UNIVERSIDADE ESTADUAL DE CAMPINAS
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MARIANA OLIVEIRA BESSELER

PERFIL CARDIOLÓGICO, ODONTOLÓGICO E QUALIDADE DE VIDA RELACIONADA À SAÚDE BUCAL DE PACIENTES COM HISTÓRICO DE FEBRE REUMÁTICA.

CARDIOLOGICAL, DENTAL PROFILE AND QUALITY OF LIFE RELATED TO ORAL HEALTH OF PATIENTS WITH HISTORY OF RHEUMATIC FEVER.

Piracicaba
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DENTAL, CARDIOLOGICAL PROFILE AND QUALITY OF LIFE RELATED TO ORAL HEALTH OF PATIENTS WITH HISTORY OF RHEUMATIC FEVER.

Dissertação apresentada à Faculdade de Odontologia de Piracicaba da Universidade Estadual de Campinas como parte dos requisitos exigidos para a obtenção do título de Mestra em Estomatopatologia, na Área de Estomatologia.

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Orientador: Prof. Dr. Alan Roger dos Santos Silva

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Faculdade de Odontologia de Piracicaba

A Comissão Julgadora dos trabalhos de Defesa de Dissertação de Mestrado, em sessão pública realizada em 12 de julho de 2024, considerou a candidata MARIANA OLIVEIRA BESSELER aprovada.

PROF. DR. ALAN ROGER DOS SANTOS SILVA

PROF. DR. GUILHERME SOBREIRA SPINA

PROF. DR. LUIZ ALCINO MONTEIRO GUEIROS

A Ata da defesa, assinada pelos membros da Comissão Examinadora, consta no SIGA/Sistema de Fluxo de Dissertação/Tese e na Secretaria do Programa da Unidade.

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RESUMO

Introdução: A febre reumática (FR) é uma doença autoimune de etiologia complexa, desencadeada por uma infecção não supurativa, geralmente associada à amigdalite estreptocócica. A progressão da FR pode resultar em lesões valvulares, culminando na doença cardíaca reumática (DCR). A presença da DCR torna os indivíduos mais suscetíveis à endocardite infecciosa. **Objetivo:** Caracterizar o perfil cardiológico e odontológico, bem como avaliar o impacto da qualidade de vida relacionada à saúde bucal (QVRSB) em pacientes diagnosticados FR **Métodos:** Um estudo transversal foi conduzido para analisar diversos aspectos, incluindo avaliação clínica (CPO-D e IHO-S), revisão de prontuários médicos, estratificação econômica (ABEP), análise de radiografias panorâmicas e avaliação da QVRSB (OHIP-14). Este estudo foi realizado com pacientes acompanhados na Liga de Combate à Febre Reumática do Instituto do Coração da Faculdade de Medicina da Universidade de São Paulo, Brasil, de março a dezembro de 2023.**Resultados:** O estudo contou com a participação de 83 pacientes, dos quais 75 eram mulheres e 8 homens, com uma média de idade de 47 anos. A maioria dos participantes era composta por afrodescendentes (61,4%) e pertencia às classes socioeconômicas C1 e C2, caracterizadas por baixa escolaridade. A DCR estava presente em 97,5% da amostra, sendo as lesões mitro-aórticas as mais comuns, com a valva mitral sendo frequentemente afetada. A endocardite infecciosa (EI) foi verificada em 6% dos casos. O índice CPO-D foi classificado como muito alto, com uma média de 19,6, sendo mais elevado nas faixas etárias entre 50 e 79 anos, com uma média de 9 dentes perdidos por paciente. O índice de higiene oral simplificado (IHO-S) foi considerado satisfatório em 50% da população estudada. Uma análise radiográfica foi realizada em 52 pacientes, revelando a presença de cárie dentária, com ou sem comprometimento pulpar, em 29 (55,7%) casos, alterações periapicais em 41 indivíduos, e 20 (38,4%) pacientes foram identificados como apresentando alto risco para doença periodontal, enquanto outros 20 apresentaram risco moderado. A condição de saúde bucal teve um impacto relativamente baixo na QVRSB dos participantes. **Conclusão:** A amostra composta por pacientes com FR demonstrou ser predominantemente composta por adultos de meia-idade do sexo feminino, com baixo nível de escolaridade e, em sua grande maioria, apresentando DCR. Observou-se uma alta incidência de cárie dentária, periodontite apical e risco considerável para doença periodontal, associada a um índice CPO-D elevado, caracterizando um perfil de saúde bucal precário. No entanto, apesar dessas condições, os problemas bucais aparentemente não têm um impacto significativo na QVRSB dos pacientes.

Palavras-chaves: febre reumática; doença cardíaca reumática; saúde bucal; qualidade de vida relacionada à saúde bucal.

ABSTRACT

Introduction: Rheumatic fever (RF) is an autoimmune disease of complex aetiology, triggered by a non-suppurative infection, usually associated with streptococcal tonsillitis. The progression of RF can result in valvular lesions, culminating in rheumatic heart disease (RHD). The presence of RHD makes individuals more susceptible to infective endocarditis. **Objective:** To characterise the cardiological and dental profile and assess the impact of oral health-related quality of life (OHRQoL) in patients diagnosed with RF. **Methods:** A cross-sectional study was conducted to analyse various aspects, including clinical assessment (DMFT and OHI-S indices), review of medical records, economic stratification (BARC criteria), analysis of panoramic radiographs and assessment of OHRQoL (OHIP-14 questionnaire). This study was carried out with patients followed up at the Rheumatic Fever League of the Heart Institute of the Faculty of Medicine of the University of São Paulo, Brazil, from March to December 2023. **Results:** The study included 83 patients, of whom 75 were women and 8 men, with a mean age of 47 years. The majority of participants were of African descent (61.4%) and belonged to socioeconomic classes C1 and C2, characterised by low levels of education. RHD was present in 97.5% of the sample, with mitral-aortic lesions being the most common, with the mitral valve being frequently affected. Infective endocarditis (IE) was found in 6% of cases. The DMFT index was classified as very high, with an average of 19.6, and was highest in the 50-79 age group, with an average of 9 missing teeth per patient. The simplified oral hygiene index (OHI-S) was considered satisfactory in 50% of the population studied. A radiographic analysis was carried out on 52 patients, revealing the presence of dental caries, with or without pulp involvement, in 29 (55.7%) cases, periapical alterations in 41 individuals, and 20 (38.4%) patients were identified as being at high risk of periodontal disease, while another 20 were at moderate risk. Oral health status had a relatively low impact on the OHRQoL of the participants. **Conclusion:** The sample of patients with RF was predominantly made up of middle-aged female adults, with a low level of schooling and, for the most part, DCR. There was a high incidence of dental caries, apical periodontitis and considerable risk of periodontal disease, associated with a high DMFT index, characterising a poor oral health profile. However, despite these conditions, oral problems apparently do not have a significant impact on patients' OHRQoL.

Keywords: rheumatic fever; rheumatic heart disease; oral health; oral health-related quality of life.

SUMÁRIO

1 INTRODUÇÃO

A febre reumática (FR), ainda altamente prevalente em países de baixa renda, apresenta-se em um episódio agudo com sintomas como dores articulares, regurgitação valvar cardíaca, manifestações cutâneas e subcutâneas, febre e, menos comumente, coreia de Sydenham (Liu et al., 2015; Carapetis et al., 2016). Originada por uma infecção na amígdala não tratada, ou tratada de modo inadequado, o diagnóstico é estabelecido com base nos Critérios de Jones modificados, que requerem a presença de 2 critérios maiores ou 1 critério maior e 2 menores, juntamente com confirmação de infecção estreptocócica β-hemolítica (Szczygielska et al., 2018).

Fatores de risco para FR incluem a faixa etária, afetando mais frequentemente crianças de 5 a 14 anos, além de fatores ambientais como condições de moradia em aglomerados e superlotação domiciliar, subnutrição ou desnutrição, e dificuldade de acesso a serviços de saúde, associados à baixa adesão à profilaxia secundária para FR (Liu et al., 2015; Carapetis et al., 2016). A suscetibilidade genética também desempenha um papel importante na interação entre o agente etiológico e o hospedeiro, levando à autoimunidade. Episódios repetidos de FR aguda podem resultar em lesões valvares crônicas e, consequentemente, na doença cardíaca reumática (DCR) (Carapetis et al., 2016).

Apesar dos avanços significativos nos tratamentos medicamentosos e cirúrgicos, a população afetada ainda apresenta taxas elevadas de mortalidade, com a endocardite infecciosa (EI) como uma das sequelas mais graves (Cahill e Prendergast et al., 2016; Leal et al., 2019). Devido à sua relevância em termos de morbidade e mortalidade, a EI é considerada uma doença complexa, com diagnóstico desafiador e intimamente associada à saúde bucal precária (Peterson e Crowley, 2019; Wilson et al., 2021).

Estudos sobre a saúde oral de populações com histórico de febre reumática ou doença cardíaca reumática são escassos na literatura. Diante dessa realidade e dos desafios no acesso aos cuidados odontológicos no Brasil, este estudo tem como objetivo evidenciar o panorama de saúde bucal e qualidade de vida relacionada à saúde bucal desta população em um contexto de país de baixa renda, onde os desafios no acesso aos serviços de saúde bucal são ainda mais acentuados.

2 CARDIOLOGICAL, DENTAL PROFILE AND QUALITY OF LIFE RELATED TO ORAL HEALTH OF PATIENTS WITH HISTORY OF RHEUMATIC FEVER.

Artigo submetido para publicação na sessão Oral Medicine do periódico Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology Journal (Anexo 2)

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ABSTRACT

Introduction: Rheumatic fever (RF) is an autoimmune disease triggered by a non-suppurative streptococcal tonsillitis infection, leading to valve lesions and subsequent rheumatic heart disease (RHD). RHD increases the risk of infective endocarditis.

Objective: This study aimed to characterize the cardiological and dental profiles of patients with RF and assess the impact on their oral health-related quality of life (OHRQoL).

Methods: A cross-sectional study was conducted from March to December 2023, involving clinical analysis [decayed, missing, and filled teeth (DMFT) index and Oral Hygiene Index Simplified (OHI-S)], medical record review, economic stratification (questionnaire endorsed by the Brazilian Association of Research Companies), panoramic radiograph evaluation, and OHRQoL assessment (Oral Health Impact Profile-14) of patients followed at the Rheumatic Fever League of the Heart Institute, University of São Paulo Medical School, Brazil.

Results: A total of 83 patients participated in the study. They were predominantly female (90.4%), and their mean age was 47 years. Most were of Afro-Brazilian ethnicity (61.4%) and belonged to economic classes C1 and C2, with a low level of education. RHD was present in 97.5% of the sample, with mitral-aortic lesions being the most common, primarily affecting the mitral valve; infective endocarditis was found in 6% of cases. The DMFT index was very high (mean, 19.6), with higher values observed in the 50–79 year age group, and the average number of missing teeth per patient was nine. The OHI-S score was satisfactory in 50% of the population. Panoramic radiographic analysis was performed on 52 (62.6%) patients, revealing dental caries in 29 (55.7%), periapical alterations in 41 (78.8%), and a high risk of periodontal disease in 20 (38.4%), with another 20 patients at moderate risk. Despite the poor oral health profile, including the high DMFT index, dental caries, apical periodontitis, and periodontal disease risk, OHRQoL was minimally affected.

Conclusion: The study population, predominantly middle-aged women with a low level of education, largely presented with RHD. Despite significant oral health issues, including a high incidence of dental caries and periodontal disease, these problems did not substantially impact OHRQoL.

Keywords: rheumatic fever; rheumatic heart disease; oral health; oral health-related quality of life

INTRODUCTION

Rheumatic fever (RF) is an autoimmune disease that develops secondary to a non-suppurative tonsillitis infection caused by Lancefield group A beta-hemolytic streptococcus.[1,2] Clinically, RF presents with polyarthritis, cardiac involvement leading to valve damage, fever, and, in some cases, Sydenham's chorea.[1] As the valve lesions progress, rheumatic heart disease (RHD) may develop, potentially resulting in rheumatic heart failure, atrial fibrillation, ischemic embolic events, and a heightened risk of infective endocarditis (IE).[1,2]

According to the 2021 Cardiovascular Statistics in Brazil, RHD is the leading cause of valve disease in the country. The mitral valve is most commonly affected, and stenosis is present in 90% of cases and regurgitation in 55% to 60%.[3] Predisposing factors for RF include a low socioeconomic status, age range of 5 to 14 years, and genetic susceptibility.[1,4] Although both sexes are equally affected by RF, RHD is more prevalent in women.[1]

IE, while rare, is a significant concern in dentistry because of the oral cavity's role as a reservoir for microorganisms and a potential site for opportunistic infections. Among patients with RHD, 10% to 15% of IE cases stem from oral foci of infection, influenced by oral hygiene, socioeconomic factors, and oral health conditions.[6,7]

Given the medical and dental implications of RHD, it is crucial to understand the medical and dental profiles of patients with RF in the Brazilian population, as well as the impact of oral health-related quality of life (OHRQoL). Such an understanding could guide the development of preventive clinical protocols for patients with a history of RF, thereby reducing the risk of RHD in Brazil.

METHODS

This cross-sectional study utilized clinical evaluations, a medical records review, and questionnaires administered to participants enrolled in the League to Combat Rheumatic Fever at the Heart Institute of the Hospital das Clínicas, Faculty of Medicine, University of São Paulo. Data collection occurred between March and December 2023.

Sample

The study sample comprised individuals aged 18 years and older who were consecutively evaluated at the Rheumatic Fever League, with a documented history of RF and/or RHD. Patients over 18 years of age with neuropsychomotor impairments that precluded their ability to provide informed consent, participate in interviews, or comprehend oral hygiene instructions were excluded from the study. All participants were verbally informed about the study's objectives, associated risks, and the epidemiological nature of the research, which precluded the provision of dental treatment.

Patient identification, demographic data, habits, and medical and dental history

Data collection involved retrieving each patient's hospital registration number from the SI3 (Integrated Institutional Information System, Zerbini Foundation, São Paulo-SP, Brazil), which allowed for visualization the of medical care records. Collected information included the patient's name, date of birth, sex, nationality, place of birth, cardiac diagnosis, affected anatomical structures and/or devices, comorbidities, current medications, allergies, history of cardiac surgery, and previous episodes of IE.

Additionally, after their medical evaluation by the Rheumatic Fever League, the patients were interviewed to gather further information, including marital status, self-declared ethnicity, occupation, and contact details as well as habits such as smoking, alcohol consumption, and other drug use. Dental history was also assessed, including the timing of the last dental visit,

access to dental care, and oral hygiene practices such as brushing frequency, flossing, and mouthwash use.

Socio-economic assessment

The socio-economic assessment used a validated socio-economic questionnaire endorsed by the Brazilian Association of Research Companies (BARC) for the Brazilian Economic Classification Criterion (BECC).[7] This questionnaire evaluates factors including education level, presence of comfort items in the household, estimated family purchasing power, and access to public services such as piped water and paved streets. Each response was categorized and coded according to the points and cutoffs provided by the BARC, allowing for the determination of each participant's economic class.

OHRQoL

The OHRQoL of the patients was assessed using the validated Portuguese version of the Oral Health Impact Profile-14 (OHIP-14) questionnaire, a condensed version of the 49-question OHIP-49 questionnaire.[8] The OHIP-14 includes 14 questions designed to evaluate perception across 7 conceptual domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and social disadvantage. Participants were asked to indicate the frequency of each event over the past 6 months using a 5-point Likert scale: never (0), almost never (1), occasionally (2), quite often (3), and often (4). Average scores were calculated for both the overall study population and age groups defined by the Brazilian Institute of Geography and Statistics (BIGS). The total questionnaire score ranges from 0 to 56, with higher scores indicating a greater impact of oral health on daily life and thus poorer OHRQoL.

Clinical and radiological dental assessment

The clinical examination involved assessment of the average number of decayed, missing, and filled teeth (DMFT index) and the Simplified Oral Hygiene Index (OHI-S). It was conducted under artificial white light directed at the oral cavity, with the patient seated in a conventional chair. The assessor stood facing the patient for optimal visualization of the oral cavity.[9]

The DMFT index for permanent teeth was obtained following the World Health Organization methodology.[9] This involved identifying decayed teeth (D), missing teeth or those requiring extraction (M), and filled teeth (F), which were then summed to determine the individual DMFT index. The average DMFT index was calculated by summing the DMFT index of each individual and dividing by the number of participants in each age group (i.e., in 10-year intervals from 20 to 79 years of age), based on the Brazilian Population Projection conducted by the BIGS.[10] The DMFT index was classified as very low (0.0–1.1), low (1.2–2.6), moderate (2.7–4.4), high (4.5–6.5), and very high (≥6.6), both for the total sample and for each age group.

Dental plaque was assessed using the OHI-S.[11] Plaque evidence was recorded based on the extent of coverage on specific teeth and surfaces. Quantitative indices were classified as good, fair, or poor. Following the assessment, patients received an oral hygiene kit containing a toothbrush and fluoridated toothpaste, along with an illustrative folder demonstrating the modified Bass technique and dental floss use.[12]

Panoramic radiographs were analyzed to assess the total tooth count, caries, periodontal conditions, restorations, endodontic treatments, and bone loss.[13,14] Criteria for periapical lesions and alveolar bone loss were based on established classifications.[14–16] Image analysis was calibrated using ImageJ software, and the risk of periodontal disease was classified based on specific measurements and validated formulae.[16]

Statistical analysis

The statistical analysis was performed using absolute numbers, means, and medians, with frequencies displayed as percentages.

Ethical aspects

All patient data were handled in accordance with research ethics guidelines. This study received approval from the Research Ethics Council under number 66423323.9.0000.5418.

RESULTS

Demographic data

A total of 83 patients participated in the study, including 75 women and 8 men. Of these patients, 81 (97.5%) were diagnosed with RHD. The mean age of the sample was 47 years, with a median age of 45 years. Most patients were from the states of São Paulo (n = 42, 50.6%) and Bahia (n = 20, 24.1%), with only one patient being Chilean. Regarding ethnicity, 49.4% identified as Brown and 37.3% as White. According to the BIGS classification, which combines Black and Brown categories, 61.4% of the population identified as Black.

The sample was stratified using the BARC questionnaire, revealing higher percentages for economic classes C1 (37.3%) and C2 (30.1%). In terms of education, 38 patients (45.8%) reported that the head of the family had completed secondary school, while approximately 19% (n = 16) had completed primary school II or had not finished secondary school. Only 12 patients (14.5%) reported completing higher education, while 11 patients (13.3%) had completed primary school I or had not completed primary school II, and 6 patients (7.2%) were either

illiterate or had not completed primary school I. Additionally, 3.6% of the sample (n = 3) reported lacking access to piped water or paved roads. Further demographic characteristics and economic classifications of the participants are detailed in Table 1.

Medical profile

Eighty-one patients (97.5%) presented with some form of valvular heart disease (Table 2), while only 2 patients did not exhibit cardiac sequelae of RF. Mitral-aortic lesions were reported in 20.9% of patients, followed by mitral insufficiency and double mitral lesions, each accounting for approximately 13.0%. The mitral valve and the mitral-aortic combination were the most common, with frequencies of 40.8% and 29.1%, respectively, among the 83 patients. Thirty-three patients (39.8%) underwent heart surgery. However, detailed descriptions of cardiac device usage were lacking, with only 7.2% of patients (n = 6) having a biological prosthesis in the aortic valve position, 6.0% (n = 5) having a mechanical prosthesis in the mitral valve position, and 4.0% (n = 4) having a biological prosthesis in the mitral valve position. Among the 83 patients, only 5 had a history of IE, and 27.7% (n = 23) still received benzathine penicillin G every 21 days for secondary prophylaxis of RF.

Regarding comorbidities, systemic arterial hypertension, dyslipidemia, and hypothyroidism were reported in 32.4%, 17.1%, and 9.5% of patients, respectively. In terms of hereditary history, the patients primarily reported systemic arterial hypertension (19.7%), dyslipidemia (16.7%), unspecified heart disease (16.2%), cancer (12.8%), pneumopathies (10.7%), and diabetes mellitus (9.0%). Table 3 presents the cardiological aspects of the study participants, including the affected valves, cardiac devices, and occurrences of IE. Table 4 displays the most common comorbidities.

Dental profile

Regarding habits and professional care related to oral health, nearly half of the sample (49.4%) reported consulting a dental surgeon or receiving dental treatment within the last 6 months, while 22 patients (26.5%) reported difficulty accessing dental care at some point in their lives because of their general health history.

Approximately 51% (n = 43) of the patients reported practicing oral hygiene three times a day or more, while 43.4% (n = 36) brushed their teeth twice a day, and only 4 individuals brushed once a day. Additionally, 48.2% (n = 40) of the sample reported daily use of dental floss, 25.3% (n = 21) used it sporadically, and 22 patients reported not flossing at all. Mouthwash was not used by 57.8% (n = 48), while 24.1% (n = 20) used it daily and 18.1% (n = 15) used it occasionally.

The DMFT index for this sample was 19.6. When analyzed by age group, the average indices were 23.8, 25.6, and 26.7 for the age groups 50–59 years, 60–69 years, and 70–79 years, respectively. The lowest DMFT index (6.0) was observed in the age group 20–29 years (Figure 1). The average number of decayed teeth, missing teeth, and filled teeth in the total sample was 1.3, 9.0, and 9.2, respectively.

Oral hygiene according to the OHI-S classification was considered good in 50.0% of the sample (n = 40), regular in 43.8% (n = 35), and poor in only 5 patients. Three patients were edentulous; thus, the OHI-S was not applied.

Analysis of oral infection foci using panoramic radiographs was possible for 52 patients who underwent radiographic examination, revealing an infection focus in 98% of these patients. In total, 1907 teeth were assessed; of these, 15.3% (n = 292) showed bone loss, 3.6% (n = 68) had caries in dentin without pulp involvement, 7 had caries with pulp involvement, 1.2% (n =

23) had an enlarged pericementary space, and 10 had furcation lesions. The other oral foci found are detailed in Table 5.

Regarding apical periodontitis, 31.3% (n = 25) of patients with teeth (n = 80) had periapical alterations scored between 3 and 4, with an average of 0.4 teeth scored as 3 and an average of 0.2 teeth scored as 4. We identified 31.3% of patients with periapicopathies scored as 2, with an average of 0.6 teeth. No teeth were found to have periapicopathy corresponding to a score of 5. The number of patients with teeth showing periapicopathy based on radiographic image scores is shown in Figure 2. In some cases, the same patient had more than one periapical lesion or teeth with different scores.

Regarding the bone loss index, 38.4% (n = 20) were at high risk and 38.4% (n = 20) were at moderate risk. The average age of patients at high risk was 54.3 years (median, 48 years), and that of patients at moderate risk was 45.1 years (median, 45 years). Twenty-three percent of the patients were at low risk, with a mean age of 43.3 years and a median of 46 years (Figure 3).

OHRQoL

Patients' OHRQoL was assessed using the OHIP-14 questionnaire, focusing on the 6 months preceding the questionnaire administration. The mean scores for the functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and social disadvantage domains were 0.42, 1.69, 1.57, 1.14, 1.05, 0.78, and 0.83, respectively, for the overall study population.

Analysis of OHRQoL by age group (Table 6) revealed higher mean scores in the domains of physical pain (2.28), physical disability (1.72), social disability (1.17), and social

disadvantage (1.11) among individuals aged 30–39 years. Psychological disability (1.41) was more pronounced in those aged 50–59 years, while the 70–79 year age group exhibited greater functional limitation (1.67) and psychological discomfort (3.00). Each domain of the questionnaire has a maximum score of 8 points, with scores closer to this maximum indicating a greater impact on patients' quality of life.

DISCUSSION

This cross-sectional study primarily involved a female population with significant cardiac complications resulting from RF, including a high incidence of IE. Despite their unsatisfactory oral health, OHRQoL did not appear to be significantly affected, raising concerns about the lack of awareness regarding the importance of maintaining oral health.

The sample was composed of 90.3% women, predominantly middle-aged adults, with an average age of 47 years. This aligns with existing literature suggesting that while the sex distribution of RHD is similar up to the age of 15 years, women are more severely affected as they age, although the reasons for this remain unclear.[17]

Most participants self-identified as Black and were categorized within economic classes C1 and C2 according to the BARC stratification. Approximately 45% had completed primary school, while 7.2% were illiterate or had not completed primary school, indicating a generally low level of education and limited access to information. Despite the scarcity of robust epidemiological studies in low- and middle-income countries, there is consensus regarding the high prevalence of RHD in impoverished and marginalized populations.[17] Environmental and

socioeconomic factors, such as overcrowded living conditions, malnutrition, education, and limited access to healthcare, are closely associated with RF.[18,19]

The highest prevalence rates of RHD in Brazil are concentrated in the northern and northeastern regions,[3] which typically have a lower Human Development Index and sparse population density, leading to limited access to healthcare services. Residents often face challenges such as long distances and transportation difficulties when trying to reach public health facilities.[20] In this study, most participants were from São Paulo (southeast region) and Bahia (northeast region), aligning with national epidemiological trends. However, the study was conducted at a specialized cardiac care center in São Paulo, which explains the predominance of individuals from São Paulo in the sample.

Regarding the medical profile, 97.5% of the study population presented with valvular heart disease, either involving native valves or as users of valve prostheses. The mitral valve was most commonly affected, either alone or in combination with aortic valve lesions. Chronic damage to the mitral valve is strongly associated with the sequelae of RF, particularly stenosis and regurgitation.[3,21] In this sample, mitral insufficiency and double mitral lesions were the most prevalent valve disorders observed. Notably, within the Brazilian Unified Health System, 50% of valve surgeries are related to RHD. In this study, approximately 39% of patients had undergone corrective or replacement valve surgery.

RHD is recognized as a predisposing factor for IE. In this study, five patients (6% of the total), all female, had a history of IE with unspecified etiological agents. Although IE predominantly affects older men, particularly those over the age of 65 years,[22] this study revealed a notable occurrence of IE within the cohort. Globally, IE rates range from 0.01% to 0.02% per year, equating to approximately 10 to 20 cases per 100,000 inhabitants annually.[23]

A study by Montano et al.,[21] conducted at the same institution, showed that 51.9% of patients with valvular heart disease who developed IE due to oral bacteria also had RHD.

Hypertension and dyslipidemia were the most prevalent comorbidities, affecting 34 and 18 patients, respectively. This is consistent with the broader landscape of cardiovascular diseases in Brazil, where systemic arterial hypertension is one of the most common conditions, affecting approximately 43.2 individuals per 1,000 annually. According to the Global Burden of Disease Study 2019, the mortality rate attributed to systemic arterial hypertension increases significantly with age, peaking at 104.8 per 100,000 inhabitants.[3]

The DMFT index of the study sample was notably high at 19.6. This was especially clear when stratified by age group, with higher values observed in older age groups, particularly those aged 50–79 years. This indicates a compromised oral health status. These findings are consistent with a recent study of the Brazilian population (SB Brasil-2010),[24] which reported an average DMFT index of 16.75 for individuals aged 35–44 years and 27.53 for those aged 65–74 years. Although the DMFT index indicated poor oral health, 50.0% of the sample exhibited good oral hygiene during the clinical examination and 43.8% engaged in regular oral hygiene according to the OHI-S assessment. This can be attributed to the fact that more than half of the sample maintained satisfactory daily oral hygiene practices, brushing their teeth three times or more per day.

Supporting these findings, 55.7% of the 52 patients evaluated radiographically had at least one tooth with a carious lesion, with or without pulp involvement. Additionally, 48.1% had teeth with periapical disease, and 44.2% showed evidence of bone loss, suggesting underlying periodontal disease as a potential source of spontaneous bacteremia. It is estimated that approximately 34% of the world's population lives with untreated caries, and chronic oral diseases are closely related to a low socioeconomic status. In 2010, the SB Brasil survey showed

that caries and periodontal disease were the most prevalent oral diseases in the population, as observed in the present sample, with caries more common in children and adolescents and periodontal disease more severe in adults over 35 years of age.[24]

Apical periodontitis, indicated by scores of 3 and 4, was observed in 49% of the sample. Notably, while a score of 2 is not incorporated into the proposed methodology,[14] 31% of participants displayed radiographic evidence consistent with this score, highlighting the significant role of endodontic pathology as a potential source of infection within this subset of the studied population.

Limited research exists on the oral health status of individuals with a history of RF or RHD. A clinical investigation conducted in 2012 assessed 44 adult patients with severe RHD scheduled for cardiac surgery in an African hospital. The results revealed a poor plaque index in 31.8% of patients, with radiographic findings predominantly showing caries, periapical pathologies, and residual roots.[25] Similarly, a cross-sectional study in Turkey demonstrated that children aged 5 to 12 years with acute RF or RHD exhibited higher rates of dental caries and poorer plaque indices than did healthy children, indicating suboptimal oral health.[26]

These results highlight the severity of caries and periodontal diseases, which remain highly prevalent in the Brazilian population. This underscores the importance of non-pharmacological interventions, such as improving access to basic sanitation, medical care, and dental services. These aspects should be prioritized to ensure comprehensive care for patients with heart valve disease secondary to RF.[3]

Overall, the study findings suggest that oral health conditions have a limited impact on OHRQoL. Higher mean values ranging from 2.9 ± 5.4 to 3.5 ± 6.8 were reported in a study comparing OHRQoL in patients with heart failure and ventricular assist devices, indicating relatively low impairment in this population. Both psychosocial impact and oral function

domains were comparable between the two groups, with a slightly higher psychosocial impact in the ventricular assist device group (±4.3).[27] In another study assessing OHRQoL in patients with periodontal disease and associated cardiovascular conditions, higher mean scores were observed in the physical pain domain (4.16) than in the psychological discomfort domain (0.57).[28] In our sample, physical pain (1.69) and psychological discomfort (1.57) demonstrated significant effects, reflecting the precarious oral health status observed and its potential implications.

While these findings may not be fully representative, they raise concerns regarding the oral health status of this population. The lack of significant impact on quality of life may indicate reduced demand for dental care, potentially leading to the persistence of oral health problems and, consequently, an increased risk of IE.

Limitations

A portion of the sample did not undergo panoramic radiography of the jaws, limiting the ability to radiographically analyze potential foci of oral infection. Additionally, the periodontal condition was radiographically assessed because of the specific risk of IE in the studied population, which restricted the scope of the investigation.

CONCLUSION

The results of our analysis, conducted on a sample of patients with a history of RF from a tertiary referral hospital in Brazil, revealed that the majority were middle-aged adults,

predominantly female, of Black ethnicity, with low levels of education, and nearly all presented with RHD. This population exhibited a high incidence of dental caries, apical periodontitis, and risk of periodontal disease, along with a notably high DMFT index, indicating a precarious oral health profile. These findings underscore the importance of implementing oral health promotion, prevention, and intervention strategies, as well as enhancing access to healthcare services, given the heightened risk of IE associated with oral bacteria. Despite the challenging oral health context, our study did not find evidence of a significant impact of oral health conditions on the OHRQoL of these individuals.

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Table 1. Demographic characteristics and economic classification of the study sample (n = 83)

DEMOGRAPHIC DATA	**n**	**%**
SEX		
Female	75	90.4
Male	8	9.6
	83	**100**
AGE RANGE (years)		
20–29	2	2.4
30–39	18	21.7
40–49	31	37.3
50–59	22	26.5
60–69	7	8.4
70–79	3	3.6
	83	**100**
ETHNICITY		
White	31	37.3
Black	10	12.0
Brown	41	49.4
Indigenous	0	0.0
Asian	2	2.4
	83	**100**
NATIONALITY		
Brazil	82	97.6
Chile	1	1.2
	83	**100**
BIRTHPLACE		
São Paulo	42	50.6
Bahia	20	24.1
Minas Gerais	4	4.8
Ceará	3	3.6
Paraná	3	3.6
Pernambuco	3	3.6
Piauí	2	2.4
Sergipe	1	1.2
Acre	1	1.2
Espírito Santo	1	1.2
Maranhão	1	1.2
Paraíba	1	1.2
-	1	1.2
	83	**100**
ECONOMIC CLASSIFICATION		
A	1	1.2
B1	1	1.2
B2	18	21.7
C1	31	37.3

C2	25	30.1
D–E	7	8.4
	83	**100**

Table 2. Distribution of identified valve diseases

VALVULOPATHIES	n	%
MITRAL LESION	**35**	**33.33**
Mitral insufficiency	14	13.33
Mitral stenosis	7	6.67
Double mitral lesion	14	13.33
AORTIC LESION	**8**	**7.62**
Aortic insufficiency	7	6.67
Double aortic lesion	1	0.95
MITRAL-AORTIC LESION	**22**	**20.95**
Others	40	38.10
TOTAL	**105**	**100**

Table 3. Cardiologic characteristics of the study sample

DAMAGED VALVE	**n**	**%**
Aortic	7	6.8
Mitral	42	40.8
Mitral-aortic	30	29.1
Tricuspid	24	23.3
TOTAL	**103**	**100**
DEVICES	**n**	**%**
Mechanical aortic prosthesis	1	1.2
Aortic biological prosthesis	6	7.2
Mitral biological prosthesis	4	4.8
Mitral-aortic biological prosthesis	2	2.4
Mechanical mitral prosthesis	5	6.0
Mitral-aortic mechanical prosthesis	2	2.4
OTHERS	2	2.4
NO CARDIAC DEVICES	61	73.5
TOTAL	**83**	**100**
INFECTIVE ENDOCARDITIS		
NO	78	94.0
YES	5	6.0
TOTAL	83	100

Table 4. Distribution of clinical comorbidities.

COMORBIDITIES	n	*%*
Systemic arterial hypertension	34	32.4
Dyslipidemia	18	17.1
Hypothyroidism	10	9.5
Depression	9	8.6
Generalized anxiety disorder	9	8.6
Stroke	8	7.6
Rheumatoid arthritis	5	4.8
Epilepsy	5	4.8
Osteoarthrosis	3	2.9
Fibromyalgia	2	1.9
Diabetes mellitus	1	1.0
Hepatopathy	1	1.0
	105	**100**

Table 5. Radiographically analyzed foci of oral infections

FOCUS OF ORAL INFECTION	n	%	AVERAGE	MEDIAN
Dentin caries	68	3.6	1.31	1.0
Dentin/pulp caries	7	0.4	0.13	0.0
Residual root	6	0.3	0.12	0.0
Apical periodontitis	57	3.0	1.10	0.0
Furcation lesion	10	0.5	0.19	0.0
Enlarged pericementary space	23	1.2	0.44	0.0
Root resorption	2	0.1	0.04	0.0
Bone loss	292	15.3	5.62	5.0
Semi-included third molar	10	0.5	0.19	0.0
TOTAL	**475**			
TOTAL NUMBER OF TEETH ANALYZED	**1907**			

Table 6. Oral health-related quality of life based on mean score for each domain of OHIP-14 by age group (years)

AGE RANGE	DOMAIN 1	DOMAIN 2	DOMAIN 3	DOMAIN 4	DOMAIN 5	DOMAIN 6	DOMAIN 7
GENERAL	0.42	1.69	1.57	1.14	1.05	0.78	0.83
20–29	0.00	0.00	1.00	0.00	0.00	0.00	0.00
30–39	0.56	2.28	2.00	1.72	1.22	1.17	1.11
40–49	0.19	1.48	1.32	0.94	0.90	0.81	0.94
50–59	0.45	1.91	1.64	1.23	1.41	0.86	0.77
60–69	0.57	0.71	0.86	0.71	0.43	0.00	0.43
70–79	1.67	2.00	3.00	1.00	1.00	0.00	0.00

Figure 1. DMFT index by age group

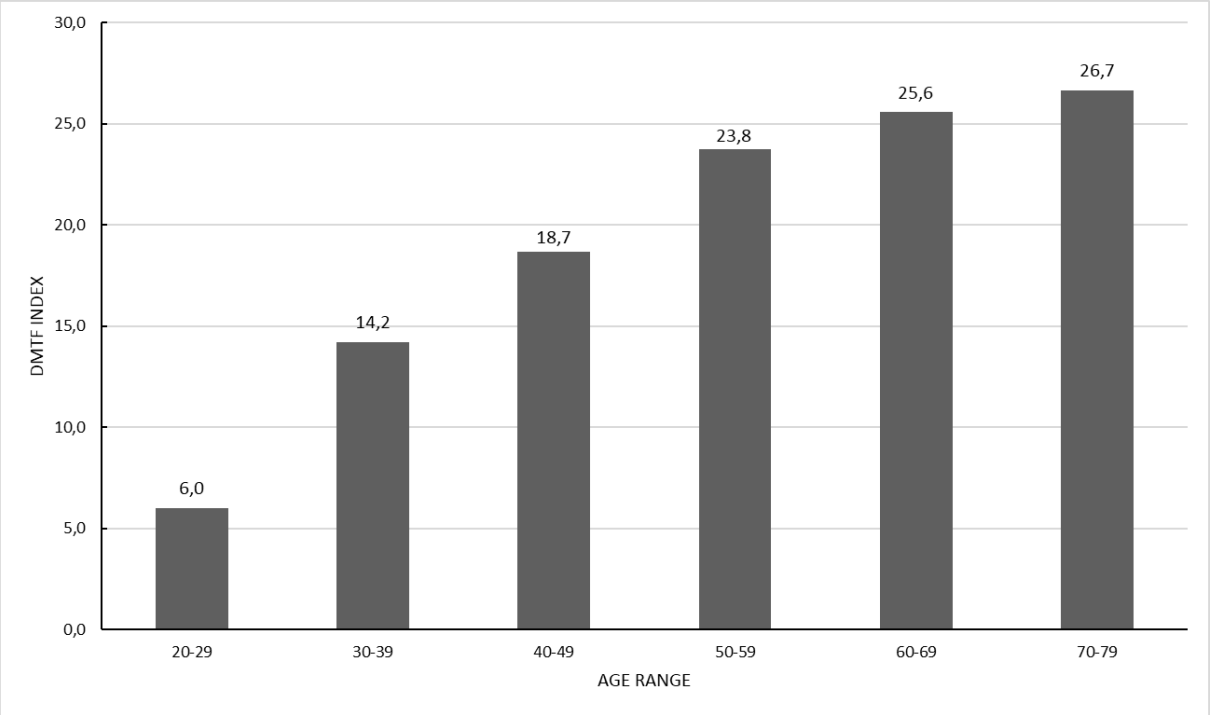


Figure 2. Number of patients and number of teeth with apical periodontitis scores of 2, 3 and 4 in the periapical index, applied to radiographic images

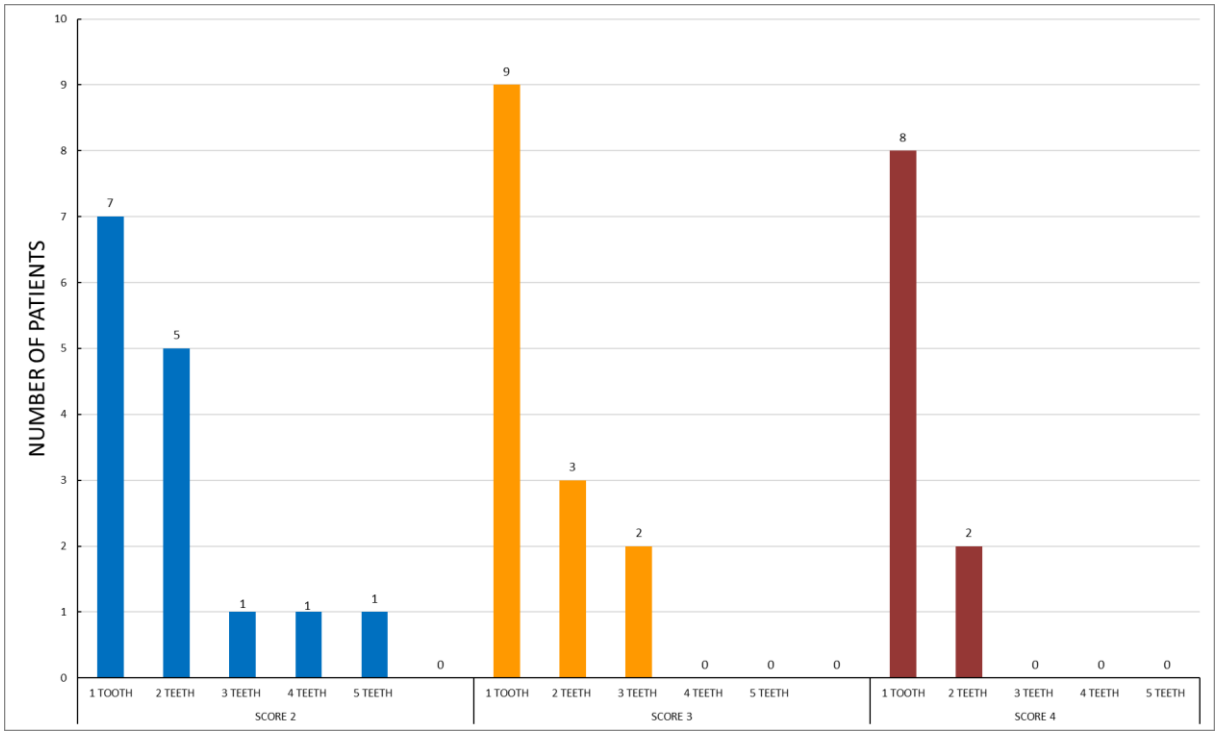
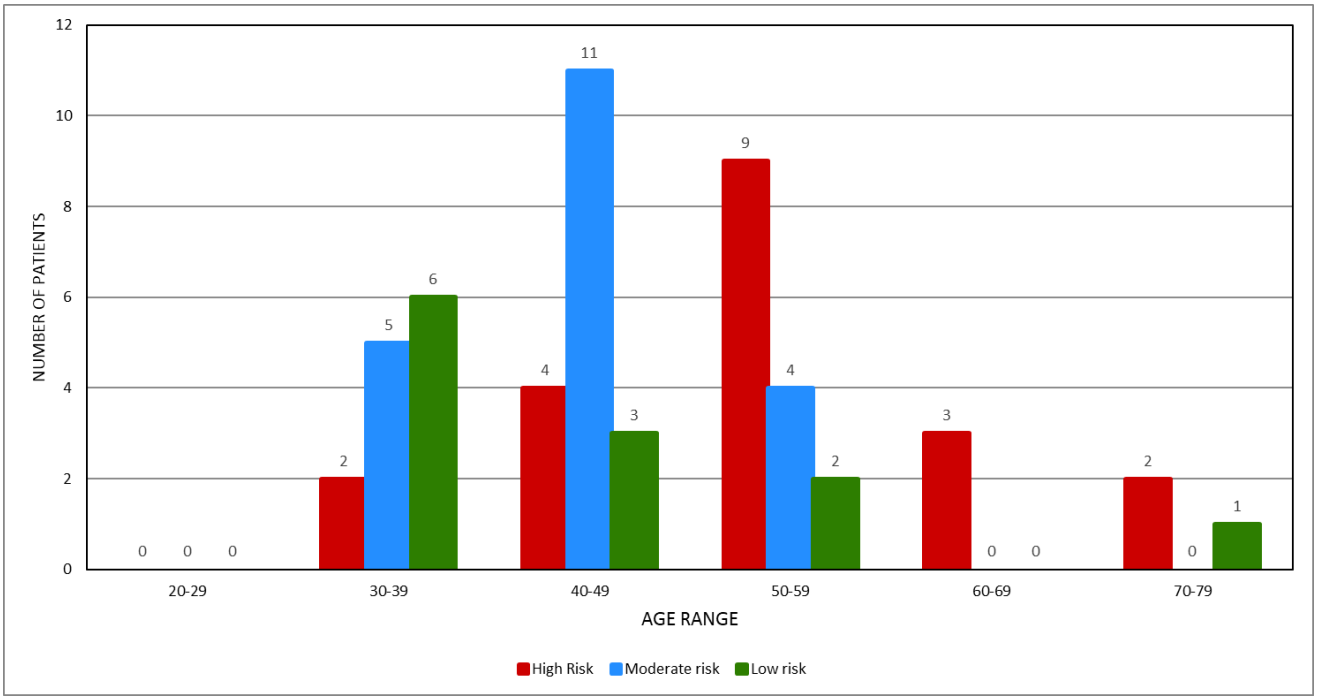


Figure 3. Bone loss according to age range and classified by risk for periodontal disease



Risk for periodontal disease was determined according to Tiller et al.: low risk, <5 missing teeth and/or bone loss index of <0.5; moderate risk, 5–8 missing teeth and/or bone loss index of 0.5–1.0; high risk, 9 missing teeth and/or bone loss index of ≥1.1.

3 CONCLUSÃO

Este estudo foi motivado pela escassez de informações sobre a saúde bucal de pacientes com histórico FR. Propusemo-nos a caracterizar uma população atendida na Liga de Combate à Febre Reumática do Instituto do Coração da Faculdade de Medicina da Universidade de São Paulo, abordando aspectos demográficos, cardiológicos e odontológicos, e correlacionando a saúde oral com a qualidade de vida relacionada à saúde bucal. Os resultados sugerem que a amostra é composta principalmente por mulheres adultas em meia idade, a maioria com doença cardíaca reumática. O perfil de saúde bucal, considerado precário, é caracterizado pela presença de cárie, perda óssea considerável e alterações periapicais, que aparentemente não têm um impacto negativo significativo na qualidade de vida relacionada à saúde bucal desses indivíduos. Essas descobertas podem contribuir para orientar políticas de saúde pública, promovendo a expansão das intervenções em saúde bucal para oferecer maior acesso a equipamentos de saúde e profissionais inseridos nessa linha de cuidado, especialmente para uma população com DCR e alto risco de endocardite infecciosa associada a bactérias orais.

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*De acordo com as normas da UNICAMP/FOP, baseadas na padronização do *Internacional Commitee of Medical Journal Editors – Vancouver Group*. Abreviaturas dos periódicos em conformidade com o PubMed.

Anexo 1 – Aprovação Comitê de Ética em Pesquisa

FACULDADE DE ODONTOLOGIA DE PIRACICABA DA UNIVERSIDADE DE CAMPINAS - FOP/UNICAMP

PARECER CONSUBSTANCIADO DO CEP

DADOS DA EMENDA

Título da Pesquisa: PERFIL ODONTOLÓGICO, CARDIOLÓGICO E QUALIDADE DE VIDA RELACIONADA À SAÚDE BUCAL DE PACIENTES COM HISTÓRICO DE FEBRE

Pesquisador: Mariana Oliveira Besseler

Área Temática:

Versão: 3

CAAE: 66423323.9.0000.5418

Instituição Proponente: Faculdade de Odontologia de Piracicaba - Unicamp

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 5.983.963

Apresentação do Projeto:

O parecer inicial é elaborado com base na transcrição editada do conteúdo do registro do protocolo na Plataforma Brasil e dos arquivos anexados à Plataforma Brasil. Os pareceres de retorno, emendas e notificações são elaborados a partir do último parecer e dos dados e arquivos da última versão apresentada.

Trata-se de SOLICITAÇÃO DE EMENDA (E1) AO PROTOCOLO originalmente aprovado em 24/02/2023 para inclusão de termo de anuência de instituição coparticipante. O parecer foi atualizado de acordo com a documentação apresentada. A solicitação está detalhadamente descrita ao final do parecer.

A EQUIPE DE PESQUISA citada na capa do projeto de pesquisa inclui MARIANA OLIVEIRA BESSELER (Cirurgiã Dentista, Mestranda no PPG em Estomatopatologia da FOP-UNICAMP, Pesquisadora responsável), ALAN ROGER DOS SANTOS SILVA (Cirurgião Dentista, Docente da área de Semiologia da FOP-UNICAMP), o que é confirmado na declaração dos pesquisadores e na PB.

DELINEAMENTO DA PESQUISA: Trata-se de estudo observacional, transversal, por meio de

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Bairro: Areião **CEP:** 13.414-903
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FACULDADE DE ODONTOLOGIA DE PIRACICABA DA UNIVERSIDADE DE CAMPINAS - FOP/UNICAMP

Continuação do Parecer: 5.963.963

Declaração de Pesquisadores	DeclaracaoPesquisadoresFOPMarianaBesseler.pdf	04/01/2023 16:55:00	Mariana Oliveira Besseler	Aceito
Folha de Rosto	FolhadeRostoMarianaBesseler.pdf	04/01/2023 16:51:39	Mariana Oliveira Besseler	Aceito
Orçamento	Declaracaofinanciamento.pdf	30/12/2022 18:04:15	Mariana Oliveira Besseler	Aceito
Declaração de concordância	DeclaracaoDeAnuenciaIncor.pdf	30/12/2022 18:03:10	Mariana Oliveira Besseler	Aceito
Declaração de Instituição e Infraestrutura	DeclaracoesdaInstituicaoMARIANABESSELER.pdf	30/12/2022 18:01:08	Mariana Oliveira Besseler	Aceito

Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

PIRACICABA, 04 de Abril de 2023

Assinado por:
Jacks Jorge Junior
(Coordenador(a))

Endereço: Av.Limeira 901 Caixa Postal 52, Prédio Administrativo, Segundo Piso, Setor de Secretarias de Ensino
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Anexo 2 - Comprovante de submissão do artigo.

Date: 06 Jun 2024
To: "Tânia Cristina Pedroso Montano" tania.montano@incor.usp.br
From: "OOOO (Triple O) journal" tripleojournal@gmail.com
Subject: TRIPLEO-D-24-00763 - Confirming your submission to Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology

Dear Dr. Montano,

Your submission entitled "Cardiological, dental profile and quality of life related to oral health of patients with history of rheumatic fever." has been received by Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. It has been assigned the following manuscript number: **TRIPLEO-D-24-00763**.

You may check on the progress of your paper by logging on to the Editorial Manager as an author. The URL is https://www.editorialmanager.com/tripleo/
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Your manuscript will be given a reference number when an Editor has been assigned.

Thank you for submitting your work to this journal.

Sincerely,

Editorial Manager
Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology

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Anexo 3 - Relatório de verificação e prevenção de plágio.

DENTAL, CARDIOLOGICAL PROFILE AND QUALITY OF LIFE RELATED TO ORAL HEALTH OF PATIENTS WITH HISTORY OF RHEUMATIC FEVER.

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