17 studies[9, 10, 14, 27-29, 31-33, 35, 36, 38, 40, 42-44].

All studies provided sufficient data of the source information. However, none of the included studies stated if the examiner were blinded to the nutritional status. Only three studies described any assessment for quality assurance purpose, such as examiner reproducibility [32, 36, 37].

Therefore, the studies that assessed the nutritional status using MNA and provided sufficient data describing the oral condition were included in the meta-analysis. Three separated meta-analyses were conducted in order to account for different oral parameters evaluated in the studies included in the present review. The first meta-analysis assessed edentulism and was performed with eight studies[15, 28, 32, 33, 36, 37, 39, 44], the second one evaluated the use of prosthesis and was composed of 4 studies [33, 34, 36, 38] and the third one assessed mean number of present teeth and included 5 studies[10, 15, 33, 36, 44].

The pooled RR for edentulism was 1.072 (95% CI 0.957 – 1.200, p=0.230), favoring the normal nutritional individuals (Figure 3A). No publication bias was detected in both tests for this analysis (p=0.711and p=0.839 for Begg's and Egg's tests, respectively) (Figure S1). A moderate risk of bias was detected (I^2 = 50%, p-value=0.051). The meta-regression adjusted for age did not explain heterogeneity (coefficient -0.0072; p=0.513).

Regarding the prosthesis use, the pooled RR was 0.874 (95% CI 0.710 – 1.075, p=0.202) (Figure 3B). Furthermore, no publication bias was showed in both test for this analysis (p=0.089 and p=0.072 for Begg's and Egg's tests, respectively). To better view the publication bias data, see the Funnel plot (Figure S2). A high heterogeneity was found (I^2= 78%, p=0.003). Again, the meta-regression adjusted for age did not explain heterogeneity (coefficient -0.010; p=0.351).

The meta-analysis of mean number of present teeth showed that the subjects with malnourished/at risk of malnutrition demonstrated a SMD of -0.141 (95%CI -0.278 – -0.005, p=0.042) (Figure 3C). There was no risk of bias, according to the Begg's and Egg's tests (p=0.806 and p=0.474, respectively) (Figure S3). A low heterogeneity showed for this analysis (I^2=9.7%, p=0.351), and no meta-regression was performed.

DISCUSSION

The aim of this systematic review was to determine the existence of an association between malnutrition or the risk of malnutrition, assessed by MNA or SGA, and the oral health status in older adults. It was demonstrated that individuals with malnutrition or at risk of malnutrition had less number of present teeth and that the use of prosthesis and to be edentulous had no association with the nutritional status.

This systematic review included 26 studies. Almost all studies used for nutritional assessment, the complete MNA or the Short-Form (n=25). According to Bauer et al[48], the MNA is the first method for the nutritional assessment of elderly patients to be chosen, since it was built especially for this population. The MNA has 18 items clustered in four categories: anthropometric, general, dietary and subjective assessments[49]. The MNA is divided into 2 stages, the first, a short one, corresponding to the Short-Form, is a screening tool. When malnutrition is diagnosed, the second step is performed for confirmation, filling the MNA[16].

The association between poor oral health and malnutrition in elderly may be evidenced, mainly, for the number of present teeth, as demonstrated in qualitative[10, 14, 31, 33, 37] and quantitative analysis (SMD:-0.141; 95%CI -0.278;-0.005). Malnourished individuals presented 0.14 less teeth on average when compared to the well-nourished. Although this result is statistically significant, the interpretation of this finding should be evaluated cautiously, because its clinical significance may not be relevant.

Number of remaining teeth is an important outcome for buccal status particularly in older adults since it represents the longlife exposure to the cumulative effect of caries and periodontitis[5, 50]. Some studies observed that the

number of present teeth were associated with the number of food items that elderly were able to eat, leading to limited choice of foods and a consequent reduction of the intake of fruits, vegetables and fibers, providing an increased risk of malnutrition[1, 8, 14, 51].

Chewing ability is also assessed by functional teeth units (FTU) or posterior occluding pairs that are defined as opposite dental pairs. The number of FTUs is a reliable indicator of chewing and determines chewing ability[52]. Several studies included in this systematic review reported the data of occluding pairs and FTUs, but the variability between these studies did not allow a quantitative approach. The literature shows that individuals without posterior occluding pairs were twice more likely to be malnourished[36]. Additionally, there is a significant association between a lower number of posterior occluding pairs and reduced intake of nutrients[14, 15, 27, 34, 38]. El Osta et al[29] observed that elderly with less than 4 FTU have difficulty in chewing or swallowing and tend to avoid hard foods, including meat, vegetables and bread, which would explain the increased risk of malnutrition of these individuals.

Regarding the use of prosthesis, most of the studies were not able to show a significant difference between malnourished and well-nourished individuals[28, 29, 33, 35, 36, 40] although subjects using denture demonstrated chewing ability and bite force reduced to only 20%[19, 53] in comparison to fully dentate individuals. The quantitative analysis from this study also showed no relationship between the use of prosthesis and the nutritional status in elderly. However, the relation between prosthesis use and nutritional status is highly influenced by edentulism. A study that associated the use of prosthesis in edentulous demonstrated that individuals wearing only one prosthesis have 36% more risk of malnutrition[10]. Besides that,

edentulous without prosthesis or with only one complete denture are more likely to eat foods with pastry consistency in daily routine, presenting, therefore, lower scores of MNA compared to individuals who present healthy dietary preferences[7, 51]. This suggests that edentulous individuals that use a complete pair of prosthesis have a better nutritional status[10] compared to edentulous using only one complete denture, indicating that wearing complete pair of dentures may be an advantage against malnutrition[7].

Among the studies that evaluated the relationship between edentulism and nutritional status, only one showed a higher risk of malnutrition in fully edentulous patients[32]. The meta-analysis performed in this study did not find a significant association between edentulism and nutritional status. Population- based studies suggested that edentulism is correlated with less nutrients consumption and multiples nutritional deficiencies[11, 54, 55]. The edentulism reduce the chewing ability, leading to changes in the eating habits and selection of easily chewed foods. Those foods may not contain all the nutrients to a well balanced diet. The altered diet may occurs in two manners: through the progressive exclusion of hard to chew foods, such as meat, fruits or fresh vegetables, or through changes in the food preparation in order to adequate to food texture to the chewing ability [47, 56-58].

There is a high variability in the selected studies, suggesting major differences among them, such as follow-up, risk of bias, different oral health indicators, and sampling with or without comorbidities. These characteristics may influence the results and partially explain the discrepant results found in this study. Additionally, the nutritional status definition based exclusively on anthropometric measurements, such as body mass index (BMI) do not cover all

the important qualitative aspects in the elderly evaluation, such as self-perception, existence of any disease and diet. These conditions are considered in the MNA and SGA application, leading to a better diagnosis of the nutritional status[36, 37, 49].

Some limitations must be highlighted in this systematic review. Due to the high variability among the selected studies, a few of them were included in the meta-analysis. Furthermore, only studies that performed an oral examination by a dental professional were included in this systematic review, excluding other important outcomes to the nutritional status, such as salivary flow and specifics test to assess chewing capacity. It is not possible to exclude the possibility that the oral health outcomes assessed in this systematic review are, in fact, sub-rogated ones. Additionally, the findings of this study should be taken with cautious, as the majority of the included studies were cross-sectional and this study design did not include temporality between the associations. Despite of that, efforts should be made to improve the oral health and nutritional status of all individuals, as some evidences suggest that a deficient oral health may be a predictor of malnutrition.

The diagnosis of malnutrition is complex and challenging, especially in elderly. Therefore, more studies are necessary to clarify the issues raised by this study. These studies should use a standard methodology with longer follow-up, searching for a direct association between the clinical oral indicators and the nutritional status. Oral health should be assessed by means of clinical parameters, avoiding self-reported evaluation. Additionally, more longitudinal studies assessing the relationship between oral health indicators and nutritional status in adults is needed, especially among older aged ones.

CONCLUSION

It was concluded that the mean number of teeth present was associated with nutritional status. However, the clinical effect of this association may not be relevant. On the other hand, edentulism and use of prosthesis was not associated with nutritional status. Nevertheless, it is necessary to be cautious in interpreting the results because these studies have major methodological limitations. Additionally, it is strongly recommended the conduction of high quality longitudinal studies in this field, as a tentative to determine a causal relationship between the state of oral health and malnutrition.

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LEGENDS

Figure 1. Flowchart of the study selection.

Figure 2. Results of the evaluation of the risk of bias in the cross-sectional studies.

Figure 3. Florest plot for the edentulism, number of prosthesis and number of present teeth in relation to nutritional status.

Table 1. Main results of the selected studies.

Supplementary material

Figure S1. Funnel plot of the risk of bias, according to the Begg's and Egg's tests, for the edentulism (supplementary material)

Figure S2. Funnel plot of the risk of bias, according to the Begg's and Egg's tests, for the number of prosthesis (supplementary material)

Figure S3. Funnel plot of the risk of bias, according to the Begg's and Egg's tests, for the mean number of teeth present (supplementary material)

Figure 1

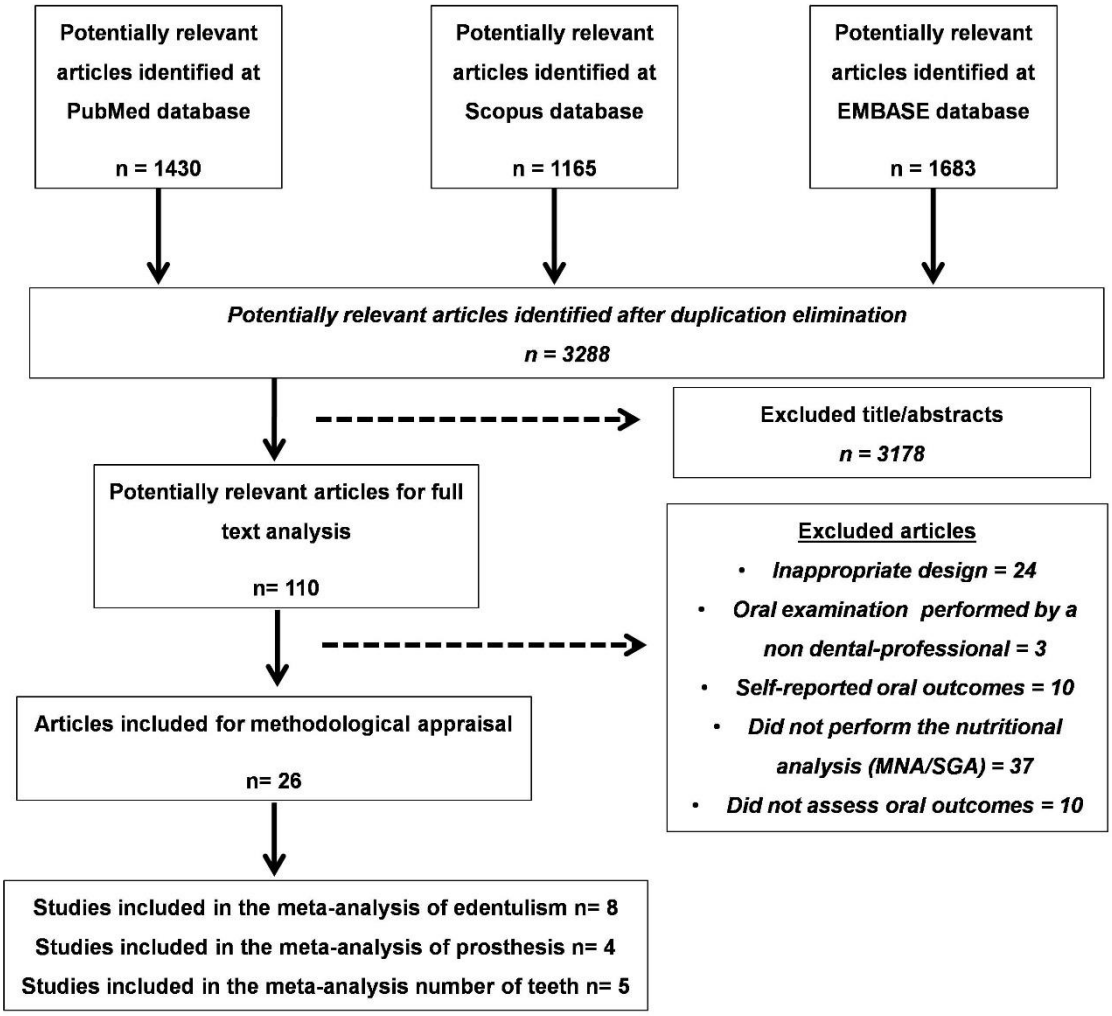
Potentially relevant articles identified at PubMed database
n = 1430
Potentially relevant articles identified at Scopus database
n = 1165
Potentially relevant articles identified at EMBASE database
n = 1683
Potentially relevant articles identified after duplication elimination
n = 3288
Excluded title/abstracts
n = 3178
Potentially relevant articles for full text analysis
n= 110
Excluded articles
• Inappropriate design = 24
• Oral examination performed by a non dental-professional = 3
• Self-reported oral outcomes = 10
• Did not perform the nutritional analysis (MNA/SGA) = 37
• Did not assess oral outcomes = 10
Articles included for methodological appraisal
n= 26
Studies included in the meta-analysis of edentulism n= 8
Studies included in the meta-analysis of prosthesis n= 4
Studies included in the meta-analysis number of teeth n= 5

Figure 2

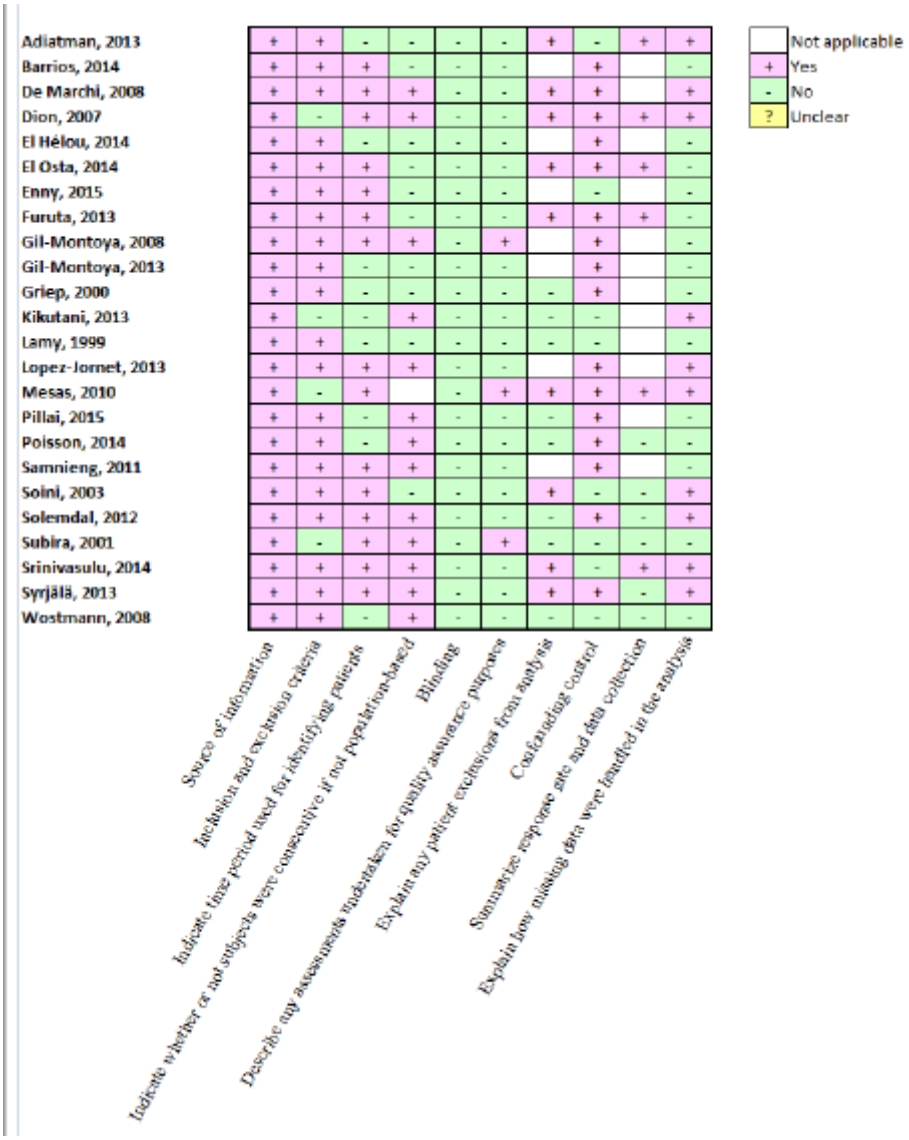
Adiatman, 2013
Barrios, 2014
De Marchi, 2008
Dion, 2007
El Hélou, 2014
El Osta, 2014
Enny, 2015
Furuta, 2013
Gil-Montoya, 2008
Gil-Montoya, 2013
Griep, 2000
Kikutani, 2013
Lamy, 1999
Lopez-Jornet, 2013
Mesas, 2010
Pillai, 2015
Poisson, 2014
Samnieng, 2011
Soini, 2003
Solemdal, 2012
Subira, 2001
Srinivasulu, 2014
Syrjälä, 2013
Wostmann, 2008
Source of information
Inclusion and exclusion criteria
Indicate time period used for identifying patients
Indicate whether or not subjects were consecutive if not population-based
Blinding
Describe any assessments undertaken for quality assurance purposes
Explain any patient exclusions from analysis
Confounding control
Summarize response rate and data collection
Explain how missing data were handled in the analysis
Not applicable
Yes
No
Unclear

Figure 3

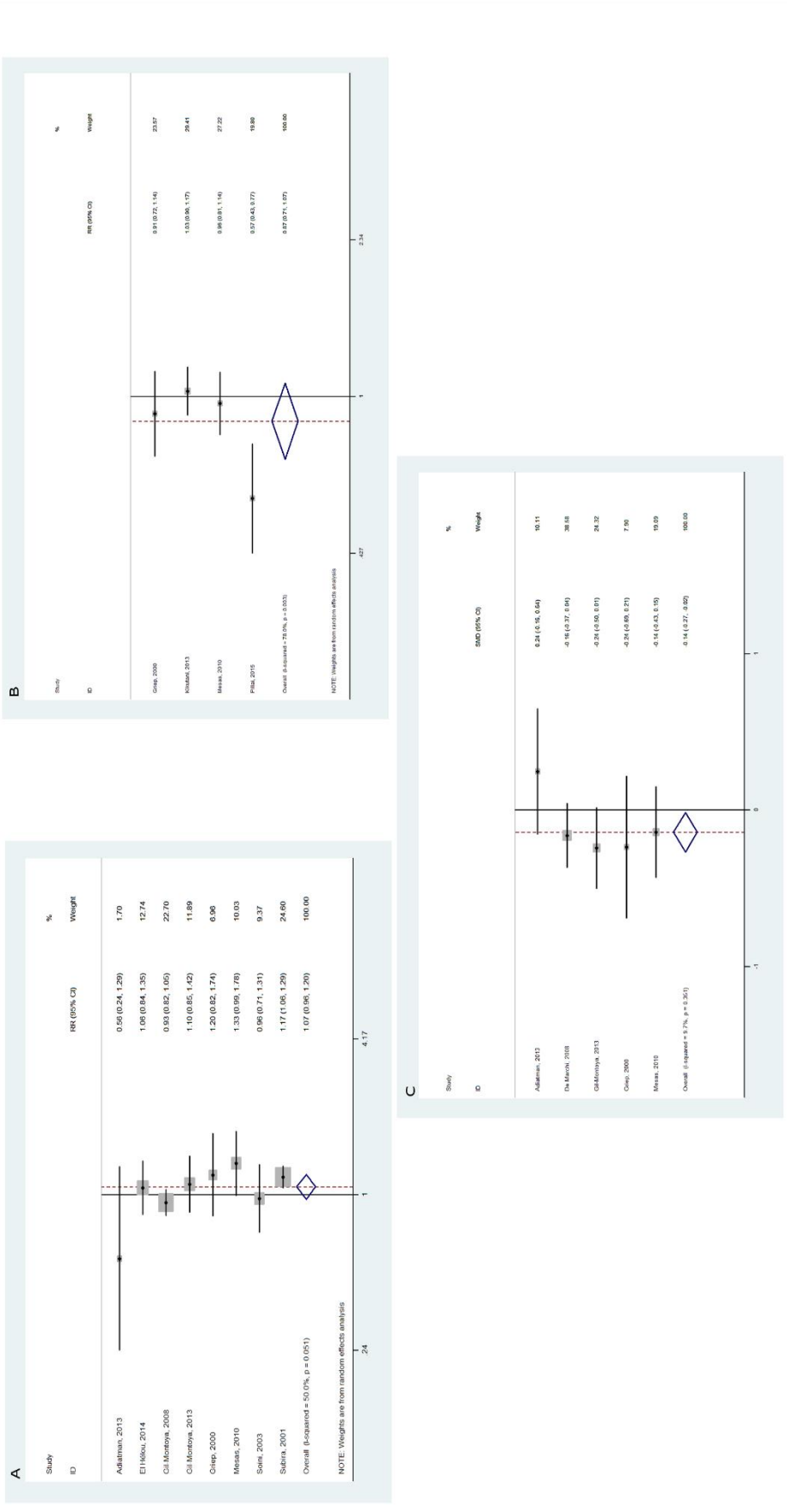
A
Study
ID
%
Weight
RR (95% CI)
Adlaman, 2013 0.56 (0.24, 1.29) 1.70
El Hilou, 2014 1.06 (0.84, 1.35) 12.74
Gil Montoya, 2008 0.93 (0.82, 1.05) 22.70
Gil Montoya, 2013 1.10 (0.85, 1.42) 11.89
Griep, 2000 1.20 (0.82, 1.74) 6.96
Meisas, 2010 1.33 (0.99, 1.78) 10.03
Soini, 2003 0.96 (0.71, 1.31) 9.37
Subira, 2001 1.17 (1.06, 1.29) 24.60
Overall (I-squared = 50.0%, p = 0.051) 1.07 (0.96, 1.20) 100.00
NOTE: Weights are from random effects analysis
.24
1
4.17
B
Study
ID
%
Weight
RR (95% CI)
Griep, 2000 0.91 (0.72, 1.14) 23.57
Kitabatz, 2013 1.03 (0.90, 1.17) 29.41
Meisas, 2010 0.96 (0.81, 1.14) 27.22
Pitsi, 2015 0.57 (0.43, 0.77) 19.80
Overall (I-squared = 78.0%, p = 0.003) 0.87 (0.71, 1.07) 100.00
NOTE: Weights are from random effects analysis
.427
1
2.34
C
Study
ID
%
Weight
SMD (95% CI)
Adlaman, 2013 0.24 (-0.16, 0.64) 10.11
Da Mavoli, 2008 -0.16 (-0.37, 0.04) 38.68
Gil-Montoya, 2013 -0.24 (-0.50, 0.01) 24.32
Griep, 2000 -0.26 (-0.69, 0.21) 7.90
Meisas, 2010 -0.14 (-0.43, 0.15) 19.99
Overall (I-squared = 9.7%, p = 0.361) -0.14 (-0.27, -0.02) 100.00
-1
0
1

Figure S1

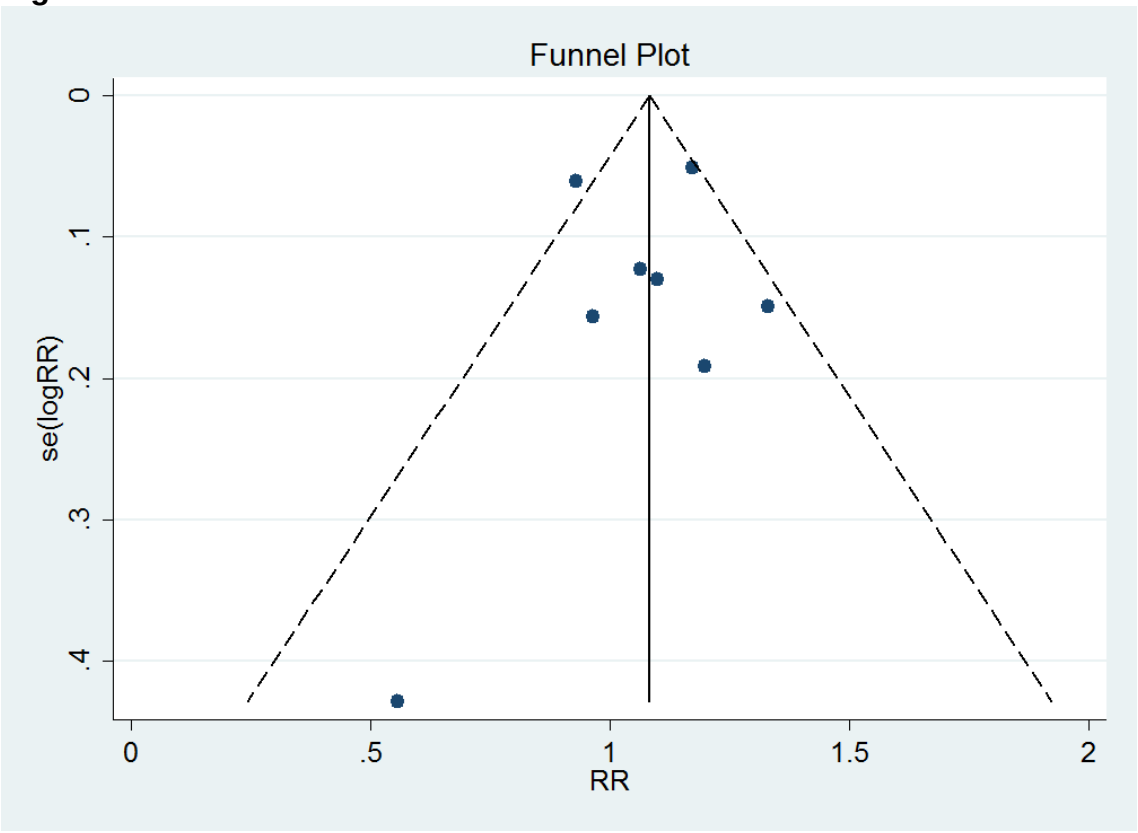

Figure S2

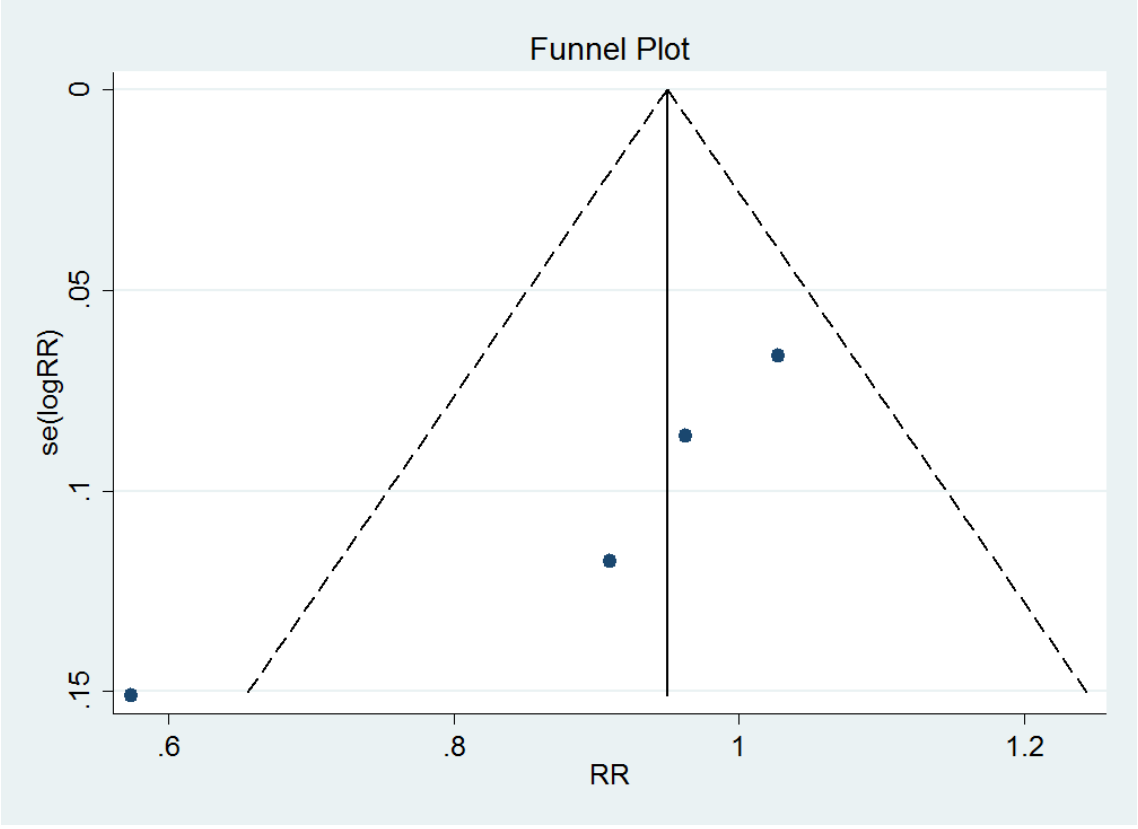

Figure S3

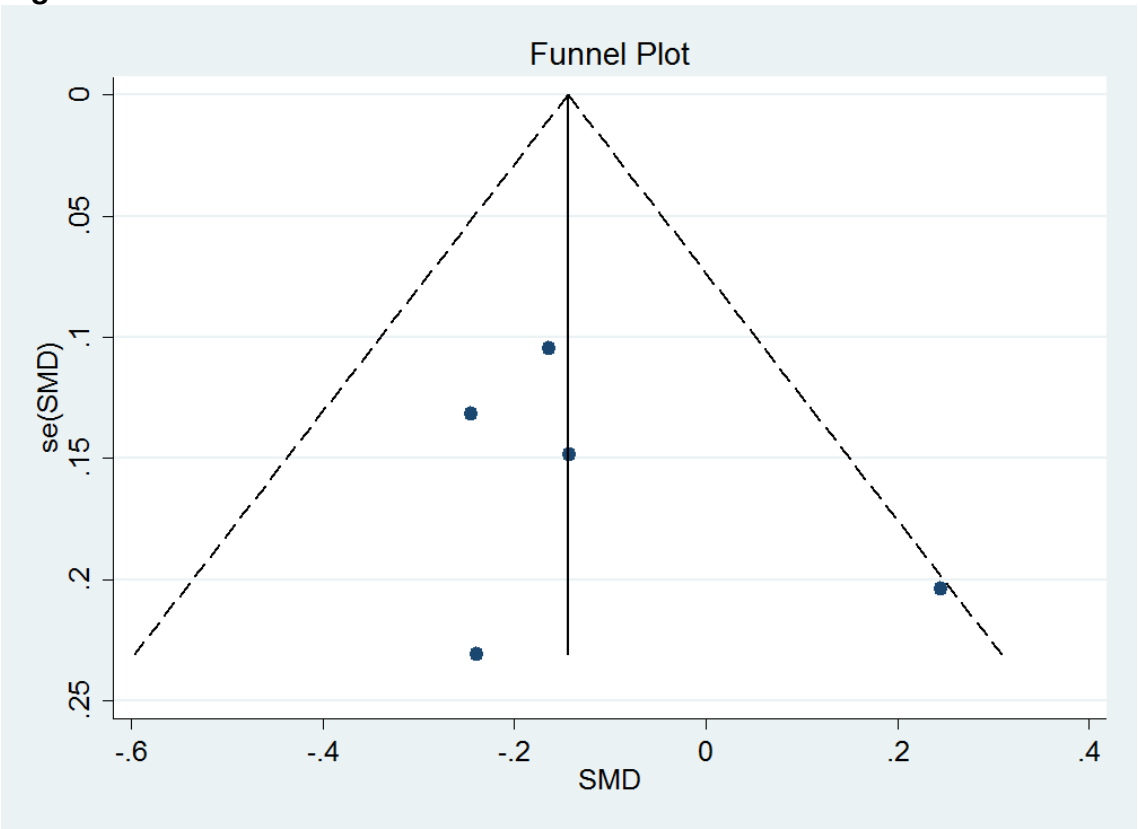

Table 1. Main results of the selected studies.

	Study design	N	Age Mean±SD	Men (n)	Oral assessment	Nutritional assessment	Results
Adiatman (2013)	Cross sectional	100	72.4±8.2	0	Remaining teeth, Edentulism, FTU, prosthesis	MNA	Malnourished or at risk of malnutrition (59%) • 13.6% Edentulous • 50.8% FTUs = 0 • 14.7±11.2 mean number of teeth Normal nutritional status (41%) • 24.4% Edentulous • 43.9% FTUs =0 • 12.1±9.7 mean number of teeth
Barrios (2014)	Cross sectional	133	86±8	84	FTU	MNA e MNA-SF	Malnourished a risk of malnutrition (77.4%) • 1.3±2.3 Anterior mean FTU • 1.1±2.8 Posterior mean FTU Normal nutrition status (22.6%) • 2.6±2.7 Anterior mean FTU • 2.8±3.8 Posterior mean FTU
Cousson (2012)	Case control	97	70.1±8.1 test group and 70.1±6.1 control group	45	Prosthesis	MNA	• 25.86±2.89 mean MNA in the edentulous with new denture (study group) • 28.21±1.53 mean MNA to a full posterior contact support (control group) Malnourished an risk of malnutrition (10.31%) Normal nutrition status (89.69%)

De Marchi (2008)	Cross sectional	471	69.19±6.6 normal nutritional e 70.6±7.5 malnourished or at risk of malnutrition	195	Remaining teeth, prosthesis	MNA	Malnourished or at risk of malnutrition (73.46%) • 4.60±6.68 mean number of teeth • 39.2% Upper and lower dentures Normal Nutritional Status (26.54%) • 5.75±7.14 mean number of teeth • 38.7% Upper and lower dentures
Dion (2007)	Cross sectional	1094	85±8.16	284	Prosthesis, remaining teeth	MNA	• Mean number of teeth 3 superior arch and 4 lower arch • 57.3% used upper denture • 44.9% used lower denture, • Malnourished or at risk of malnutrition (59.1 %) • Normal nutritional status (40.9%)
El Hélou (2014)	Cross sectional	115	76.2±5.6	56	Remaining teeth, prosthesis wearing, edentulism	MNA	Malnourished and at risk of malnutrition (56.52%) • 33.3% ≥20 number of remaining teeth • 41.1% <20 number of remaining teeth • 45% edentulous Normal Nutritional Status (43.48%) • 66.7% ≥20 number of remaining teeth • 58.9 % <20 number of remaining teeth • 55% edentulous

El Osta (2014)	Cross sectional	201	Women-71.59±5.97 and Men-72.74±6.98	80	DMFT, denture status, FTU posterior	MNA	Malnourished and at risk of malnutrition (42.29%) • 61.2% FTUs ≤4 /7.1% FTUs = 5 or 6/ 31.8% FTUs = 7 or 8 • 25.2 ±4.4 mean DMTF • 14.1% edentulous without denture Normal Nutritional Status (57.71%) • 32.8% FTUs ≤4/ 20,7% FTUs = 5 or 6 /46.6% FTUs = 7 or 8 • 24.4 ±4.7 mean DMTF • 4.3% edentulous without denture
Enny (2015)	Cross sectional	174	71.4±7.59	84	Silness and Löe plaque index and Augsburger denture plaque index	MNA-SF	• 2.72±0.34 mean dental plaque • 2.82±0.57 mean denture plaque • Malnourished and at risk of malnutrition (69%) • Normal nutritional status (31%)
Furuta (2013)	Cross sectional	286	84.5±7.9	75	Remaining teeth	MNA-SF	• 14.4±8.9 mean number of teeth • 10.1 ± 2.2 mean Nutritional status (MNA-SF) total • Normal nutritional status (30.8%) • Malnourished and at risk of malnutrition (69.2%)
Gil-Montoya (2008)	Cross sectional	2860	73.6±6.8	1193	Edentulism, remaining teeth	MNA	Malnourished (3.46%) • 3% dentate • 4.7% edentulous Risk of malnutrition (31.54%) • 30.5% dentate • 34.1% edentulous Normal nutritional status (65%) • 61.3% dentate • 66.6% edentulous

Gil-Montoya (2013)	Cross sectional	250	82.7±8.2	88	Remaining teeth, pairs of teeth	MNA	Malnourished and at risk of malnutrition (36.8%) • 39% edentulous • 37.8% of 1-19 remaining teeth • 3.5±2.8 mean pair of teeth anterior • 6.0±5.6 mean pair of teeth posterior Normal nutritional status (63.2%) • 61% edentulous • 62.2% of 1-19 remaining teeth • 4.4±2.4 mean pair of teeth anterior • 7.6±5.1 mean pair of teeth posterior
Griep (2000)	Cross sectional	81	83.4±6.6	16	Remaining teeth, prosthesis	MNA	Malnourished (2%) • 100% edentulous • 100% with complete dentures Risk of malnutrition (37%) • 3.3±6.4 number of teeth • 60.7% used complete dentures Normal nutritional status (61%) • 4.8±6.2 number of teeth • 52.9% used complete dentures
Group (2001)	Cross sectional	3459	73.2±6.4	1433	DMFT, CPI, edentulism, dentate	MNA	Malnourished or at risk of malnutrition (37.7%) • 41.5% edentulous • 69.5% dentate Normal nutritional status (62.3%) • 58.5% edentulous • 70.5% dentate • 20.8±10.4 Mean DMFT whole sample

Kikutani (2013)	Cross sectional	716	83.2±8.6	240	Dental loss, remaining root, occlusion	MNA-SF	Malnourished (13.27%) • 21.2±9.6mean number missing teeth • 2.3±4.0 mean number remaining roots Risk of malnutrition (51.68%) • 22.4±9.8 mean number missing teeth • 1.7±3.3 mean number remaining roots Normal nutritional status (35.05%) • 20.2±10.6 mean number missing teeth • 0.9±2.2 mean number remaining roots
Lamy (1999)	Cross sectional	120	81±8	29	Prosthesis, remaining teeth	MNA	• 21.4±3.1 mean MNA edentulous without dentures or with only one complete denture • 23.6±3.1 mean MNA edentulous with two complete dentures • 22.3±3.4 mean MNA dentate with or without partial dentures • 10.4±7.8 mean number of teeth Malnourished and at risk of malnutrition (63%) Normal nutrition status (37%)
Lopez-Journet (2013)	Cross sectional	465	75.7±7.8	213	Remaining teeth, prosthesis and teeth loss	MNA	• 14.4 mean number of teeth • 17.4 mean number of missing teeth Malnourished and at risk of malnutrition (21.1%) Normal nutrition status (78.9%)
Mesas (2010)	Cross sectional	267	66.5±4.1	107	Remaining teeth, prosthesis, posterior occlusion, edentulism	MNA	Malnourished and risk of malnutrition (21.7%) • 7.00± 9.39 remaining teeth • 53.5% Edentulous Normal nutritional status (78.3%) • 8.33± 9.27 remaining teeth • 40.2% Edentulous

Okabe (2016)	Cohort	177	Not reported	47	Remaining teeth, prosthesis	MNA-SF	Well-nourished and risk of malnutrition (91%) • 17.4% ≥ 20 teeth • 67.7% < 20 teeth, with dentures • 14.9% < 20 teeth, no dentures Malnutrition (9%) • 6.2% ≥ 20 teeth • 75% < 20 teeth, with dentures • 18.8% < 20 teeth, no dentures
Pillai (2015)	Cross sectional	946	66.3±5.46	623	Prosthesis need and want, posteriors occluding pairs and dental loss	MNA	Malnourished and at risk of malnutrition (64.2%) • 12% edentulous • 12.2% used prosthesis • 3.96 ± 3.11 mean pair of teeth Normal nutritional status (35.8%) • 12.4% edentulous • 21.2% used prosthesis • 4.07 ± 3.136 mean pair of teeth
Poisson (2016)	Cross sectional	159	85.28±5.68	51	Plaque index, DMFT, posterior occluding pairs and prosthesis	MNA-SF	Malnourished • 59.7% Dental plaque • 20.2±7.4 mean DMFT • 69.2% used prosthesis • It was made only in 144. 31.2% risk of malnutrition, 53.5% malnourished and 15.3% well-nourished.

Samnieng (2011)	Cross sectional	612	68.8±5.9	158	DMFT, prosthesis, remaining teeth and FTU	MNA	Malnourished (7.7%) • 8.7±1.4 mean number of teeth present • 1.6±0.3 mean number of decayed teeth • 0.5±0.2 mean number of filled teeth • 8.3±1.1 mean number of FTUs Risk of Malnutrition (67.1%) • 10.1±0.4 mean number of teeth present • 1.3±0.1 mean number of decayed teeth • 0.4±0.1mean number of filled teeth • 8.4±0.3 mean number of FTUs Normal nutritional status (25.2%) • 13.2±0.7 mean number of teeth present • 1.1±0.2 mean number of decayed teeth • 0.3±0.1mean number of filled teeth • 10.3±0.5 mean number of FTUs

Soini (2003)	Cross sectional	51	83.7±4.4	11	Dental loss, remaining teeth, fixed or removal prosthesis	MNA	• 10.59±6.92 mean number teeth • 51% Complete dentures • 14% Partial dentures in addition to natural dentition • 8% Partial dentures without natural dentition • 35% Plaque • 24% Calculus • 29% Ginqivitis • 10% Periodontitis Normal nutritional status (52.94%) Malnourished and at risk of malnutrition (47.06%)
Solemdal (2012)	Cross sectional	138	83.2±5.9	39	Dental loss, prosthesis, posterior occluding pairs, dental plaque	MNA-SF	• 17.4% used prosthesis and had no natural teeth • 25.4% had natural teeth and denture • 57.2% had only natural teeth • 41.3% had at least 20 teeth • 32.3% malnutrition
Srinivasulu (2014)	Cross sectional	81	70.12±7.32	34	DMFT	MNA	• 12.45±5.574 mean DMFT malnourished • 10.51±8.535 mean DMFT at risk of malnutrition • 6.3 4±5.765 mean DMFT normal nutritional status Normal nutritional status (43%) Malnourished and at risk of malnutrition (57%)

Syrjälä (2013)	Cross sectional	157	Stimulated saliva: 80.4±3.6 (-de 1ml/min) and 78.6±3.4 (≥1ml/min)	NR	Remaining teeth, pairs occlusal and periodontal disease	MNA-SF	Stimulated <1.0 ml/min • 13.8±8.0 mean number of teeth • 2.7 ±3.5 mean number of teeth with periodontal pockets ≥4 mm • 4.1 ±2.6 occlusal pairs • 15.7% Risk of malnutrition (MNA-SF score < 12) Stimulated ≥1.0 ml/min • 15.5±8.0 mean number of teeth • 2.8±3.9 mean number of teeth with periodontal pockets ≥4 mm • 4.6±2.4 occlusal pairs • 12.3% Risk of malnutrition (MNA-SF score < 12) Unstimulated <0.1 ml/min • 14.0±8.1 mean number of teeth • 2.4 ±3.1 mean number of teeth with periodontal pockets ≥4 mm • 4.5±2.9 occlusal pairs • 15.6% Risk of malnutrition (MNA-SF score < 12) Unstimulated ≥0.1 ml/min • 15.3±8.0 mean number of teeth • 3.0±4.0 mean number of teeth with periodontal pockets ≥4 mm • 4.5±2.3 oclusal pairs • 12.5% Risk of malnutrition (MNA-SF score < 12)
Wostmann (2008)	Cross sectional*	47	72,6 ±6.7	19	Remaining teeth and prosthesis	MNA	• 25.5 ± 3.7 mean baseline MNA Edentulous • 26.8 ± 1.6 mean 1–10 remaining teeth • 25.6 ± 4.6 >10 remaining teeth • 25.5±3.7 mean overall

Legend: *Randomized Clinical Trial considered as a cross sectional study because only the baseline data was used; SD - Standard deviation; DMFT - Decayed, missed and filled teeth; FTU- Functional Teeth unit; MNA - Mini Nutritional Assessment; SGA - Subjective Global Assessment; CPI - Communitary Periodontal Index; MNA-SF - Mini Nutritional Assessment - Short Form.

5 MANUSCRITO 2:

Association between oral health and nutritional status in diabetic and nondiabetic patients hospitalized: a cross-sectional study.

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ABSTRACT

Objective: To evaluate the oral condition and nutritional status of diabetic and non-diabetic individuals admitted to the Hospital de Clínicas of Porto Alegre (HCPA). **Methodology:** This cross-sectional study evaluated 394 patients admitted to the HCPA wards. After an interview for the record of socio demographic data and medical history, a calibrated examiner performed a dental examination and registered visible plaque index, gingival bleeding index, plaque retentive factors, probing depth, clinical attachment loss, bleeding on probing, number of present teeth and functional masticatory capacity. The nutritional status was evaluated with the Subjective Global Assessment. The association between nutritional status and age, sex, length of hospitalization, smoking, presence of periodontitis, presence of diabetes, masticatory capacity and number of teeth were evaluated by Poisson regression with robust variance. **Results:** Diabetic patients presented worse periodontal conditions, greater past periodontitis experience and lower mean number of present teeth when compared to non-diabetic patients (9.29 ± 8.37 versus 12.29 ± 9.88; P = 0.01). Diabetic subjects remained hospitalized for a longer period than the non-diabetic subjects (18.33 ± 12.79 days versus 16.53 ± 14.54 days; p = 0.01). In the multivariate analysis, sex, number of teeth and length of hospitalization remained associated with malnutrition. **Conclusions:** It is concluded that the oral health condition is associated with malnutrition in both diabetic and non-diabetic patients hospitalized, as well as with long-term hospitalization and being male.

INTRODUCTION

Poor oral health and impaired masticatory function have been implicated as risk indicators for inadequate food intake and malnutrition [1]. Individuals with fewer teeth or edentulous individuals are less likely to consume nutrient-dense foods, such as vegetables, fruits, meat, and whole grains [2]. There is evidence that impaired oral health can cause dietary restrictions through difficulty in chewing, compromising the nutritional status and well-being of individuals [1, 3].

Several studies have been conducted to investigate the relationship between nutritional status and oral health, most of them in older populations [1,4,5,6,7,8]. In this respect, food selection and nutrient intake are limited by oral conditions, such as tooth loss [5], absent or inadequate prosthetic rehabilitation [6], periodontal disease [7], and caries-related pain or discomfort, reducing masticatory efficiency and affecting food preferences and consumption patterns [1, 8].

Diabetes is the main systemic disease associated with periodontitis. Studies have shown that diabetic individuals have a higher prevalence of periodontal disease and more severe and rapidly progressing forms of the disease than nondiabetic individuals [9-11]. Periodontitis has a two-way relationship with metabolic control, i.e., both influencing and being influenced by the poor metabolic control of diabetes. Diabetic individuals with poor glycemic control show an exacerbated response to the presence of supra- and subgingival biofilm, with hyperactivation of all specific inflammatory pathways [10, 12]. These individuals also show increased periodontal tissue destruction and tooth loss compared to diabetic individuals with good metabolic control [9].

Hospitalized patients usually experience many risk factors that may contribute to the occurrence of malnutrition, including loss of appetite, underlying disease, diseases that can prevent normal eating or impair nutrient absorption, length of hospital stay, and diabetes [13]. Older people with diabetes mellitus are more likely to be malnourished than those without diabetes [14]. From a metabolic point of view, insulin deficiency and malnutrition share similarities. Both are catabolic states that lead to increased cell function and subsequent demand for nutrients, vitamins, and minerals. Low metabolic rate leads to decreased protein production, especially albumin, globulins, enzymes, and hormones, which are essential to the process of nutrient absorption [15]. Although this hypothesis attempts to explain the relationship between diabetes and malnutrition, the presence of other factors associated with malnutrition makes it difficult to directly correlate the two conditions, especially in hospitalized patients.

Diabetic patients with poor glycemic control, in addition to the presence of systemic factors and comorbidities predisposing to malnutrition, often have poorer oral health status. A higher prevalence of periodontal disease and tooth loss is observed in diabetic patients, which may limit the consumption of foods high in resistant starch and fiber, thereby reducing diet quality in this population.

The purpose of this study was to evaluate the oral health status of diabetic and nondiabetic patients hospitalized at Hospital de Clínicas de Porto Alegre and relate the condition to nutritional status.

MATERIALS AND METHODS

This was a cross-sectional study of patients who were hospitalized in medical and surgical wards at Hospital de Clínicas de Porto Alegre (HCPA) from December 2015 to June 2016. Eligible participants were all patients aged > 18 years with or without a diagnosis of diabetes who could stand alone (without assistance) and had no comorbidities that prevented dental examination or required antibiotic chemoprophylaxis to undergo examination. Patients who were about to be discharged or who were not present in the room at the time of the interview were excluded.

The study was approved by HCPA the Research Ethics Committee of the institution, and written informed consent was obtained from all individual participants prior to their inclusion in the study. Sample size calculation was based on a malnutrition rate of 38.9% as reported by Waitzberg et al [21]. Assuming an attrition rate of 5%, a beta error of 20% and an alpha error of 5%, a sample size of 384 patients was required.

All participants were interviewed and underwent oral examination and nutritional assessment. The interviews were conducted by two trained interviewers (DS and JR) who collected personal data, socioeconomic data [16], and information on dental history and smoking. The diagnosis of diabetes was based on information in the patient's medical record and medication use.

Oral health status

Oral examinations were performed by a single examiner using a headlamp and a 10-mm Williams probe while standing at the patient's bedside. The examiner was trained and calibrated to perform a complete bedside periodontal

examination. The pre-experimental inter-examiner with golden pattern reproducibility values were 0.85 for probing depth and 0.81 for attachment loss, as assessed using the weighted kappa index (± 1 mm). The pre-experimental intra-examiner weighted kappa index was 0.93 for probing depth and 0.82 for attachment loss. Intra-examiner reproducibility values throughout the study period were 0.97 for probing depth and 0.88 for attachment loss, as obtained by repeating 10% of the measurements (randomly selected).

The following oral health indicators were assessed: visible plaque index [17], gingival bleeding index [17], plaque retentive factors, probing depth, clinical attachment loss, bleeding on probing, number of teeth, and masticatory function. The 'masticatory function' variable was constructed based on the combination of number of teeth and prosthesis use and categorized into 3 groups: (1) patients with more than 19 teeth both using and not using prostheses; (2) patients with less than 19 teeth using prostheses; and (3) patients with less than 19 teeth not using prostheses.

Nutritional status

For nutritional status assessment, patients' weight and height were measured to calculate body mass index (BMI) and the Subjective Global Assessment (SGA) was performed [18]. Patients were classified according to the BMI cutoff points established by the World Health Organization [19] for adults: underweight (< 18,5 kg/m^2), normal weight (18,5-24,9 kg/m^2), overweight (25-29,9 kg/m^2), and obese (> 30 kg/m^2); and for elderly people [20]: underweight (< 22 kg/m^2), normal weight (22-27 kg/m^2), and obese (> 27 kg/m^2). The total SGA

score is 30, divided into 3 categories: well nourished (< 17), moderate malnutrition (17-22), and severe malnutrition (> 22) [18].

Glycated hemoglobin and albumin levels were measured in all participants to determine, respectively, glycemic control and protein-energy status.

Statistical analysis

Continuous variables were expressed as mean (SD), and categorical variables were expressed as absolute and relative frequencies. Groups were compared using an independent samples *t* test or the chi-square test. Age was dichotomized into middle-aged adults (< 60 years) and older adults (≥ 60 years). The cutoff point for length of hospital stay was based on the 75th percentile of distribution of this variable in the sample (≤ 23 days/ > 23 days). To categorize the number of teeth, the 75th (19 teeth) and 50th (6 teeth) percentiles of distribution of this variable in the sample were used.

Associations between nutritional status and age, sex, length of hospital stay, smoking, presence of periodontitis, presence of diabetes, masticatory function, and number of teeth were determined by univariate and multivariate analysis with Poisson regression with robust variance. The malnutrition outcome was defined by a total SGA score ≥ 17, according to the 75th percentile of distribution of this variable in the population. All independent variables with a p-value less than 0.20 in the univariate analysis were included in the final model. In all models, statistical interactions and multicollinearity among variables were tested and discarded. Statistical analysis was performed using SPSS for Windows, version 18.0. Each individual was considered a sampling unit and the level of significance was set at 5%.

RESULTS

Of 3746 patients who were admitted to the medical and surgical wards of the institution during the data collection period, 1024 were selected for screening. Of these, 574 were excluded and 450 were eligible for the study. Fifty-six patients refused to participate, totaling 394 patients included in the study (Figure 1).

Among the 56 patients who refused to participate in the study, 23.0% were women, 28.6% had diabetes, and the most common reasons for hospitalization were treatment of a tumor (23.2%) and heart disease (16.1%). These patients had a mean age of 66.19 (9.89) years and a mean of 20.85 (7.76) lost teeth. Tooth loss was significantly higher in diabetic patients (24.25 [6.29] teeth) than in nondiabetic patients (19.5 [7.95] teeth) ($p = 0.04$).

The sociodemographic characteristics of the 394 patients included in the study are shown in Table 1. Mean patient age was 63.43 (10.76) years among diabetic patients (87 women and 110 men) and 59.85 (15.18) years among nondiabetic patients (93 women and 104 men). Regarding smoking, 51.8% of diabetic patients and 54.8% of nondiabetic patients had quit smoking. Both diabetic and nondiabetic patients had a mean of 6 years of education, and most participants were of low social class in both groups. Diabetic patients had a longer hospital stay than nondiabetic patients (18.33 [12.79] days *vs* 16.53 [14.54] days). Regarding oral health status, diabetic patients had a higher prevalence of supra- and subgingival periodontal inflammation, had more often experienced periodontitis in the past, and had fewer teeth than nondiabetic patients. Nutritional status was similar in both groups according to the SGA score. However, the distribution of patients according to BMI categories differed between groups, with more obese patients in the diabetic group (38.4% *vs* 29.4%) and more

underweight patients in the nondiabetic group (15.9% *vs* 8.5%). There was a statistically significant negative correlation between BMI and SGA ($\rho = -.438$; $p = 0.001$).

The reasons for hospitalization are shown in Table 2. Most nondiabetic patients were admitted for removal of a tumor (26.9%), while most diabetic patients were admitted due to heart disease (16.7%).

The sample was divided into two groups according to their SGA score. The well-nourished group (SGA score < 17) consisted of 275 participants and the moderate-to-severe malnutrition group ($17 \geq$ SGA score ≤ 22) consisted of 109 participants. Table 3 shows the prevalence ratios for malnutrition *vs* age, length of hospital stay, sex, smoking, presence of periodontitis, presence of diabetes, masticatory function, and number of teeth. Sex, number of teeth, length of hospital stay and masticatory function were associated with malnutrition in the univariate analysis. In the multivariate analysis, only sex, number of teeth and length of hospital stay remained associated with malnutrition (Table 4).

DISCUSSION

This study evaluated the oral health status of diabetic and nondiabetic patients hospitalized in medical and surgical wards at Hospital de Clínicas de Porto Alegre and found that having fewer teeth, being male, and having a prolonged hospital stay were associated with malnutrition. These findings are relevant because they indicate that the presence of poor oral health is one of the factors implicated in malnutrition in hospitalized patients.

Data from studies conducted worldwide show that 30 to 50% of medical and surgical patients have some degree of malnutrition [21] and, in hospitalized elderly patients, this rate can reach up to 90% [22]. Malnutrition in hospitalized individuals is the result of a number of factors, such as inadequate food intake, cognitive and physical decline, depressive symptoms, and emotional changes, and may be associated with the underlying disease and/or its treatment [23]. Malnutrition may develop during hospitalization or malnourished individuals may manifest a worsening nutritional status during hospital stay. The present study showed that prolonged hospital stay is associated with malnutrition (1.11 – 95%CI 1.02-1.20). This finding is consistent with the reports of prolonged hospital stay (> 2 weeks) in most malnourished patients [24, 25].

Being female was a protective factor against malnutrition (0.90 – 95%CI 0.84-0.96) in the present study. This finding is consistent with data from two previous studies also showing that women are less likely to be malnourished [7, 26]. Conversely, other studies have shown that being female is associated with an increased risk of malnutrition [27, 28]. These divergent results suggest that being female by itself should not be considered a risk factor for malnutrition, since it is associated with other factors such as disability and functional limitations [23].

Oral health can be assessed by different parameters, and having fewer natural teeth represents a real oral health outcome. Two cross-sectional studies showed that individuals who had 8 to 15 natural teeth had impaired masticatory ability and were therefore at increased risk of malnutrition [29, 30]. The present study showed similar results, as having 6 to 19 teeth (1.15 – 95%CI 1.03-1.28) or < 6 teeth (1.21 – 95%CI 1.04-1.41) was associated with malnutrition.

Prosthesis use alone has also been evaluated as a predictor of malnutrition. However, studies have found no association between using and not using dental prostheses in malnourished *vs* well-nourished individuals [4, 26]. It is risky to infer that prosthesis use will improve or worsen masticatory function and, in this way, might influence malnutrition, since the number of remaining natural teeth in prosthesis users contributes decisively to masticatory performance. In the present study, we used a variable combining prosthesis use and number of teeth (masticatory function). However, masticatory function was not associated with malnutrition (1.02 – 95%CI 0.91-1.15) in the adjusted analysis.

Individuals with poorer oral health status have reduced masticatory function and, therefore, tend to change their dietary practices by consuming soft, easy-to-chew foods that are often of low nutritional value [29, 31]. A possible explanation for this is that individuals with fewer teeth or wearing prostheses cannot chew or bite comfortably and are therefore less likely to consume high-fiber foods, such as fruits and vegetables, thus risking reducing their intake of essential nutrients [2, 32] and increasing the risk of malnutrition.

Diabetic participants had a worse periodontal status than nondiabetic participants, which is in line with studies showing that individuals with untreated

periodontitis have poorer glycemic control [9-11]. Our findings show low mean values for probing depth as compared to the mean values for attachment loss. This difference is likely to be related to the large number of lost teeth in the study population, indicating that the teeth that had a higher degree of inflammation and were affected by periodontitis had already been lost. In this scenario, the lack of association between periodontitis and malnutrition reported in the present study is justified, since, in older populations with high rates of tooth loss, the number of natural teeth becomes more representative as a measure of oral health status than all other clinical periodontal parameters [33].

SGA was chosen as the nutritional assessment tool in the present study because it is a good indicator of the risk of developing malnutrition-related complications in hospitalized patients. SGA differs from other nutritional assessment methods used in clinical practice in that it includes information on changes in nutrient intake, digestion and absorption as well as their effects on body function and composition [18].

This study has some limitations. First, due to the study design, the present results did not include a temporal component in the associations. Second, only generic data were used to determine masticatory function—other parameters commonly used to evaluate masticatory function in more detail, such as the quality of occlusal contacts and chewing ability, were not assessed in this study. Nevertheless, efforts should be made to improve oral health and nutritional status in all individuals, since some evidence suggests that a deficient oral health status may be a predictor of malnutrition [1, 3].

Two systematic reviews [34, 36] sought to clarify the existence of an association between clinical oral parameters and nutritional status. Both reviews

found that number of natural teeth is a potential predictor of nutritional status, showing that malnourished individuals have fewer teeth than well-nourished individuals. Regarding prosthesis use, Toniazzo et al [36] failed to show such an association, as this relationship may be masked by other variables such as the number of teeth and edentulism.

In conclusion, oral health status is associated with malnutrition in both diabetic and nondiabetic hospitalized patients, as are prolonged hospital stay and being male. The present results can only be extrapolated to populations of hospitalized patients. The implications of this study include the need to raise awareness among dental and nutrition professionals of the importance of good oral health for the maintenance of a good nutritional status in older and middle-aged adults in an attempt to reduce aging-related complications in these populations.

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LIST OF FIGURES AND TABLES

Figure 1

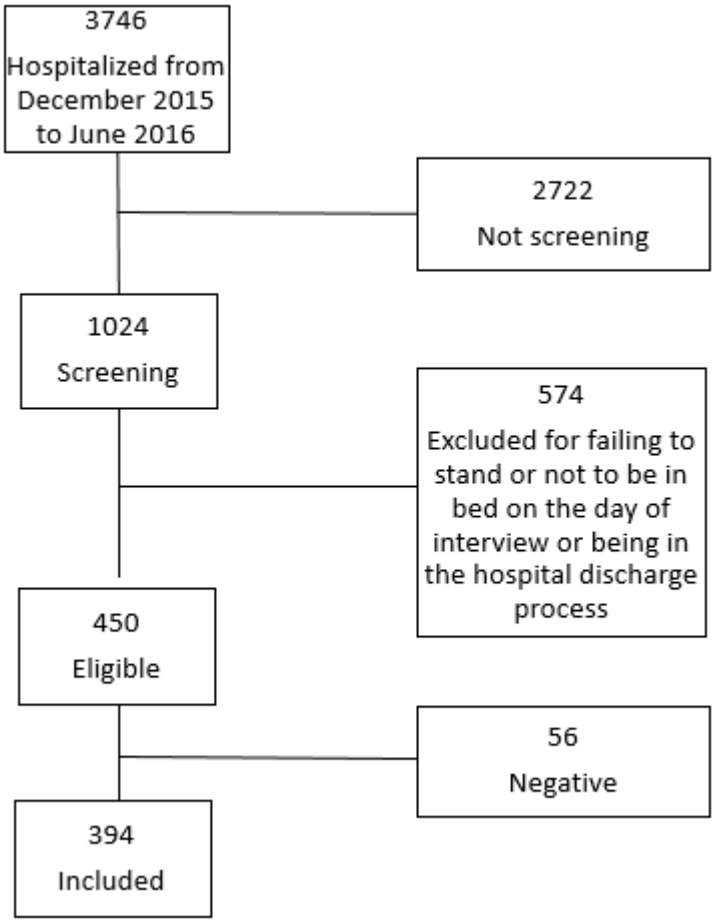
3746
Hospitalized from December 2015 to June 2016
2722
Not screening
1024
Screening
574
Excluded for failing to stand or not to be in bed on the day of interview or being in the hospital discharge process
450
Eligible
56
Negative
394
Included

Table 1- Socio-demographic characteristics, oral condition, nutritional status and glycated hemoglobin of the study population according to Subjective Global Assessment

	Normal Nutrition (275)	**Malnourished Moderate / Severe (109)**	**p-value**
Age (mean ± sd)	60.90±13.87	63.10±11.87	0.20[b]
Gender n(%)			
Female	139(50.5)	38(34.9)	
Male	136(49.5)	71(65.1)	0.00[a]
Study years (mean ±sd)	6.62±3.92	6.30±4.00	0.11[b]
Smoke status n(%)			
Non smoker	114(41,5)	34(31.2)	
Smoker	20(7.2)	13(11.9)	
Ex–smoker	141(51.3)	62(56.9)	0.10[a]
Hospitalization time (mean days ± sp)	16.35±14.54	20.89±15.31	0.00[b]
Socio-economic status n(%)			
Low	146(52.7)	60(55)	
Medium/ High	129(47.3)	49(45)	0.72[a]
Oral Conditions			
Edentulous	63(23.5)	34(31,8)	
Dentate	212(76.5)	75(68,8)	0.09[a]
VPI (% mean sites ± sd)	54.24±25.60	62.83±25.91	0.00[b]
GBI (% mean ± sd)	23.45±23.62	32.44±27.26	0.01[b]
PRF(% mean sites ± sd)	26.01±27.35	39.61±41.15	0.00[b]
PD (mean ±sd)	2.12±0.78	1.94±0.54	0.13[b]
CAL (mean ±sd)	4.07±1.82	4.68±1.86	0.00[b]
BOP(% mean sites ± sd)	10.07±11.22	9.29±9.98	0.82[b]
FTUs (mean ±sd)	2.33±3.74	1.19±0.2.81	0.00[b]
Number of teeth present (mean ±sd)	11.92±9.46	8.07±8.25	0.00[b]
Systemic antibiotics n(%)			
Yes	149(53.7)	65(59.6)	0.33[a]
No	126(46.3)	44(40.4)	
Prosthetic used n(%)			
No use	100(36.1)	27(24.8)	0.02[a]
Use	177(63.9)	82(75.2)	
Diabetes n(%)			
No	144 (51.9)	54(49,5)	
Yes	135(48.1)	55(50,5)	0.80[a]
BMI (média±dp)	28.43±5.39	22.32±3.73	
Obese	125(45.1)	5(4.6)	
Overweight	34(12.3)	7(6.4)	
Eutrophic	113(40.8)	53(48,6)	
Low weight	3(1.8)	44(40.4)	0.00[a]
Albumin (mean±sd)	3.85±0.63	3.49±0.79	0.00[b]
Hba1c (mean±sp)	6.50±1.75	6.25±1.52	0.63[b]

a-chi-squared test b- Mann- Whitney

Table 2 - Reason for hospitalization

Reason for hospitalization n(%)	Normal Nutrition (n=275)	Malnourished Moderate / Severe (n=109)
Tumor	56(20.3)	27(24.8)
Heart diseases	60(21.8)	15(13.8)
Kidney diseases	16(5.8)	6(5.5)
Orthopedics	31(11.3)	4(3.7)
Gynecological diseases	6(2.2)	1(1)
Lung diseases	24(8.7)	10(9.2)
Gastrointestinal diseases	35(12.7)	22(20.2)
Exams	33(12)	17(15.6)
Endocrine diseases	14(5.2)	7(6.2)

Table 3: Univariate analysis of potential predictors of malnutrition in a sample of 384 patients admitted to Clínicas Hospital of Porto Alegre, between December 2015 and June 2016.

	Normal Nutrition (n=275)	**Malnourished Moderate / Severe (n=109)**	**RP****	**95% CI**	***p*-value**
Gender					
Male	136	71	1		
Female	139	38	0.90	(0.84-0.96)	0.00
Age (years)					
< 60 anos	107	34	1		
≥ 60 anos	168	75	1.05	(0.98-1.13)	0.15
Smoke status					
Non smoker	114	34	1		
Ex –smoker	141	62	1.06	(0.98-1.14)	0.11
Smoker	20	13	1.13	(0.99-1.29)	0.06
Socio-economic status					
Medium/ High	129	49	1		
Low	146	60	1.01	(0.94-1.08)	0.72
Periodontite*					
No	206	72	1		
Yes	69	37	1.07	(0.94-1.08)	0.08
Diabetes					
No	140	54	1		
Yes	135	55	1.00	(0.94-1.08)	0.80
Hospitalization time					
< 23 days	213	72	1		
≥ 23 days	62	37	1.09	(1.01-1.18)	0.02
Functional masticatory capacity					
≥19 teeth with or without prosthesis	83	15	1		
<19 teeth with prosthesis	165	80	1,15	(1,02- 1,31)	0,00
<19 teeth without prosthesis	27	14	1,16	(1,06-1,24)	0,01
Numbers of teeth present					
≥ 19	83	15	1		
< 19 and ≥ 6	104	43	1.12	(1.03-1.21)	0.00
< 6	88	51	1.18	(1.08-1.29)	0.00

*Prevalence ratio
* Periodontite moderada definida por Page e Eke, 2007[35]

Table 4: Multivariate analysis of potential predictors of malnutrition in a sample of 384 patients admitted to Clínicas Hospital of Porto Alegre, between December 2015 and June 2016.

	RP**	**95% CI**	***p*-value**
Age (years)			
< 60 anos	1		
≥ 60 anos	0.99	(0.91-1.07)	0.92
Gender			
Male	1		
Female	0.87	(0.81-0.94)	0.00
Periodontal inflammation			
No	1		
Yes	1.02	(0.91-1.15)	0.68
Numbers of teeth present			
≥ 19	1		
< 19 and ≥ 6	1.15	(1.03-1.28)	0.01
< 6	1.21	(1.04-1.41)	0.01
Smoke status			
Non smoker	1		
Ex –smoker	0.99	(0.92-1.07)	0.84
Smoker	1.07	(0.94-1.23)	0.28
Hospitalization time			
< 23 days	1		
≥ 23 days	1.11	(1.02-1.20)	0.00
Functional masticatory capacity			
≥19 teeth with or without prosthesis	1		
<19 teeth with prosthesis	1		
<19 teeth without prosthesis	1,02	(0,91-1,15)	0,69

* Periodontite moderada definida por Page e Eke, 2007[35]

**Prevalence ratio

6 COSIDERAÇÕES FINAIS

O presente estudo faz parte do projeto intitulado “Avaliação do estado bucal e do estado nutricional de pacientes diabéticos e não diabéticos internados no Hospital de Clínicas de Porto Alegre”. Teve como objetivo avaliar relação entre condição bucal e estado nutricional em sujeitos diabéticos e não diabéticos internados nas enfermarias clínicas e cirúrgicas do Hospital de Clínicas de Porto Alegre.

Os resultados deste estudo colaboram com as evidências de que a condição de saúde bucal está associada com desnutrição tanto em pacientes diabéticos quanto não diabéticos internados, assim como internação por tempo prolongado e pertencer ao sexo masculino. As implicações deste estudo incluem a necessidade de aumentar a consciência por profissionais da Odontologia e da Nutrição da importância de manter saúde bucal para a manutenção de um bom estado nutricional em idosos e adultos de meia idade visando diminuir complicações em decorrência do envelhecimento nessas populações.

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ANEXOS

ANEXO A - Termo de Consentimento Livre e Esclarecido

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

(Grupo de Casos)

Você está sendo convidado (a) a participar de um projeto de pesquisa chamado "Avaliação da saúde bucal e do estado nutricional de pacientes diabéticos e não diabéticos internados no Hospital de Clínicas de Porto Alegre". Pertencemos a um grupo de pesquisa multidisciplinar composto por médicos, dentistas e nutricionistas da Universidade Federal do Rio Grande do Sul (UFRGS) realizado em colaboração com o Hospital de Clínicas de Porto Alegre (HCPA). O projeto tem como objetivo estudar a saúde bucal e o estado nutricional de pessoas com diabetes. Você está sendo convidado a participar porque possui o diagnóstico de diabetes.

Se você aceitar participar desse estudo, realizaremos uma avaliação clínica através de exame dentário e nutricional, além de fazer perguntas sobre uso de medicações, hábitos alimentares e de vida. Também será necessário consultar alguns dados em seu prontuário durante a sua estada no hospital, para que possamos coletar informações de exames laboratoriais realizados rotineiramente na sua internação hospitalar. Serão consultados dados de há quanto você possui o diagnóstico de diabetes, se você tem outras doenças associadas, quais medicações faz uso e informações sobre hábitos de vida. Além disso, você responderá dois questionários, um sobre qualidade de vida bucal e outro sobre a sua percepção sobre doenças nas gengivas.

Mediremos também seu peso, altura e a região ao redor de seu braço para saber como está seu estado nutricional. Faremos um exame dos seus dentes e da sua gengiva, e se você for diagnosticado com alguma necessidade de tratamento dentário será encaminhado para atendimento nas clínicas de graduação da Faculdade de Odontologia da UFRGS. Você também receberá orientações de como realizar sua própria higiene bucal no período em que estiver internado.

Os desconfortos possíveis da sua participação no estudo são o preenchimento dos questionários, o que levará em torno de 15 minutos e algum desconforto pelas medições que serão realizadas no seu corpo. O exame bucal é igual ao usualmente realizado em consultas dentárias, alguns pacientes podem perceber desconforto ou sensibilidade leve durante este exame, sem necessitar o uso de anestésicos. Na última parte deste exame você ficará com a boca fechada por 2 minutos e após será coletada a saliva que estiver na sua boca. A saliva será avaliada para ver a presença de bactérias e após será devidamente descartada. O possível benefício da sua participação é receber as orientações sobre higiene bucal e o encaminhamento, caso necessário, para tratamento dentário.

A participação neste estudo é totalmente voluntária, a não participação ou desistência após ingressar no estudo não implicará em nenhum tipo de prejuízo para o participante. Todas as informações obtidas através desse estudo poderão ser publicadas com finalidades científicas. Os pesquisadores se comprometem em manter a confidencialidade dos seus dados de identificação pessoal e os resultados serão divulgados de maneira agrupada, ou seja, você não será identificado.

Não está previsto nenhum tipo de pagamento pela participação no estudo e também não haverá nenhum custo com os procedimentos envolvidos.

Todas as dúvidas poderão ser esclarecidas antes e durante o curso da pesquisa, através do contato com a pesquisadora responsável, a Prof.ª Ticiana da Costa Rodrigues, pelo telefone 3359-8127 ou 3308-5318, ou com o Comitê de Ética em Pesquisa, através do telefone (51) 3359-7640, com horário de atendimento das 8 às 17h de segunda a sexta-feira, ou no 2º andar do HCPA sala 2227.

Entendi as informações que me foram dadas e concordo livremente em participar do estudo.

Este documento está elaborado em duas vias: uma pertencente ao pesquisador e outra ao participante.

Nome do participante _____

Assinatura _____

Nome do pesquisador _____

Assinatura _____

Local e data: Porto Alegre, ..., ... de 201...

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO
(Grupo de Controles)

Você está sendo convidado (a) a participar de um projeto de pesquisa chamado “Avaliação da saúde bucal e do estado nutricional de pacientes diabéticos e não diabéticos internados no Hospital de Clínicas de Porto Alegre”. Pertencemos a um grupo de pesquisa multidisciplinar composto por médicos, dentistas e nutricionistas da Universidade Federal do Rio Grande do Sul (UFRGS) realizado em colaboração com o Hospital de Clínicas de Porto Alegre (HCPA). O projeto tem como objetivo estudar a saúde bucal e o estado nutricional de pessoas com diabetes. Você está sendo convidado a participar como grupo controle, um grupo que servirá de comparação para pacientes com diabetes, portanto você não possui o diagnóstico de diabetes e está internado no hospital para realizar algum outro tratamento de saúde.

Se você aceitar participar desse estudo, realizaremos uma avaliação clínica através de exame dentário e nutricional, além de fazer perguntas sobre uso de medicações, hábitos alimentares e de vida. Também será necessário consultar alguns dados em seu prontuário durante a sua estada no hospital, para que possamos coletar informações de exames laboratoriais realizados rotineiramente na sua internação hospitalar. Serão consultados dados sobre seu diagnóstico, se você tem outras doenças associadas, quais medicações faz uso e informações sobre hábitos de vida. Além disso, você responderá dois questionários, um sobre qualidade de vida bucal e outro sobre a sua percepção sobre doenças nas gengivas.

Mediremos também seu peso, altura e a região ao redor de seu braço para saber como está seu estado nutricional. Faremos um exame dos seus dentes e da sua gengiva, e se você for diagnosticado com alguma necessidade de tratamento dentário será encaminhado para atendimento nas clínicas de graduação da Faculdade de Odontologia da UFRGS. Você também receberá orientações de como realizar sua própria higiene bucal no período em que estiver internado.

Os desconfortos possíveis da sua participação no estudo são o preenchimento dos questionários, o que levará em torno de 15 minutos e algum desconforto pelas medições que serão realizadas no seu corpo. O exame bucal

é igual ao usualmente realizado em consultas dentárias, alguns pacientes podem perceber desconforto ou sensibilidade leve durante este exame, sem necessitar o uso de anestésicos. Na última parte deste exame você ficará com a boca fechada por 2 minutos e após será coletada a saliva que estiver na sua boca. A saliva será avaliada para ver a presença de bactérias e após será devidamente descartada. O possível benefício da sua participação é receber as orientações sobre higiene bucal e o encaminhamento, caso necessário, para tratamento dentário.

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Este documento está elaborado em duas vias: uma pertencente ao pesquisador e outra ao participante.

Nome do participante _____ Assinatura _____

Nome do pesquisador _____ Assinatura _____

Local e data: Porto Alegre, ..., ... de 201...

ANEXO B - Entrevista

Registro pesquisa: _____ Número do prontuário: _____

I - IDENTIFICAÇÃO

1-Iniciais: _____-

_____

2- Telefones para contato:

_____

3 - Data de nascimento: _____ 4 - Idade: _____

5- Motivo da internação:

_____

6 –Cor da Pele: 1☐ branco 2 ☐pretas 3☐ amarela 4☐ parda 5☐ indígena

II – NÍVEL EDUCACIONAL

7 - Anos de estudo: _____

8 – Até que nível você estudou?

Analfabeto / Fundamental I incompleto	
Fundamental I completo / Fundamental II incompleto	
Fundamental completo/Médio incompleto	
Médio completo/Superior incompleto	
Superior complete	

III – NÍVEL SÓCIO ECONÔMICO:

9 –

		Quantidade Que Possui			
ITENS DE CONFORTO	NÃO POSSUI	1	2	3	+4
Quantidade de banheiros					
Quantidade de automóveis de passeio exclusivamente para uso particular					
Quantidade de empregados mensalistas, considerando apenas os que trabalham pelo menos cinco dias por semana					
Quantidade de máquinas de lavar roupa, excluindo tanquinho					
DVD, incluindo qualquer dispositivo que leia DVD e desconsiderando DVD de automóvel					
Quantidade de geladeiras					
Quantidade de freezers independentes ou parte da geladeira duplex					
Quantidade de microcomputadores, considerando computadores de mesa, laptops, notebooks e netbooks e desconsiderando tablets, palms ou smartphones					
Quantidade de lavadora de louças					

Quantidade de fornos de micro-ondas					
Quantidade de motocicletas, desconsiderando as usadas exclusivamente para uso profissional					
Quantidade de máquinas secadoras de roupas, considerando lava e seca					

10- A água utilizada neste domicílio é proveniente de?

1	Rede geral de distribuição
2	Poço ou nascente
3	Outro meio

11- Considerando o trecho da rua do seu domicílio, você diria que a rua é:

1	Asfaltada/Pavimentada
2	Terra/Cascalho

12 – Qual o estudo do chefe da sua casa?

Analfabeto / Fundamental I incompleto	
Fundamental I completo / Fundamental II incompleto	
Fundamental completo/Médio incompleto	
Médio completo/Superior incompleto	
Superior complete	

IV – HÁBITOS

13 - Você fuma ou já fumou?
1☐ Não (pular para a questão 20)
2☐ Sim, fumo
3☐ Sim, parei (ir para questão 17)

14 – Há quanto tempo você fuma? ☐anos ☐ meses ☐ dias

15 - Quantos cigarros por dia você fuma agora? _____cigarros/dia

16 - Com que idade você iniciou a fumar? _____

17 - Há quanto tempo você parou de fumar?☐ anos ☐ meses ☐ dias

18 - Quantos cigarros por dia você fumava antes de parar?
_____cigarros/dia

19 - Por quanto tempo você fumou? ☐ anos ☐ meses ☐ dias

20 - Você toma bebidas alcoólicas?
1 ☐ nunca (pular para questão 22)
2 ☐ raramente
3 ☐ algumas vezes
4 ☐ frequentemente

21 – Qual tipo? 1☐ nenhum 2 ☐ cerveja 3☐ cachaça 4☐ vinho
5 ☐outros

22 - Quantas doses/copos você, geralmente, ingere por semana:
_____

23 – Você utiliza algum tipo de droga? 1 ☐ Não (pular para questão 25)
2 ☐ Sim

24 – Se afirmativo, qual é o tipo? _____

V - DADOS ODONTOLÓGICOS

25 – Quando você limpa os dentes?

_____

26 – O que você usa para limpar os dentes?

_____

27 – Você faz a limpeza entre os dentes?

1 ☐ Não (pular para a questão 29)

2 ☐ Sim

28– O que você usa para limpar entre os dentes?

_____

29 – Quantas vezes você usa esse instrumento na semana? _____

30 – Qual o tipo de escova que você usa? ☐ macia ☐ média ☐ dura

31 – Qual o tipo de pasta de dentes que você usa?

_____

32 – Você nota sangramento nas suas gengivas?

1☐Não (pular para questão 34) 2 ☐ Sim

33–Se afirmativo, quando ele ocorre?

_____

34 – Você sente sensibilidade nos dentes? 1 ☐ Não 2☐ Sim

35 – Você tem as gengivas inchadas? 1 ☐ Não 2☐ Sim

36 – Você sente mau gosto na boca? 1 ☐ Não 2 ☐ Sim

37 – Você sente seus dentes frouxos? 1 ☐ Não 2 ☐ Sim

38 – Nesse período de sua internação você tem realizado sua higiene bucal?

1( ) Não 2( ) Sim

39 – Você consegue realizar sua higiene bucal sozinho? 1( ) Não 2( ) Sim

40 – Se não, quem o auxilia na sua higiene bucal?

_____

41 – Você recebeu alguma orientação quanto a realização da higiene bucal nesse período que está internado? 1( ) Não 2( ) Sim. Qual (s)?

_____

VI – ORAL HEALTH IMPACT PROFILE 14 (validado para uso no Brasil)

Nos últimos 6 meses, por causa de problemas com seus dentes, sua boca ou dentadura:

38– Você teve problemas para falar alguma palavra?

nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

39 – Você sentiu que o sabor dos alimentos tem piorado?

nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

40 – Você sentiu dores em sua boca ou nos seus dentes?

nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

41 – Você se sentiu incomodado ao comer algum alimento?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

42 – Você ficou preocupado?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

43 – Você se sentiu estressado?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

44 – Sua alimentação ficou prejudicada?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

45 – Você teve que parar suas refeições?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

46 – Você encontrou dificuldade para relaxar?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

47 – Você se sentiu envergonhado?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

48– Você ficou irritado com outras pessoas?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

49 – Você teve dificuldade para realizar suas atividades diárias?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

50– Você sentiu que a vida, em geral, ficou pior?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

51 – Você ficou totalmente incapaz de fazer suas atividades diárias?
nunca ( ) raramente ( ) às vezes ( ) repetidamente ( ) sempre ( )

VIII - AUTO PERCEPÇÃO DE PERIODONTITE (validado para uso no Brasil)

52-Você acha que pode ter doença de gengiva?
( ) Sim, ( ) Não, ( ) Não sei, ( ) Recusou-se

53- No geral, como você classificaria a saúde de seus dentes e gengivas?
( ) Excelente ( ) Muito boa ( ) Boa ( ) Razoável ( ) Ruim

( ) Não sei ( ) Recusou-se

54- Você já fez algum tratamento para doença de gengiva, como raspagem ou alisamento radicular, algumas vezes chamado de limpeza profunda?

( ) Sim ( ) Não ( ) Não sei ( ) Recusou-se

55- Você já teve um dente que “caiu sozinho”, sem ter sofrido nenhum problema?
( ) Sim ( ) Não ( ) Não sei ( ) Recusou-se

56- Algum dentista já lhe informou que você tem perda óssea ao redor dos seus dentes?
( ) Sim ( ) Não ( ) Não sei ( ) Recusou-se

57- Nos últimos 3 meses, você percebeu que tenha algum dente que não está bem?
( ) Sim ( ) Não ( ) Não sei ( ) Recusou-se

58- Além de escovar os seus dentes com escova de dentes, nos últimos 7 dias, quantas vezes você usou fio dental ou outro material para limpar entre os dentes?
( ) Nenhuma ( ) 1vez ( ) 2 vezes ( ) 3 vezes ( ) 4 vezes

( ) 5 vezes ( ) 6 vezes ( ) 7 vezes ( ) Não sei

59- Além de escovar os seus dentes com escova de dentes, nos últimos 7 dias, quantas vezes você usou bochecho ou outro líquido para tratar doenças ou problemas dentários?
( ) Nenhuma ( ) 1vez ( )2 vezes ( ) 3 vezes ( ) 4 vezes
( ) 5 vezes ( )6 vezes ( ) 7 vezes ( ) Não sei

ANEXO C- Ficha Clínica

NOME DO PACIENTE: DATA: EXAMINADOR ☐ CH ☐ P

	17			16			15			14			13			12			11			21			22			23			24			25			26			27		
	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV
IP																																										
IG																																										
FR																																										
	DP	P	MP	DP	P	MP	DP	P	MP	DP	P	MP	DP	P	MP	DP	P	MP	DP	P	MP	MP	P	DP	MP	P	DP	MP	P	DP	MP	P	DP	MP	P	DP	MP	P	DP	MP	P	DP
IP																																										
IG																																										
FR																																										

	47			46			45			44			43			42			41			31			32			33			34			35			36			37		
	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV
IP																																										
IG																																										
FR																																										
	DL	L	ML	DL	L	ML	DL	L	M;	DL	L	ML	DL	L	ML	DL	L	ML	DL	L	ML	ML	L	DL	ML	L	DL	ML	L	DL	ML	L	DL	ML	L	DL	ML	L	DL	MD	L	DL
IP																																										
IG																																										
FR																																										

	17			16			15			14			13			12			11			21			22			23			24			25			26			27		
	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV
PS																																										
PI																																										
SI																																										
	DP	P	MP	DP	P	MP	DP	P	MP	DP	P	MP	DP	P	MP	DP	P	MP	DP	P	MP	MP	P	DP	MP	P	DP	MP	P	DP	MP	P	DP	MP	P	DP	MP	P	DP	MP	P	DP
PS																																										
PI																																										
SI																																										
CPOD																																										

	47			46			45			44			43			42			41			31			32			33			34			35			36			37		
	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	DV	V	MV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV	MV	V	DV
PS																																										
PI																																										
SI																																										
	DL	L	ML	DL	L	ML	DL	L	MV	DL	L	ML	DL	L	ML	DL	L	ML	DL	L	ML	ML	L	DL	ML	L	DL	ML	L	DL	ML	L	DL	ML	L	DL	ML	L	DL	ML	L	DL
PS																																										
PI																																										
SI																																										
CPOD																																										

ANEXO D- Avaliação Subjetiva Global

Avaliação Nutricional Subjetiva Global

A)Peso corporal

MUDOU nos últimos meses(1) ( ) sim ( ) não

Continua perdendo peso(1) ( ) sim ( ) não

Peso atual (em kg): _____

Peso usual(em kg): _____

PERDA DE PESO (%): _____

Se>10% (2)_____

Se<10% (1)_____ **Total de pontos:** _____

B) Alimentação

Mudança de dieta (1) ( ) sim ( ) não

Se mudou foi para:

(1) hipocalórica

(2) pastosa

(2) líquida > 15 dias ou solução intravenosa>5 dias

(3) jejum>5 dias

(2) hipercalórica **Total de pontos:** _____

C)Sintomas gastrointestinais

(1) disfagia

(1) náuseas

(1) vômito

(1) diarreia

(2)dor abdominal, distenção abdominal

(2) não consegue comer

(3) dor para engolir

D)Capacidade funcional (por mais de 2 semanas)

(1)deambula sem auxílio

(2) deambula com auxílio

(3)acamado

E)Diagnóstico da doença

(1) baixo estresse

(2) moderado estresse

(3) alto estresse

F)Exame físico

(0) normal

(+1ponto) se leve ou moderadamente depletado

(+2pontos) se gravemente depletado

( ) PERDA DE GORDURA SUBCUTÂNEA TRÍCEPS OU TÓRAX

( ) PERDA DE GORDURA NO MÚSCULO ESTRIADO

( )EDEMA SACRAL

( ) ASCITE

( ) EDEMA TORNOZELO **Total de pontos:** _____

Somatória geral de todos os pontos: _____

G)Classificação

Bem nutrido <17 pontos

Desnutrido moderado 17≤ 22 pontos

Desnutrido Grave >22 pontos

HOSPITAL DE CLÍNICAS DE PORTO ALEGRE - HCPA / UFRGS

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Avaliação da saúde bucal e do estado nutricional de pacientes diabéticos e não diabéticos internados no Hospital de Clínicas de Porto Alegre.

Pesquisador: Ticiana da Costa Rodrigues

Área Temática:

Versão: 2

CAAE: 48935015.0.0000.5327

Instituição Proponente: Hospital de Clínicas de Porto Alegre

Patrocinador Principal: Hospital de Clínicas de Porto Alegre
Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 1.300.492

Apresentação do Projeto:

Projeto de Pesquisa: Avaliação da saúde bucal e do estado nutricional de pacientes diabéticos e não diabéticos internados no Hospital de Clínicas de Porto Alegre. Trata-se de estudo observacional transversal, a ser realizado nas enfermarias clínicas do Hospital de Clínicas de Porto Alegre.

Pacientes com diabete melitus (DM) estão em maior risco de periodontite, em comparação a indivíduos sem DM. Um único estudo observou que a falta de assistência à saúde bucal está associada a maior necessidade e uso de assistência medica, seja em internações hospitalares, idas à emergência ou consultas clínicas.

O presente trabalho pretende estudar e entender as possíveis relações entre doenças periodontais e condições clínicas que motivam atendimento hospitalar e consequente internação em indivíduos com e sem diabetes, e se isso teria algum diferencial no estado nutricional destes pacientes. A falta de conhecimento na literatura motivou nosso estudo.

Hipótese:

Pacientes diabéticos internados possuem pior condição bucal e nutricional se comparados a pacientes não diabéticos.

Critério de Inclusão:

Endereço: Rua Ramiro Barcelos 2.350 sala 2227 F
Bairro: Bom Fim **CEP:** 90.035-903
UF: RS **Município:** PORTO ALEGRE
Telefone: (51)3359-7640 **Fax:** (51)3359-7640 **E-mail:** cephcpa@hcpa.edu.br

Serão incluídos pacientes diabéticos e não diabéticos internados nas enfermarias clínicas do Hospital de Clínicas de Porto Alegre (HCPA).
Critério de Exclusão:
Serão excluídos pacientes que apresentarem comorbidades que impeçam o exame odontológico ou que necessitam de quimioprofilaxia antimicrobiana para a realização do exame odontológico.
Metodologia Proposta:
A estimativa de tamanho amostral prevê um mínimo de 394 indivíduos. Os dados médicos serão buscados no prontuário dos pacientes internados e compreenderão: duração do diabetes, presença de complicações associados ao diabetes, uso de medicações, IMC, uso de álcool e fumo, e exames laboratoriais (dosagem de albumina sérica e hemoglobina glicada HbA1c), contagem de leucócitos e transferrina). Também serão aplicados o questionário OHIP-14 e o questionário de auto percepção de periodontite, ambos validados para população brasileira. A avaliação nutricional será feita com a escala Avaliação Subjetiva Global produzida pelo paciente – ASG-PPP para determinar a presença e severidade da desnutrição em cada paciente. O exame odontológico será realizado no leito e serão aferidos, em todos os dentes presentes, Índice de Placa, Índice Gengival, Fatores retentivos de placa, Profundidade de Sondagem, Sangramento Periodontal, Perda de inserção e Índice CPOD. Também serão contados o número de dentes e número de pares oclusais. Após o exame, será coletado saliva não estimulada para determinar a diversidade microbiana e verificar a presença de genes de resistência a agentes antimicrobianos.

Objetivo da Pesquisa:
Objetivo Primário:
O objetivo geral do presente estudo é estudar a condição bucal em pacientes diabéticos e não diabéticos internados nas enfermarias clínicas do Hospital de Clínicas de Porto Alegre.
Objetivo Secundário:
Os objetivos específicos do presente estudo são:
- Descrever a condição bucal de pacientes diabéticos e não diabéticos internados;
- Caracterizar qualidade de vida relacionada à saúde bucal e auto percepção de periodontite em pacientes diabéticos e não diabéticos internados;
- Estudar a relação entre perda dentária e estado nutricional em pacientes diabéticos internados;
- Determinar a diversidade microbiana e verificar a presença de genes de resistência a agentes antimicrobianos em pacientes diabéticos e não diabéticos internados;
- Avaliar possíveis desfechos clínicos e tempo de internação em relação à saúde bucal.

Avaliação dos Riscos e Benefícios:

Riscos:

Os desconfortos possíveis da participação são o preenchimento dos questionários, o que levará em torno de 15 minutos, e o exame bucal. Alguns pacientes podem perceber desconforto ou sensibilidade leve durante este exame, sem necessitar o uso de anestésicos.

Benefícios:

Após os exames, se os pacientes forem diagnosticados com alguma necessidade de tratamento odontológico este serão encaminhados para receber atendimento nas clínicas de graduação da Faculdade de Odontologia da Universidade Federal do Rio Grande do Sul. Também receberão orientações de como realizar sua própria higiene bucal, no período em que estiverem internados.

Comentários e Considerações sobre a Pesquisa:

Será realizada uma entrevista para coletar informações sobre dados pessoais, sócio demográficos, história odontológica e percepção de saúde bucal. Também serão aplicados dois questionários: o OHIP-14, validado para população brasileira, que avalia o impacto da saúde oral na qualidade de vida e o questionário de autopercepção de periodontite que avalia a capacidade do paciente reconhecer ou não a presença de periodontite. Os dados médicos serão buscados no prontuário dos pacientes internados e compreenderão: duração do diabetes, presença de complicações associados ao diabetes, uso de medicações, IMC, uso de álcool e fumo.

Além das medidas de peso e de altura para o cálculo de índice de massa corporal, será utilizada uma escala chamada PG- SGA33, para determinar a presença e severidade da desnutrição em cada paciente. A escala será aplicada por um aluno de iniciação científica treinado no mesmo. Esta escala foi traduzida e validada para versão em português e é chamada de Avaliação Subjetiva Global produzida pelo paciente – ASGPPP35.

A reserva de tecido muscular pode ser estimada antropometricamente pela circunferência muscular do braço (CMB), obtida a partir dos valores de circunferência do braço (CB) e de prega cutânea tricipital (PCT). A estimativa de gordura corporal será realizada através da circunferência do braço e da prega cutânea triciptal. Com uma fita métrica inelástica e sem compressão, será mensurada a CB, localizada no ponto médio do braço esquerdo entre o acrômio da escápula e o olecrano com o braço relaxado. A dobra cutânea tricipital será medida no mesmo ponto médio localizado para a medida da circunferência braquial, com o indivíduo em pé, com o braço paralelo ao tronco. O aparelho utilizado para a realização desta medida será um adipômetro científico. O ponto de corte será classificado de acordo com o percentil considerando sexo e idade, conforme o sugerido por Frisancho.

Medida da circunferência do pescoço, abdominal e panturrilha.
Utilizaremos os dados dos exames laboratoriais que o próprio paciente já possua como: dosagem de albumina sérica e hemoglobina glicada (HbA1c), bem como a contagem de leucócitos e transferrina. Serão considerados os exames iniciais da chegada do paciente (dentro da primeira semana de internação).
Um examinador treinado fará o exame odontológico no leito. Os procedimentos de treinamento serão prévios ao estudo até que se obtenha reprodutibilidade satisfatória, definida por valor de kappa ponderado (±1 mm) superior a 0,80.
Serão examinados 6 sítios por dente de todos os dentes presentes com exceção de terceiros molares. Serão aferidos: Índice de Placa, Índice Gengival, Fatores retentivos de placa, Profundidade de Sondagem, Sangramento Periodontal, Perda de inserção e Índice CPOD (Ficha Clínica – Anexo 3) e serão contados o número de dentes e número de pares oclusais. O exame odontológico será realizado após entrevista e avaliação do estado nutricional. Após exame odontológico será coletada saliva não estimulada em tubo plástico do tipo Falcon, previamente esterilizado. O paciente será instruído a cuspir dentro do tubo plástico,por 1 minuto. Serão atribuídos códigos às amostras, e as mesmas serão armazenadas em freezer, a -20°C.
A caracterização das comunidades microbianas das amostras de saliva será feita por meio da análise do polimorfismo dos fragmentos terminais de restrição (terminal restriction fragment lenght polymorphism).
Após o exame odontológico, os pacientes receberão bochecho de 1 minuto com solução de óleos essenciais sem álcool. Todos participantes receberão informações por escrito a respeito de higiene bucal e autocuidado, com enfoque especial para o período de internação. Acompanhantes/ familiares receberão informações e instruções nos casos que isso se fizer necessário. Todos participantes que apresentarem necessidade de assistência odontológica serão encaminhados para atendimento na Faculdade de Odontologia da UFRGS.
Para as análises univariadas será utilizado teste t de Student não-pareado ou pareado conforme o caso para comparação de 2 médias e ANOVA para comparação de 3 ou mais médias. As variáveis categóricas serão analisadas pelo teste qui-quadrado. As correlações serão analisadas pelos testes de Pearson e Spearman conforme for apropriado. Nas análises multivariadas serão realizadas regressão logística e regressão linear múltipla para desfechos categóricos ou contínuos, respectivamente.

Considerações sobre os Termos de apresentação obrigatória:

Apresenta TCLE para casos e outro para controles.

Recomendações:

Nada a recomendar.

Conclusões ou Pendências e Lista de Inadequações:

As pendências emitidas para o projeto no parecer 1.253.935 foram adequadamente respondidas pelos pesquisadores de acordo com a carta de respostas adicionada em 20/10/2015. Não apresenta novas pendências.

Considerações Finais a critério do CEP:

Lembramos que a presente aprovação (versão do projeto de 04/09/2015,TCLEs de 20/10/2015 e demais documentos submetidos até a presente data, que atendem às solicitações do CEP) refere-se apenas aos aspectos éticos e metodológicos do projeto.

Projeto cadastrado no sistema WebGPPG sob número 15-0403.

O projeto somente poderá ser iniciado após aprovação final da Comissão Científica, através do Sistema WebGPPG.

Qualquer alteração nestes documentos deverá ser encaminhada para avaliação do CEP. Informamos que obrigatoriamente a versão do TCLE a ser utilizada deverá corresponder na íntegra à versão vigente aprovada. A comunicação de eventos adversos classificados como sérios e inesperados, ocorridos com pacientes incluídos no centro HCPA, assim como os desvios de protocolo quando envolver diretamente estes pacientes, deverá ser realizada através do Sistema GEO (Gestão Estratégica Operacional) disponível na intranet do HCPA.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_564939.pdf	20/10/2015 16:32:02		Aceito
Recurso Anexado pelo Pesquisador	RespostaadiligenciaHCPA.pdf	20/10/2015 16:31:37	Mirian Paola Toniazzo	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLEcontroles.pdf	20/10/2015 16:30:24	Mirian Paola Toniazzo	Aceito
TCLE / Termos de	TCLEcasos.pdf	20/10/2015	Mirian Paola	Aceito

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Continuação do Parecer: 1.300.492

Assentimento / Justificativa de Ausência	TCLEcasos.pdf	16:30:11	Toniazzo	Aceito
Declaração de Pesquisadores	delegacaofuncoes.pdf	04/09/2015 17:44:00	Mirian Paola Toniazzo	Aceito
Declaração de Pesquisadores	utilizacaodados.pdf	04/09/2015 17:42:56	Mirian Paola Toniazzo	Aceito
Declaração de Pesquisadores	dadosinstitucionais.pdf	04/09/2015 17:41:44	Mirian Paola Toniazzo	Aceito
Declaração de Pesquisadores	dadosinstitucionais.pdf	04/09/2015 17:40:11	Mirian Paola Toniazzo	Aceito
Declaração de Manuseio Material Biológico / Biorepositório / Biobanco	Materialbiologico.pdf	04/09/2015 17:32:40	Mirian Paola Toniazzo	Aceito
Projeto Detalhado / Brochura Investigador	Projeto.pdf	04/09/2015 17:32:13	Mirian Paola Toniazzo	Aceito
Folha de Rosto	folha de rosto.pdf	13/08/2015 10:20:29		Aceito

Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

PORTO ALEGRE, 28 de Outubro de 2015

Assinado por:
José Roberto Goldim
(Coordenador)

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