

Preoperative oral health assessment and treatment needs in candidates for cardiothoracic and vascular surgery: a Brazilian cross-sectional study

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Abstract:

Objective: To assess the oral health status and dental treatment needs of patients with cardiovascular diseases (CVD) preparing for cardiothoracic and/or vascular surgery in a Brazilian population. **Methods:** This cross-sectional study included adults with CVD. Demographic and cardiological data were obtained from medical records, while dental examinations assessed Decayed, Missing, and Filled Teeth (DMFT) scores, periodontal alterations, and sources of oral infection. Radiographic evaluations identified bone defects and intraosseous lesions. **Results:** Forty-eight participants (54.2% male, mean age 62.4 years) were included. Coronary artery disease (CAD) and aortic stenosis were the most prevalent CVD. Myocardial revascularization and valve replacement surgeries accounted for 97.9% of the procedures. Participants had a high mean DMFT score (18.8 ± 6.8). Oral findings included dental calculus (35.4%), gingival recession (31.1%), and horizontal bone defects (83.3%). CAD was not significantly associated with gingival inflammation and/or salivary calculus ($p=0.063$), although a trend toward significance was observed. A significant association was found between valvular surgery and myocardial revascularization ($p=0.019$). **Conclusion:** Patients awaiting cardiovascular surgery exhibited significant dental treatment needs, underscoring the importance of preventive, restorative, and periodontal care to minimize adverse cardiac outcomes. Our findings align with international guidelines and contribute to promoting safer and more effective perioperative care for individuals with complex cardiac conditions. **Clinical significance statement:** Comprehensive dental evaluations in candidates for cardiovascular surgery are crucial to address prevalent oral health issues, such as periodontal disease and dental infections. Early interventions can reduce systemic inflammation, minimize the risk of postoperative complications, and optimize surgical outcomes, especially in patients with coronary artery disease and multiple comorbidities.

Keywords: Cardiovascular surgical procedures; Gingivitis; Thoracic surgery; Oral health; Oral hygiene.

INTRODUCTION

The World Health Organization recognizes chronic noncommunicable diseases (NCD) as the leading causes of mortality worldwide, with their burden disproportionately affecting low- and middle-income countries¹. Among the most prevalent NCD are cardiovascular diseases (CVD), chronic respiratory conditions, diabetes mellitus, and various forms of cancer¹. The etiology of these conditions is strongly linked to modifiable behavioral and lifestyle factors, including tobacco use, unhealthy dietary patterns, insufficient physical activity, and excessive alcohol consumption^{1,2}. These risk factors

Statement of Clinical Significance

Preoperative dental assessment in patients awaiting cardiac surgery is essential to manage oral infections and reduce perioperative complications. Our findings highlight the need for integrated, interdisciplinary protocols to improve patient safety and surgical outcomes.

highlight the preventable nature of many NCD, making early intervention and comprehensive care essential¹.

CVD encompasses a wide range of conditions affecting the heart and vascular system, including the endocardium, myocardium, cardiac valves, and major

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blood vessels³. Common CVD include coronary artery disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart defects, deep vein thrombosis, pulmonary embolism, and infective endocarditis^{4,5}. Management strategies for CVD typically involve pharmacological interventions, such as anticoagulants, antiplatelet agents, and antihypertensive medications. However, in severe or advanced cases, surgical interventions (e.g., cardiothoracic surgery, vascular surgery, and other invasive cardiovascular procedures) are often required^{6,7}.

Dental care for patients with CVD is a well-established concern in the medical literature, particularly regarding the risks associated with oral surgical procedures in individuals receiving antiplatelet or anticoagulant medications⁸. Another critical aspect is the prevention of infective endocarditis, especially in patients with prosthetic heart valves or other cardiac prostheses⁹. Growing evidence underscores the importance of eliminating sources of oral infection as a preoperative strategy to reduce the risk of postoperative complications. This is particularly relevant, given that many patients require anticoagulant therapy after surgery, complicating the management of untreated oral infections^{10,11}. Moreover, in heart transplant recipients, immunosuppressive therapy increases susceptibility to oral infections, highlighting the need for meticulous dental care in this population¹⁰.

Kumar and Rai¹² demonstrated that individuals with heart disease preparing for cardiac surgery often exhibit poor oral health, particularly untreated dental caries. Similarly, another study found inadequate oral health among individuals awaiting heart transplantation or valvular surgery¹⁰. These findings emphasize the critical need for specialized dental care tailored to the unique medical and surgical contexts of patients with CVD. Comprehensive oral health management in this population is essential not only for improving systemic health outcomes, but also for reducing the risk of complications during and after surgery¹². Despite its recognized importance, preoperative dental evaluations for individuals undergoing cardiac surgery remain inconsistent across cardiothoracic surgical centers worldwide. This gap underscores the need for interdisciplinary collaboration between cardiology, dentistry, and other medical specialties to optimize patient outcomes^{11,13}. While some guidelines exist for managing oral health in patients awaiting cardiac surgery, they are often based on observational studies or clinical experience rather than robust, controlled clinical trials¹⁰. The absence of

standardized, evidence-based protocols emphasizes the necessity of further research to establish integrated preoperative care models that align dental and medical practices.

In Brazil, there is a lack of studies assessing the oral health status of individuals with CVD prior to cardiac surgery^{13,14}. Thus, the purpose of the present study was to share the experience of a hospital care center in southeastern Brazil by evaluating the oral health status and dental treatment needs of patients with CVD preparing for cardiothoracic and/or vascular surgical procedures.

METHODS

Ethical aspects

This study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines¹⁵. Informed consent was obtained from all participants, and the study protocol was approved by the Institutional Ethics Committee (No. 6.596.993). All procedures were performed in accordance with the ethical principles outlined in the Declaration of Helsinki.

Study design, setting, and eligibility criteria

This cross-sectional study included clinical and radiographic data from a convenience sample of cardiac patients who were regular attendees at cardiology outpatient clinics at Clementino Fraga Filho University Hospital, Universidade Federal do Rio de Janeiro, Brazil. Data collection occurred between November 2023 and December 2024. Adult participants aged 18 years or older were eligible for inclusion if they required dental consultations prior to planned cardiothoracic or vascular surgical procedures. Patients were excluded if they had severe clinical conditions, cardiovascular emergencies (e.g., unstable angina pectoris or advanced congestive heart failure), or cognitive impairments, to ensure the accuracy of data collection and prioritize patient safety.

Data collection and radiographic assessment

Clinical data were retrieved from medical and dental records, including the following variables: sociodemographic information (age, sex, and ethnicity), primary cardiovascular condition (e.g., coronary artery disease CAD, congenital heart disease), planned cardiothoracic

or vascular surgery, history of cardiovascular/cerebrovascular events (e.g., infective endocarditis, acute myocardial infarction, pulmonary embolism, thrombosis, or stroke), lifestyle risk factors (e.g., smoking and/or alcohol consumption), presence of comorbidities, and regular medication use.

Participants underwent a comprehensive intraoral examination, during which the following parameters were recorded: caries index (Decayed, Missing, and Filled Teeth DMFT index), periodontal conditions (gingival inflammation, spontaneous gingival bleeding, dental calculus, tooth mobility, and gingival recession), dental wear (abrasion, abfraction, erosion, and attrition), presence of residual roots, tooth fractures, xerostomia, oral mucosal lesions, pain of endodontic origin, and bruxism. Participants also underwent endodontic assessment, including pulp sensitivity tests to cold and heat stimuli, in order to identify pulpal alterations and determine endodontic treatment needs. Oral examinations and clinical data collection were performed by a single calibrated researcher (J.F.V.), who achieved an intra-examiner reliability coefficient of $\kappa=0.81$.

Panoramic radiographs were obtained for treatment planning, focusing on the presence of vertical and horizontal bone defects, intraosseous lesions, and endodontically compromised teeth. Horizontal bone defects (or resorption) were defined as interdental regions where imaginary lines passing through the cemento-enamel junctions of two adjacent teeth and the alveolar bone crest were parallel, with the alveolar bone positioned apically relative to the expected level in a healthy periodontium¹⁶. Vertical bone defects were identified in interdental regions where two imaginary lines—one passing through the cemento-enamel junctions of adjacent teeth and the other along the alveolar bone crest—intersected at an angle¹⁶. The severity of bone defects was classified based on the extent of root involvement as follows: mild (limited to the cervical third), moderate (extending to the middle third), and severe (reaching the apical third). Radiographs were obtained using the Orthophos X extraoral imaging system (Sirona, Dentsply, NY, USA), adhering to acquisition protocols based on the patient's physical stature. Radiographic evaluations were independently performed by two calibrated researchers (J.R.T. and L.M.), both experts in maxillofacial imaging, with an inter-examiner reliability coefficient of $\kappa=0.89$.

Following the radiographic and clinical evaluations, individualized treatment plans were developed for each patient, with dental needs categorized into six groups:

- preventive, including fluoride application, prophylaxis, and oral hygiene instruction;
- restorative, including operative dentistry procedures;
- periodontal, involving scaling, root planning, and other periodontal treatments;
- surgical, including tooth extraction, biopsy, and minor oral surgeries;
- endodontic, including initial treatment or retreatment of endodontic cases;
- rehabilitative/prosthetic, involving fixed or removable prostheses and dental implants.

Statistical analysis

Normality was assessed using the Shapiro-Wilk test. Descriptive statistics for quantitative variables are presented as mean and standard deviation, and for qualitative variables as absolute numbers and frequency. Comparisons between subgroups were made using the χ^2 test, following a two-step approach. In the first step, patients were categorized based on their CVD diagnosis, and comparisons were performed between those with CAD and those with other forms of CVD. In the second step, patients were classified according to the type of planned cardiovascular surgery, with comparisons made between those requiring valvular procedures (e.g., valve replacement or valvuloplasty) and those undergoing only vascular surgery. The analysis was conducted using Jamovi software (version 2.5, The Jamovi Project).

RESULTS

A total of 48 participants who underwent dental evaluations prior to cardiovascular surgery were included in this study. The majority were male ($n=26$; 54.2%) and of mixed ethnicity ($n=29$; 60.4%), with a mean age of 62.4 years (range: 33–81 years). The most common cardiac condition requiring surgical intervention was CAD ($n=26$; 54.2%), followed by aortic stenosis ($n=10$; 20.8%). Coronary artery bypass grafting and valve replacement procedures—performed either alone or in combination—accounted for the majority of scheduled surgeries ($n=47$; 97.9%).

Regarding harmful habits and addictions, 16.7% ($n=8$) of participants reported alcohol consumption, while 8.3% ($n=4$) were current smokers (Table 1).

All patients presented with at least one comorbidity, with systemic hypertension being the most prevalent ($n=30$; 62.5%), followed by diabetes mellitus ($n=16$; 33.3%), and hypercholesterolemia ($n=14$; 29.2%). The most frequently prescribed medications included

diuretic antihypertensives (n=33; 68.8%) and beta-blockers (n=20; 41.7%), as well as oral antidiabetic agents (n=16; 33.3%) and acetylsalicylic acid (n=27; 56.3%) (Supplementary Material 1).

Table 1. Descriptive statistics, characteristics of the sample studied: demographic data, cardiovascular data and habits/addictions, expressed in absolute numbers (n) and frequency (%).

Variables	Total n=48 (100%)
Age	
Mean	62.4
Standard deviation	9.6
Median	64
Interquartile range	48
Range	33–81
Sex	
Male	26 (54.2)
Female	22 (45.8)
Ethnicity	
Mixed	29 (60.4)
White	14 (29.2)
Black	3 (6.3)
Asian	2 (4.2)
Main cardiovascular disease	
Coronary artery disease	26 (54.2)
Aortic stenosis	10 (20.8)
Rheumatic valvular heart disease	7 (14.6)
Congenital heart disease (unspecified)	3 (6.3)
Mitral insufficiency	2 (4.2)
Proposed heart surgery	
Coronary artery bypass grafting	24 (50)
Valve replacement	16 (33.3)
Coronary artery bypass grafting and valve replacement	7 (14.6)
Valvuloplasty	1 (2.1)
Adverse cardiovascular outcomes	
Acute myocardial infarction	8 (16.7)
Stroke	4 (8.3)
Thrombosis	3 (6.3)
Pulmonary embolism	2 (4.2)
Infective endocarditis	1 (2.1)
Harmful habits/addictions	
Alcoholism	7 (14.6)
Smoking	3 (6.2)
Alcoholism + Smoking	1 (2.1)

The clinical evaluation revealed a high DMFT index, with a median score of 20 (range: 0–32). Periodontal alterations were prevalent, with dental calculus (n=17; 35.4%) and gingival recession (n=15; 31.1%) being the most frequently observed conditions. Dental wear, particularly attrition, was identified in 18.8% (n=9) of patients. Radiographic analysis demonstrated a high prevalence of horizontal bone defects (n=40; 83.3%), with most cases classified as moderate to severe (n=21; 43.8%) (Table 2; Figure 1).

Additionally, a considerable number of periapical lesions of endodontic origin were detected (n=14; 29.2%) (Table 2). Among these cases, three patients were indicated for tooth extraction, whereas the remaining patients required endodontic treatment (n=11; 22.9%). Of those requiring endodontic treatment, two presented endodontic pain compatible with irreversible pulpitis, while the others were diagnosed with pulp necrosis associated with periapical lesions.

The majority (n=43/89.5%) of patients required one or more dental treatments prior to undergoing cardiac surgery. The most frequently recommended procedures included preventive care (n=43; 83.3%), restorative treatments (n=34; 70.8%), and periodontal therapy (n=29; 60.4%). Surgical interventions (n=18; 37.5%) and endodontic treatments (n=11; 22.9%) were also indicated as part of the preoperative oral management. Elective rehabilitative/prosthetic treatments (n=31; 64.6%) were recommended for postponement until after the cardiac procedures due to their non urgent nature and the potential to delay cardiovascular surgical treatment.

When comparing the CAD patient group to the remainder of the CVD group, the mean DMFT scores were 19.8 (± 6.7) and 17.6 (± 7.0), respectively, with no statistically significant difference ($p=0.278$). Similarly, no significant associations were found between CAD and other CVD regarding periodontal and endodontic treatment needs ($p=0.444$ and $p=0.977$, respectively), or the presence of horizontal and/or vertical periodontal defects ($p=0.141$). No statistically significant association was also observed between CAD and the presence of gingival/periodontal inflammation and/or salivary calculus, although a trend toward significance was identified ($p=0.063$) (Table 2).

When comparing the valvular surgery patient group to the myocardial revascularization surgery patient group, the mean DMFT scores were 17.9 (± 6.7) and 19.6 (± 6.9), respectively, with no statistically significant difference ($p=0.395$). Similarly, no significant associations were found between the two groups regarding periodontal and endodontic treatment needs ($p=0.768$ and $p=0.731$,

respectively), or the presence of horizontal and/or vertical periodontal defects ($p=0.146$). However, a statistically significant association was observed between the groups concerning the presence of gingival/periodontal inflammation and/or salivary calculus ($p=0.019$) (Table 3).

DISCUSSION

The oral health status of individuals awaiting cardiothoracic or vascular surgeries is an important determinant in preventing severe complications, such as infective endocarditis¹⁷. The present study aimed to evaluate the oral health condition and dental needs of patients prior to cardiac surgery, with the overarching goal of enhancing patient safety and optimizing postoperative outcomes. International guidelines emphasize the importance of preoperative dental evaluations in reducing systemic risks, including infective endocarditis and prosthetic valve infections^{18,19}. The American Heart Association (AHA) and the European Society of Cardiology (ESC) recommend the elimination of active infections, management of periodontal disease, and resolution of oral lesions to minimize microbial burden and systemic inflammation^{9,20,21}. Similarly, the 2024 guideline for perioperative cardiovascular evaluation from the Brazilian Society of Cardiology endorses routine dental and periodontal assessments before cardiovascular surgery²². However, practical barriers—such as stigma, fear, logistical challenges, and a lack of consensus

among dental professionals—continue to hinder the standardization of preoperative dental care, particularly in Brazil^{13,14,23}. The findings of this study, in turn, emphasize the urgent need for interdisciplinary collaboration between dentists and cardiologists to identify potential sources of infection and implement targeted interventions. Integrating these measures into the Brazilian healthcare



Figure 1. Radiographic assessment. **(A)** Cropped image of panoramic radiograph demonstrating horizontal bone defects between teeth 15 and 17, vertical bone defect associated with the distal face of tooth 45, and widespread presence of dental calculus (patient no. 31). **(B)** Cropped image of panoramic radiograph demonstrating vertical bone defect associated with the mesial face of tooth 27 (patient no. 41).

Table 2. Descriptive statistics and comparisons between coronary artery disease group and other diseases considering mean DMFT, periodontal disease and endodontic treatment requirements, in absolute numbers (n) and frequency (%).

	Coronary artery disease	Other diseases	Results
n	26	22	
Mean DMFT	19.8 (± 6.7)	17.6 (± 7.0)	$p=0.278^a$
Periodontal treatment requirement			
Presence	17 (65.3)	12 (54.5)	$p=0.444^b$
Absence	9 (44.7)	10 (45.5)	
Periodontal defects (horizontal and/or vertical)			
Presence	24 (92.3)	24 (92.3)	$\chi^2=2.16$
Absence	2 (7.7)	2 (7.7)	$p=0.141^b$
Gingival inflammation and/or salivary calculus			
Presence	14 (53.8)	6 (27.3)	$\chi^2=3.46$
Absence	12 (45.2)	16 (72.7)	$p=0.063^b$
Endodontic treatment requirement			
Presence	6 (23.1)	5 (22.7)	$\chi^2=8.25$
Absence	20 (76.9)	17 (77.3)	$p=0.977^b$

^aAccording to Student T-test; ^baccording to χ^2 test.

Table 3. Descriptive statistics and comparisons between patients that will perform valvular interventions group and myocardial revascularization group considering mean DMFT mean DMFT, periodontal disease and endodontic treatment requirements, in absolute numbers (n) and frequency (%).

	Valvular surgery	Myocardial revascularization	Results
n	24	24	
Mean DMFT	17.9 (± 6.7)	19.6 (± 6.9)	$p=0.395^a$
Periodontal treatment requirement			
Presence	14 (58.3)	15 (62.5)	$\chi^2=0.08$
Absence	10 (41.6)	9 (37.5)	$p=0.768^b$
Periodontal defects (horizontal and/or vertical)			
Presence	20 (92.3)	22 (91.6)	$\chi^2=4.00$
Absence	4 (7.7)	2 (8.4)	$p=0.146^b$
Gingival inflammation and/or salivary calculus			
Presence	6 (25.0)	14 (58.4)	$\chi^2=5.49$
Absence	18 (75.0)	10 (41.6)	$p=0.019^b$
Endodontic treatment requirement			
Presence	5 (22.7)	6 (23.1)	$\chi^2=0.11$
Absence	17 (77.3)	20 (76.9)	$p=0.731^b$

^aAccording to Student T-test; ^baccording to χ^2 test.

system could help align local practices with international standards, thereby improving surgical outcomes, reducing postoperative risks, and lowering healthcare costs related to preventable complications²².

CAD, a condition characterized by atherosclerosis and chronic inflammation, emerged as the most prevalent cardiovascular condition among participants in this study, reflecting its widespread occurrence and clinical relevance²⁴. CAD is closely associated with angina pectoris (stable or unstable) and acute myocardial infarction (AMI), both of which carry serious health implications. Globally, CAD remains a leading cause of mortality and has been the primary cause of death in Brazil over the past decade, except for 2020, when the COVID-19 pandemic altered mortality trends²⁵. According to the 2023 Brazilian Cardiovascular Statistics bulletin, the age-standardized mortality rate for CAD was 67.1 per 100,000 inhabitants, with AMI contributing to substantial economic burdens, including an average cost of US\$ 48,118 per case and productivity losses estimated at US\$ 18,678.13²⁵. In this context, managing dental care for individuals with CAD presents distinct challenges. Long-term antiplatelet therapy increases bleeding risk during oral surgical procedures⁸. Additionally, the stress and anxiety associated with dental treatments can trigger acute angina episodes, requiring immediate interventions such as nitrate administration²⁶. These complexities contribute to the limited access to dental care among individuals with CAD, as well as the

poor oral health status observed in this study. Overcoming these barriers requires an integrated medical-dental approach to reduce disparities in oral health outcomes and improve care for this vulnerable population¹³.

A key finding of the present study was that 50% of patients required valve replacement or valvuloplasty, with many presenting high DMFT scores and requiring periodontal, surgical, and/or endodontic treatments. Although the DMFT values observed were comparable to those reported in epidemiological studies of the Brazilian populations, these findings remain clinically relevant, considering the systemic vulnerability of this group and the importance of adequate oral healthcare in the preoperative cardiac setting. A Brazilian population-based study reported mean DMFT values ranging from 20.1 among adults aged 35 to 44 years with high caries severity to 27.53 among older adults aged 65 to 74 years in national surveys^{27,28}. In these populations, tooth loss represented a major component of the index and remained strongly associated with socioeconomic inequalities and limited access to oral healthcare^{27,28}. Nevertheless, these findings do not diminish the clinical relevance of the present results, since patients undergoing cardiovascular surgery represent a medically vulnerable population in whom poor oral conditions may have important systemic and perioperative implications.

The AHA emphasizes the importance of prophylactic antibiotics for patients with prosthetic valves or

implantable cardiac devices undergoing dental procedures involving manipulation of gingival tissue, the periapical region, or perforation of the oral mucosa⁹. Prophylaxis aims to prevent infective endocarditis caused by viridans group streptococci, further underscoring the role of preoperative dental evaluations in reducing risks and improving surgical outcomes. In addition, many patients undergoing valve replacement may require long term anticoagulant or antiplatelet therapy after surgery, which can complicate the management of future invasive dental procedures, particularly extractions and periodontal interventions⁸. Therefore, the elimination of oral infectious foci before cardiac surgery is especially relevant, as it may reduce the need for invasive dental treatment during postoperative anticoagulation therapy and minimize the risk of bleeding complications and infective endocarditis.

Periodontal alterations were highly prevalent in the study population, including dental calculus, gingival recession, tooth mobility, and radiographic evidence of horizontal and vertical bone resorption. In addition, our study found a trend toward significance between CAD and the presence of gingival inflammation and/or salivary calculus when compared to other CVD. Patients scheduled for valvular surgery, in comparison to those undergoing myocardial revascularization, also exhibited some degree of periodontal involvement. These findings align with previous studies, such as Nakamura et al.²⁹, which identified a high prevalence of periodontitis among cardiac patients awaiting valve surgery. Given that periodontal pathogens can act as triggers for infective endocarditis in individuals with prosthetic heart valves, targeted periodontal interventions are warranted²⁹. However, the literature remains inconclusive regarding the comparative benefits of scaling and root planing with adjunctive antibiotics versus supragingival scaling alone in preventing cardiovascular complications³⁰. Collaboration between dental and medical teams is essential to develop individualized periodontal treatment plans, minimize systemic inflammation, and optimize outcomes for patients with or at risk of CVD²⁰.

The presence of multiple comorbidities—including systemic arterial hypertension, diabetes mellitus, hypercholesterolemia, rheumatic fever, and hypothyroidism—along with the use of multiple medications (e.g., diuretics, antiplatelet agents, beta-blockers, oral antidiabetic agents, hypocholesterolemic, and antianginal agents), underscores the complexity of dental care for cardiac patients. These medical characteristics likely reflect the fact that the majority of the study sample consisted of middle-aged and older adults (>65 years).

In their meta-analysis, Wang et al.³¹ estimated the overall prevalence of polypharmacy among the elderly at 39.1% (95%CI 35.5–42.7). This highlights the need for careful evaluation of pharmacokinetic and pharmacodynamic interactions when planning dental care for this population. In patients with multimorbidity who are taking multiple medications, the risk of drug–drug and drug–disease interactions increases substantially. These interactions must be meticulously assessed during dental evaluations to ensure safe and effective treatment, particularly in the context of upcoming cardiovascular surgery.

Challenges in addressing the dental needs of patients awaiting cardiac surgery are well documented. A retrospective study evaluating patients undergoing various cardiovascular procedures, including surgical and transcatheter valve replacement, as well as coronary artery bypass grafting, demonstrated a significantly reduced number of complications related to oral care³². The observed complications were primarily associated with oral surgical procedures, with bleeding being the most frequent. Nevertheless, among the 265 patients included in the study, only two experienced major bleeding episodes. These findings are consistent with those of other authors who emphasize that dental treatments, including procedures with bleeding risk, can be safely performed in individuals with heart disease who are taking antiplatelet agents and/or anticoagulants^{8,26}. The key to ensuring safety lies in performing these procedures under the supervision of specialized dentists with access to appropriate local hemostatic measures.

Conversely, data from a systematic review highlight the need for caution when performing dental procedures in patients with heart disease prior to cardiac surgery¹⁰. The authors emphasize that, despite the absence of detailed guidelines from scientific societies, the extent of dental interventions should be carefully tailored to the patient's clinical condition. For instance, extensive dental clearance should be avoided in patients with severe heart failure, as it may pose unnecessary medical risks and lead to delays in the planned cardiac surgery.

Despite its limitations as a cross-sectional study, this research provides valuable insights within the Brazilian healthcare context, where dental teams in large hospitals remain scarce and where evidence-based, individualized protocols for managing medically complex patients should be developed. As highlighted by Cotti et al.¹⁷ in a joint publication by the Italian Society of Endodontics and the Italian Society of Cardiovascular Endodontics, the feasibility of providing appropriate

dental treatment depends not only on the patient's cardiovascular condition—specifically, disease severity and urgency of intervention—but also on the time available and the prognosis of the proposed dental treatment. One limitation of the present study is that radiographic assessments were conducted exclusively using panoramic radiography. Although this imaging modality is commonly employed in preoperative dental evaluations, it has inherent limitations, particularly in detecting carious lesions and periapical defects. However, its use was opportunistic, as it forms part of the standard pre-surgical dental evaluation protocol in the referenced hospital service. Another drawback is the lack of follow-up with participants after cardiovascular surgery, which precluded an evaluation of the impact of the proposed dental interventions on postoperative outcomes. Future multicenter studies involving larger and more diverse populations could enhance the external validity of these findings and support the integration of dental care into broader medical management strategies.

In addition, another limitation of the present study is that standardized periodontal classification systems, such as the Community Periodontal Index or Periodontal Screening and Recording, were not applied. The oral assessment protocol was primarily designed to identify active infectious foci and urgent dental treatment needs in patients requiring timely cardiovascular surgical intervention. Therefore, the examinations prioritized rapid clinical decision making and preoperative risk reduction rather than detailed periodontal epidemiological classification. Future studies should incorporate standardized periodontal assessment tools to improve reproducibility and facilitate comparisons across different populations and healthcare settings.

CONCLUSION

In summary, this study revealed substantial dental care needs among individuals awaiting cardiovascular surgery, particularly in relation to preventive, restorative, and periodontal treatments. Patients with CAD exhibited high DMFT scores, periodontal alterations, and a high prevalence of gingivitis/periodontal inflammation and salivary calculus. These oral health issues were also frequently observed among patients scheduled for valvular surgery. Collectively, these findings underscore the importance of comprehensive preoperative dental evaluations to minimize oral health risks and improve surgical outcomes in patients with complex cardiac and systemic conditions.

AUTHORS' CONTRIBUTIONS

JFV: Data curation, Formal analysis. DB: Data curation, Formal analysis. JAAA: Formal analysis, Writing – review & editing. SPO: Formal analysis. BABA: Formal analysis. LM: Methodology, Formal analysis. JRT: Supervision.

CONFLICT OF INTEREST STATEMENT

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Competing interests: The authors declare that they have no conflict of interest.

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DATA AVAILABILITY STATEMENT

The data will be available upon reasonable request from the corresponding author.

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