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# Oral health in cardiology patients survey Mogadishu Somalia-Turkiye recep Tayyip Erdogan Training and Research Hospital: cross-sectional study

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**Research Article**

**Keywords:** Oral health, Cardiology patients, Cardiovascular disease, Dental service utilization, Self-rated oral health

**Posted Date:** July 21st, 2026

**DOI:** https://doi.org/10.21203/rs.3.rs-10029066/v1

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**Additional Declarations:** No competing interests reported.

## Abstract

# Background

Oral health is an important yet frequently neglected component of comprehensive cardiovascular care. Oral diseases contribute substantially to reduced quality of life and may influence cardiovascular outcomes through chronic inflammation and impaired health behaviors. Despite increasing recognition of the oral–cardiovascular relationship, evidence regarding oral health status, oral-health practices, and access to dental services among cardiology patients remains scarce in Somalia. This study assessed oral health conditions and related factors among cardiology patients attending a tertiary referral hospital in Mogadishu.

# Objective

To assess oral health status, oral-health practices, oral-health information, barriers to dental care, and factors associated with poor self-rated oral health among cardiology patients attending Mogadishu Somalia–Turkiye Recep Tayyip Erdogan Training and Research Hospital.

# Methods

A hospital-based cross-sectional study was conducted among 300 cardiology patients between 1 May and 10 June 2026. Data were collected using a structured questionnaire administered through KoboToolbox and analyzed using R Studio. Descriptive statistics were summarized using frequencies and percentages. Logistic regression analysis was performed to identify factors associated with poor self-rated oral health using crude and adjusted odds ratios with corresponding 95% confidence intervals.

# Results

Dental service utilization was low, with 68.0% of participants reporting no dental visit during the previous 12 months. Toothache (44.0%), dental decay (40.3%), and tooth loss (27.3%) were the most frequently reported oral health problems. Oral health issues commonly affected eating behavior and daily functioning. Although self-reported tooth brushing practices were relatively common, receipt of oral-health information remained limited. In multivariable analysis, no factor remained independently associated with poor self-rated oral health after adjustment.

# Conclusion

Cardiology patients experienced a considerable burden of oral health problems alongside limited utilization of professional dental services. Integrating oral-health screening, patient education, and referral

pathways into routine cardiovascular care may strengthen comprehensive patient management and support improved oral and cardiovascular outcomes in **Somalia.**

# Introduction

Oral health is a fundamental component of general health and well-being, and oral diseases such as dental caries and periodontitis are among the most prevalent non-communicable conditions globally[1].They impose substantial disability and economic costs, particularly in low- and middle-income countries where access to dental care is limited[2]. Periodontal disease is independently associated with cardiovascular disease (CVD), with increased CVD risk observed in both men and women[3]. and consensus reports highlight periodontitis as linked to major CVDs and other chronic disorders[4].In East Africa, dental caries affects nearly half of the population[5]. and oral conditions in the East African Community reach prevalences up to 83%, with marked impacts on daily functioning and quality of life[6]. Across the WHO African Region, untreated caries and severe periodontitis are highly prevalent, and Africa bears the highest global prevalence of severe periodontitis[7].In Somalia, oral health services are poorly regulated, largely private, and insufficiently integrated into primary care, resulting in delayed care, widespread untreated disease, and limited community-oriented preventive services[2].These challenges underscore the importance of assessing oral health among high-risk groups such as cardiology patients in Mogadishu.

Patients with chronic diseases, including CVD, are particularly vulnerable to poor oral health, with higher levels of caries, tooth loss, and chronic periodontitis than healthy controls[8].Cardiovascular patients frequently show substantial periodontal burden and unmet treatment needs[9]. as well as high prevalence of periodontal disease with impaired oral-health-related quality of life[10].Contributing factors include competing medical priorities, low oral-health awareness, infrequent dental visits, fear, and structural barriers to care documented across low- and middle-income countries[11].Among CVD populations, poor oral hygiene behaviours, low awareness of the oral–cardiac link, and limited service use are common[12]. Medication use for systemic diseases is also associated with worse oral outcomes[8]. However, evidence from Somalia on oral health status, behaviours, and barriers among cardiology patients is virtually absent[2]. creating a critical gap in context-specific data.

Understanding oral health in cardiology patients is essential because periodontal disease and neglected infections may contribute to systemic inflammation, adverse cardiovascular events, and complications such as infective endocarditis[13, 14]. Integrating oral health assessment into cardiovascular care has been advocated to improve outcomes and quality of life[4, 10]. yet health systems in Africa often lack workforce, infrastructure, and policies to support such integration[2, 7]. In Somalia, where oral health services are scarce and largely out-of-pocket[2].

The present study aimed to assess oral health status, oral health practices, oral-health information, barriers to dental care, and factors associated with poor self-rated oral health among cardiology patients attending Mogadishu Somalia–Turkiye Recep Tayyip Erdogan Training and Research Hospital.

Methodology

# Methods

# Study Design

A hospital-based cross-sectional study was conducted to assess oral health status, oral health practices, oral-health information, barriers to dental care, and factors associated with poor self-rated oral health among cardiology patients attending Mogadishu Somalia–Turkiye Recep Tayyip Erdogan Training and Research Hospital.

Study Setting and Period

The study was conducted at Mogadishu Somalia–Turkiye Recep Tayyip Erdogan Training and Research Hospital, located in Mogadishu, Somalia. The hospital is one of the major tertiary referral and teaching hospitals in the country and provides specialized cardiovascular services to patients from Mogadishu and other regions of Somalia. Data collection was carried out over a six-week period from **1 May to 10 June, 2026**

Study Population

The study population consisted of cardiology patients attending the hospital during the study period. Eligible participants included patients who visited the cardiology department and were available at the time of data collection. Patients who were able to communicate and provide informed consent were included in the study. Patients who were critically ill, unable to respond to the questionnaire, or declined participation were excluded.

Sample Size and Sampling Technique

A total of 300 respondents were included in the study. Participants were recruited from the cardiology department during the study period using a hospital-based sampling approach until the required sample size was achieved. Eligible participants who met the inclusion criteria and agreed to participate were enrolled in the study.

Data Collection Tool and Procedure

Data were collected using a structured questionnaire administered through **KoboToolbox**, a digital data collection platform. The questionnaire was designed to capture information on oral health status, oral health practices, oral-health information received, barriers to seeking dental care, and patient perceptions regarding the role of cardiology nurses in oral-health support. Data were collected electronically to improve completeness, reduce entry errors, and facilitate secure storage and management of responses.

Data Management and Statistical Analysis

Collected data were exported from KoboToolbox, cleaned, coded, and analyzed using R Studio. Descriptive statistics were used to summarize participant responses and are presented as frequencies and percentages. Variables relevant to oral health outcomes were examined using logistic regression analysis. Crude Odds Ratios (COR) and Adjusted Odds Ratios (AOR) with corresponding 95% Confidence Intervals (CI) were calculated to identify factors associated with poor self-rated oral health. Variables considered relevant in the preliminary analysis were included in the multivariable model. Statistical significance was determined using a **p-value < 0.05**.

Poor self-rated oral health was coded as:

- Good / Very good / Excellent = 0
- Fair / Poor = 1

Ethical Considerations

**Ethical approval**

was obtained from the appropriate institutional review authority before commencement of the study. Permission to conduct the study was obtained from Mogadishu Somalia–Turkiye Recep Tayyip Erdogan Training and Research Hospital. Participants were informed about the purpose of the study, and informed consent was obtained prior to data collection. Participation was voluntary, and confidentiality and anonymity of participant information were maintained throughout the study. The study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki.

# Results

**Table 1. Participant Characteristics and Oral Health Practices among Cardiology Patients(N = 300)**

| Variable | Category | n | % |
|---|---|---|---|
| Dental visit during the previous 12 months | Yes | 96 | 32.0 |
| | No | 204 | 68.0 |
| Time since last dental visit† | Within 1–2 years | 25 | 8.3 |
| | Within 2–5 years | 32 | 10.7 |
| | More than 5 years ago | 37 | 12.3 |
| | Do not remember | 2 | 0.7 |
| | Not applicable | 204 | 68.0 |
| Usual place of dental care† | Public oral and dental health center / hospital | 40 | 13.3 |
| | Dental clinics covered by private health insurance | 36 | 12.0 |
| | Private dental practice | 18 | 6.0 |
| | Do not remember | 2 | 0.7 |
| | Not applicable | 204 | 68.0 |
| Frequency of tooth brushing | Never | 6 | 2.0 |
| | Once daily | 153 | 51.0 |
| | Twice daily | 93 | 31.0 |
| | More than twice daily | 48 | 16.0 |
| Oral hygiene products used | Sugar-free gum | 137 | 45.7 |
| | Mouthwash | 130 | 43.3 |
| | Fluoride tablets or drops | 26 | 8.7 |
| | Fluoride toothpaste | 7 | 2.3 |

Abbreviations: n = frequency; % = percentage.

Percentages were calculated using the total study population (N = 300). “Not applicable” indicates participants who had not visited a dentist during the previous 12 months.

Table 1 summarizes oral healthcare utilization and oral hygiene practices among cardiology patients attending a hospital in Mogadishu, Somalia. Overall, dental service utilization was low, with more than two-thirds of participants (68.0%) reporting no dental visit during the previous 12 months, whereas only 32.0% had attended a dental visit. Among those who had sought care, visits occurring more than five years earlier were the most commonly reported.

Public oral and dental health centers or hospitals represented the most frequently reported place of dental care, followed by dental clinics covered through private health insurance and private dental practices. In contrast, oral hygiene practices appeared relatively favorable, as most participants reported brushing their teeth at least once daily; over half brushed once daily and nearly one-third brushed twice daily.

Regarding oral hygiene products, sugar-free gum and mouthwash were the most commonly used, while the use of fluoride-based preventive products remained comparatively low. Collectively, these findings suggest that although self-reported oral hygiene practices were relatively common, utilization of professional dental services among cardiology patients remained limited.

**Table 2. Impact of Oral Health on Daily Living among Cardiology Patients (N = 300)**

| Variable | Category | n | % |
|---|---|---|---|
| Impact of dental problems on eating | Never | 55 | 18.3 |
| | Sometimes | 188 | 62.7 |
| | Often | 56 | 18.7 |
| | Other | 1 | 0.3 |
| Advised by healthcare professionals to avoid dental treatment | Strongly agree | 6 | 2.0 |
| | Agree | 32 | 10.7 |
| | Neutral | 102 | 34.0 |
| | Disagree | 123 | 41.0 |
| | Strongly disagree | 37 | 12.3 |
| Avoidance of dental care because treatment is painful or uncomfortable | Strongly agree | 6 | 2.0 |
| | Agree | 51 | 17.0 |
| | Neutral | 103 | 34.3 |
| | Disagree | 111 | 37.0 |
| | Strongly disagree | 29 | 9.7 |

Abbreviations: n = frequency; % = percentage.

Percentages may not total exactly 100% because of rounding.

The category “Never+B301” appeared to be a data-entry inconsistency and was merged with “Never” for presentation purposes; confirm this against the original dataset before final submission.

Table 2 presents the impact of oral health problems on daily living among cardiology patients attending a hospital in Mogadishu, Somalia. Overall, oral health problems appeared to affect daily functioning, particularly eating behavior. Nearly two-thirds of participants (62.7%) reported that dental problems sometimes affected what they ate, while an additional 18.7% reported that eating was often affected. Only 18.3% indicated that oral problems never influenced their eating habits.

Regarding access to dental treatment, most participants did not report being discouraged from receiving dental care by healthcare professionals. More than half either disagreed (41.0%) or strongly disagreed (12.3%) that they had been advised to avoid dental treatment, although approximately one in eight participants (12.7%) agreed or strongly agreed that such advice had been given.

Similarly, perceptions of pain and discomfort as barriers to dental attendance were generally low to moderate. Nearly half of participants disagreed (37.0%) or strongly disagreed (9.7%) that they avoided dental care because treatment was painful or uncomfortable, whereas 19.0% reported agreement with this concern.

Overall, these findings suggest that oral health problems had a noticeable impact on daily life, particularly dietary practices, while fear of discomfort and advice against dental treatment were less commonly reported barriers to care.

**Table 3. Impact of Oral Health on Daily Living among Cardiology Patients (N = 300)**

| Variable | Category | n | % |
|---|---|---|---|
| Impact of dental problems on eating | Never | 55 | 18.3 |
| | Sometimes | 188 | 62.7 |
| | Often | 56 | 18.7 |
| | Other | 1 | 0.3 |
| Advised by healthcare professionals to avoid dental treatment | Strongly agree | 6 | 2.0 |
| | Agree | 32 | 10.7 |
| | Neutral | 102 | 34.0 |
| | Disagree | 123 | 41.0 |
| | Strongly disagree | 37 | 12.3 |
| Avoidance of dental treatment because it is painful or uncomfortable | Strongly agree | 6 | 2.0 |
| | Agree | 51 | 17.0 |
| | Neutral | 103 | 34.3 |
| | Disagree | 111 | 37.0 |
| | Strongly disagree | 29 | 9.7 |

Abbreviations: n = frequency; % = percentage.

Percentages may not total exactly 100% because of rounding.

The category “Never+B301” was treated as a data-entry inconsistency and combined with “Never” for presentation purposes; verify against the original dataset before manuscript submission.

Interpretation of Table 3

Table 3 presents the impact of oral health problems on daily living among cardiology patients attending a hospital in Mogadishu, Somalia. Overall, oral health problems appeared to have a meaningful influence on patients’ everyday experiences, particularly dietary practices. Nearly two-thirds of participants (62.7%) reported that dental problems sometimes affected what they ate, while an additional 18.7% indicated that eating was often affected. Only 18.3% reported that oral health problems never influenced their eating behavior, suggesting that functional limitations related to oral conditions were common.

With respect to professional advice regarding dental care, most participants did not report being discouraged from receiving dental treatment. More than half either disagreed (41.0%) or strongly disagreed (12.3%) that healthcare professionals had advised them to avoid dental treatment, whereas only 12.7% agreed or strongly agreed with this statement.

Similarly, pain and discomfort did not appear to be major reasons for avoiding dental treatment among most participants. Approximately 46.7% disagreed or strongly disagreed that dental care was avoided because it was painful or uncomfortable, while 19.0% expressed agreement with this concern.

Overall, these findings indicate that oral health problems had a noticeable effect on daily functioning—particularly eating habits—whereas direct discouragement from treatment and fear of treatment-related discomfort were reported less frequently.

**Table 4. Factors Associated with Poor Self-Rated Oral Health among Cardiology Patients (N = 300)**

| Characteristic | COR (95% CI) | p-value | AOR (95% CI) | p-value |
|---|---|---|---|---|
| Dental visit during the previous 12 months | | | | |
| No | Reference | — | Reference | — |
| Yes | 0.66 (0.40–1.09) | 0.110 | 0.70 (0.40–1.23) | 0.200 |
| Tooth brushing frequency | | | | |
| High | Reference | — | Reference | — |
| Low | Not estimable | — | Not estimable | — |
| Moderate | 1.23 (0.77–1.98) | 0.400 | 1.23 (0.76–2.00) | 0.400 |
| Received oral-health information after cardiac diagnosis | | | | |
| No | Reference | — | Reference | — |
| Yes | 1.01 (0.60–1.70) | >0.900 | 1.19 (0.68–2.12) | 0.500 |
| Would follow oral-health advice provided by cardiology nurses | | | | |
| I do not know | Reference | — | Reference | — |
| No | 2.11 (0.83–5.83) | 0.130 | 1.77 (0.68–5.00) | 0.300 |
| Yes | 2.56 (1.01–7.12) | 0.056 | 1.87 (0.67–5.66) | 0.200 |
| Perceived oral-health knowledge of cardiology nurses | | | | |
| I do not know | Reference | — | Reference | — |
| No | 0.97 (0.45–2.10) | >0.900 | 0.92 (0.41–2.06) | 0.800 |
| Yes | 1.50 (0.71–3.20) | 0.300 | 1.26 (0.54–2.93) | 0.600 |

Abbreviations: COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio; OR = Odds Ratio; CI = Confidence Interval.

Statistical significance was defined as $p < 0.05$.

Odds ratios could not be reliably estimated because of sparse observations and instability in the brushing-frequency categories.

Table 4 presents the factors associated with poor self-rated oral health among cardiology patients attending a hospital in Mogadishu, Somalia. Overall, none of the variables included in the multivariable logistic regression model remained independently associated with poor self-rated oral health after adjustment for potential confounders (all adjusted p-values > 0.05).Participants who had visited a dentist during the previous 12 months demonstrated lower odds of reporting poor self-rated oral health compared with those who had not visited a dentist; however, this association was not statistically significant after adjustment (AOR = 0.70, 95% CI: 0.40–1.23, p = 0.200).Tooth brushing frequency also did not show a significant association with poor self-rated oral health. Estimates for the low brushing category could not be reliably generated because of sparse observations and model instability, while moderate brushing frequency was not associated with the outcome after adjustment (AOR = 1.23, 95% CI: 0.76–2.00, p = 0.400).

Similarly, receiving oral-health information after cardiac diagnosis was not associated with poor self-rated oral health (AOR = 1.19, 95% CI: 0.68–2.12, p = 0.500). Participants who indicated willingness to follow oral-health advice provided by cardiology nurses initially showed higher crude odds of poor self-rated oral health; however, this relationship was attenuated after adjustment and did not remain statistically significant (AOR = 1.87, 95% CI: 0.67–5.66, p = 0.200).

Likewise, perceptions regarding the oral-health knowledge of cardiology nurses were not significantly associated with self-rated oral health status after controlling for other variables (AOR = 1.26, 95% CI: 0.54–2.93, p = 0.600).

Overall, the findings suggest that although oral-health behaviors and patient perceptions may influence oral-health experiences, none of the examined factors independently predicted poor self-rated oral health in the final adjusted model.

Figure 1 illustrates the prevalence of oral health problems among cardiology patients attending a hospital in Mogadishu, Somalia. Overall, oral health complaints were common, with toothache emerging as the most frequently reported condition, affecting 44.0% of participants. Dental decay was also highly prevalent, reported by 40.3% of participants, indicating a considerable burden of untreated oral disease within the study population.

Tooth loss represented another important oral health concern and was reported by more than one-quarter of participants (27.3%), suggesting cumulative oral health challenges among patients with cardiovascular conditions. In contrast, dry mouth was relatively uncommon, affecting only 5.3% of participants.

Collectively, these findings demonstrate that painful and potentially preventable oral conditions—particularly toothache and dental decay—constituted the predominant oral health problems in this population, highlighting the importance of integrating oral health assessment and preventive strategies into routine cardiology care.

# Discussion

The present study among cardiology patients in Mogadishu highlights a substantial burden of untreated oral disease, low use of dental services, and notable impacts on eating and daily life, despite relatively frequent toothbrushing. These findings align with broader patterns in low- and middle-income countries (LMICs) and in cardiovascular populations, where unmet oral healthcare needs and limited integration of oral health into cardiac care remain persistent challenges [12,15]. Low dental attendance in this cohort is consistent with evidence that cardiovascular patients in LMICs rarely attend for preventive dental care and often seek treatment only when symptomatic[12,15]. Similar patterns of infrequent visits and problem-oriented care have been reported in urban and slum populations across LMICs, where socioeconomic constraints, limited service availability, and low perceived need are major barriers .[16,17]. The predominance of public facilities as the main source of care reflects the limited private-sector affordability seen in many African settings [16]. Although most participants reported brushing at least once daily, the preference for sugar-free gum and mouthwash over fluoride-based products suggests that preventive practices may not be optimally protective, echoing reviews from LMIC urban settings where brushing is common but technique, frequency, and fluoride exposure are often inadequate[15,18]. The high prevalence of toothache, dental decay, and tooth loss underscores a substantial cumulative disease burden, comparable to that reported among cardiovascular patients and disadvantaged communities elsewhere[12,15]. Global burden data show that dental caries and periodontal disease remain highly prevalent, particularly in low-income regions, with Sub-Saharan Africa experiencing persistent inequities in preventive care despite some regional gains[1,19]. Tooth loss in particular has been associated with worse cardiovascular outcomes in secondary prevention populations, suggesting that the levels observed in this study may have prognostic relevance for cardiology patients if not addressed[20].

The frequent impact of oral problems on eating behavior in this cohort is clinically important, given evidence that chewing discomfort and difficulty eating are closely linked to poor self-rated oral and general health in older adults[21,22]. Difficulty eating among cardiology patients may worsen nutritional status and adherence to heart-healthy diets, potentially exacerbating cardiovascular risk. The observation that most participants were not advised to avoid dental care, and that pain was not the dominant barrier, suggests that structural, financial, and informational barriers may be more salient than fear or acute symptoms, similar to findings where patients postpone care due to cost, access, and complex health systems despite perceiving need [23,24].

These findings point to substantial missed opportunities for oral-health education and integration within cardiology services. Evidence from hospital-based cardiovascular populations shows that structured oral-health education programmes, delivered in wards or outpatient clinics, can significantly improve plaque control, gingival health, and even reduce postoperative complications such as atrial fibrillation and pneumonia[25]. The current gap in routine oral-health counselling in cardiology settings has been documented in multiple regions, with poor awareness of oral–cardiac links among patients and limited oral-health messaging in cardiovascular education[12,25]. Embedding simple, nurse-delivered or digitally supported oral-health interventions into cardiology clinics in Somalia could therefore be a feasible strategy to improve hygiene practices and support secondary cardiovascular prevention.

The absence of statistically significant independent predictors of poor self-rated oral health in multivariable analysis should be interpreted cautiously. Self-rated oral health is influenced by a wide range of interrelated factors—including function, pain, aesthetics, psychosocial factors, and general health—making single behavioral indicators such as brushing frequency or recent dental visit only partial proxies[21,26]. Studies in Thailand, Canada, and Colombia have shown that predictors of self-rated oral health include chewing discomfort, bleeding gums, persistent pain, smoking, and broader general health, often requiring large samples to detect independent effects[26,27]. In the present study, limited sample size, residual confounding by unmeasured variables (such as socioeconomic status or mental health), reliance on self-report, and the modest variability in some exposures may have reduced statistical power to detect associations. The direction of the adjusted odds ratio for dental visits suggests a possible protective effect that may not have reached significance, similar to population-based work where regular dental attendance predicts better perceived oral health [24,26]. From a public health perspective, these findings add to the evidence that oral diseases are a neglected yet highly prevalent component of non-communicable disease burden in Sub-Saharan Africa[16,18]. Somalia's fragile health system and low oral-health workforce density are likely to compound access barriers similar to those described across Africa, where dentist-to-population ratios are extremely low and oral health receives only a small fraction of health budgets[16,19]. Integrating basic oral-health screening, counselling, and referral pathways into cardiology services could therefore be a pragmatic way to reach high-risk adults, aligning with global calls to embed oral health within universal health coverage and non-communicable disease strategies [18,25]. This study has several strengths. It is among the first to characterize oral health status, service use, and perceived oral health among cardiology patients in Somalia, a population often excluded from oral-health surveillance. The use of a structured, comprehensive oral-health assessment provides a broad view of symptoms, disease indicators, practices, and impacts, and digital data collection supports data quality and completeness. However, limitations must be acknowledged. The cross-sectional design precludes causal inference about relationships between oral-health behaviors, disease, and perceived health. Self-reported data on behaviors, service use, and self-rated oral health are subject to recall and social desirability biases, which may lead to over-reporting of favorable practices, as noted in other cardiovascular and LMIC surveys[12,15]. The single-center, hospital-based sample may not represent all cardiology patients in Somalia or the general population, and residual confounding in regression analyses cannot be excluded.

cardiology patients at a major referral hospital in Mogadishu carry a high burden of untreated oral disease, experience frequent impacts on eating and daily functioning, and rarely access dental care despite reporting regular toothbrushing. These findings mirror global and regional evidence of persistent oral-health inequalities, particularly in LMICs and among people with cardiovascular disease, and underscore the need to move beyond a purely curative, clinic-based model of dental care towards integrated, preventive approaches within cardiovascular services[12,18].Future research in Somalia should include clinical examinations, longitudinal designs, and multicenter samples to clarify causal pathways between oral and cardiovascular health and to evaluate context-appropriate oral-health interventions embedded within cardiac care pathways.

**Recommendations**

1. Include screening for oral health in regular cardiac care.
   To facilitate the early detection and treatment of oral problems in cardiovascular patients, hospitals should integrate basic oral-health screening and referral pathways into cardiology clinics.

2. Increase cardiology patients' oral health education
   In order to promote preventative dental-care practices and raise knowledge of the connection between oral health and cardiovascular health, structured education initiatives should be put into place.

3. Strengthen cardiology nurses' involvement in promoting oral health
   Cardiology nurses should be trained and assisted in identifying oral health issues, offering oral health counseling, and facilitating dental treatment referrals.

4. Increased availability of reasonably priced and preventive dental care
   Health authorities should lower obstacles that prevent people from seeking professional oral health consultations and increase access to reasonably priced dental care.

5. Encourage frequent dental visits and preventive oral health activities
   Preventive dental care, such as routine dental checkups and judicious use of evidence-based oral hygiene products, should be the focus of public health campaigns.

6. Include dental health in hospital procedures and non-communicable disease (NCD) policies.
   Oral health should be acknowledged by institutional and national policy as a crucial part of all-encompassing cardiovascular care.

7. Carry out additional longitudinal and multicenter studies in Somalia
   Future research should assess the long-term connections between oral health and cardiovascular outcomes, incorporate clinical oral examinations, and involve bigger and more varied populations.

# Conclusion

Important information about oral health among cardiology patients at Mogadishu Somalia–Turkiye Recep Tayyip Erdogan Training and Research Hospital is provided by this study. Despite relatively frequent self-reported oral hygiene practices, the results showed a significant burden of oral health issues, including toothache, dental decay, and tooth loss, combined with poor use of professional dental services. In individuals with cardiovascular diseases, oral health issues also had a significant functional impact on everyday functioning, particularly eating habits.

The study also revealed potential to improve the role of cardiology services in patient education and oral health promotion, as well as limited exposure to oral health information. The results indicate that oral health among cardiology patients is influenced by a number of interrelated behavioral, educational, and

healthcare-related characteristics, even though no independent factors remained substantially associated with poor self-rated oral health in the adjusted analysis.

Enhancing patient outcomes and promoting more all-encompassing healthcare delivery in Somalia may be achieved by incorporating oral health screening, education, and referral systems into standard cardiovascular care.

## Abbreviations

OH:  Oral Health

CVD: Cardıovascular dısease

WHO: World health Organızatıon

TRTEH: Somali-Turkıye Racep Tayyıp Erdogan Treanıng and Research HospıtaL

IRB: Instıtutıon Revıew Board

## Declarations

Author contributions

M.K wrote the fırst draft of the manuscript conceptualized and designed the study , S.M.S, Wrote the literature review, data collection and Data entry ,İ.M.O and A.M.O critically revised the manuscript for important intellectual content.

Ethics Approval and Consent to Participate applicable.

Availability of Data and Materials

The Datasets used and or analysed durıng the current study are avaılıble from the correspondıng Author upon reseasonable request.

Competıng Interests

The authors declare that they have no competing interests.

Funding

This research received no external funding.

Acknowledgements

The authors would like to acknowledge all individuals and institutions who supported the completion of this work.

Consent for Publication

Not applicable. No individual participant data, images, or other identifying information are included in this manuscript; therefore, consent for publication was not required.

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Mogadishu Somalia–Türkiye Recep Tayyip Erdoğan Training and Research Hospital, Mogadishu, Somalia (Approval No. 1424; 31 January 2026). All participants provided informed consent before participation. The study was conducted in accordance with the principles of the Declaration of Helsinki.

# References


1. Wu J, Chen J, Lv C, Zhou L. Global, regional, and National levels and trends in burden of dental caries and periodontal disease from 1990 to 2035: result from the global burden of disease study 2021. BMC Oral Health 2025 25:1 2025;25:844–. https://doi.org/10.1186/S12903-025-06108-W
2. Gedi S, Hassan AM, Dahir MM, Ahmed A, Mohamud NA, Garba B, Umeokonkwo CD, Mohamed MA. Challenges in oral health practice in Somalia: a call for regulatory strengthening and inclusion into primary healthcare services. BMC Oral Health 2024 24:1 2024;24:1440–. https://doi.org/10.1186/S12903-024-05221-6
3. Leng Y, Hu Q, Ling Q, Yao X, Liu M, Chen J, Yan Z, Dai Q. Periodontal disease is associated with the risk of cardiovascular disease independent of sex: A meta-analysis. Front Cardiovasc Med. 2023;10:1114927. https://doi.org/10.3389/FCVM.2023.1114927/TEXT.
4. Herrera D, Sanz M, Shapira L, Brotons C, Chapple I, Frese T, Graziani F, Hobbs FDR, Huck O, Hummers E, Jepsen S, Kravtchenko O, Madianos P, Molina A, Ungan M, Vilaseca J, Windak A, Vinker S. Association between periodontal diseases and cardiovascular diseases, diabetes and respiratory diseases: Consensus report of the Joint Workshop by the European Federation of Periodontology (EFP) and the European arm of the World Organization of Family Do…. J Clin Periodontol. 2023;50:819–41. https://doi.org/10.1111/JCPE.13807;PAGEGROUP:STRING:PUBLICATION.
5. Teshome A, Muche A, Girma B. Prevalence of Dental Caries and Associated Factors in East Africa, 2000–2020: Systematic Review and Meta-Analysis. Front Public Health. 2021;9:645091. https://doi.org/10.3389/FPUBH.2021.645091/TEXT.
6. Aminu K, Jayasinghe RM, Uwambaye P, Salami A, Murererehe J, Ineza MC, Ntigura E, Ober-Oluoch J, Milanes DZ, Jayasinghe RD, Amzat J, Kanmodi KK. Oral health-related quality of life in the East African community: a scoping review. BMC Oral Health 2025 25:1 2025;25:518-. https://doi.org/10.1186/S12903-025-05921-7
7. Foláyan MO, Ishola AG, Bhayat A, El Tantawi M, Ndembi N. Strengthening health systems to tackle oral diseases in Africa: Africa centers for disease control and prevention's role. Front Public Health. 2025;13:1539805. https://doi.org/10.3389/FPUBH.2025.1539805/TEXT.

8. Öçbe M, Çelebi E, Öçbe ÇB. An overlooked connection: oral health status in patients with chronic diseases. BMC Oral Health 2025 25:1 2025;25:314-. https://doi.org/10.1186/S12903-025-05673-4
9. Hasan S, Kulsoom S, Saeed S, Kaur M, Gombra V, Masood R, Jayakanth M. Dr. Shamimul Hasan, Samiya Kulsoom, Shazina Saeed et al. Assessment of oral health status, knowledge and behaviour of patients with cardiovascular disorders-A Cross-sectional study. Bulletin of Stomatology and Maxillofacial Surgery ORIGINAL RESEARCH ASSE… Journal Bulletin of Stomatology and Maxillofacial Surgery 2025;21:166–80. https://doi.org/10.58240/1829006X-2025.21.11-166.
10. Lazureanu PC, Popescu FG, Stef L, Focsa M, Vaida MA, Mihaila R. The Influence of Periodontal Disease on Oral Health Quality of Life in Patients with Cardiovascular Disease: A Cross-Sectional Observational Single-Center Study. Medicina 2022, Vol 58, Page 584. 2022;58:584. https://doi.org/10.3390/MEDICINA58050584
11. Shrivastava PK, Mehta A, Deka BP, Mathur MR. Barriers and facilitators in utilisation of dental health services across low- and middle-income countries: a scoping review. Evidence-Based Dentistry 2026. 2026;27:1. https://doi.org/10.1038/s41432-025-01200-0.
12. Mishra L, Sharma M, Singh NR, Dash G, Misra SR, Sokolowski K, Kumar M, Das R, Behera SK, Lapinska B. Oral Health Status, Behavior, and Knowledge of Patients with Cardiovascular Disease and Associated Risk Factors in Odisha: A Cross-Sectional Survey. Dent J (Basel). 2025;13:401. https://doi.org/10.3390/DJ13090401/S1.
13. Fu D, Shu X, Zhou G, Ji M, Liao G, Zou L. Connection between oral health and chronic diseases. MedComm (Beijing). 2025;6:e70052. https://doi.org/10.1002/MCO2.70052. ;PAGEGROUP:STRING:PUBLICATION.
14. Mostafavi S, Wyszyńska M, Skucha-Nowak M. The Importance of Dental Treatment in Patients Before Radiotherapy, Chemotherapy, and Cardiac Surgeries: A Narrative Review. J Clin Med 2025. Page 6330 2025;14:14:6330. https://doi.org/10.3390/JCM14176330.
15. Osuh ME, Oke GA, Lilford RJ, Osuh JI, Harris B, Owoaje E, Lawal FB, Omigbodun A, Adedokun B, Chen YF. Systematic review of oral health in slums and non-slum urban settings of Low and Middle-Income Countries (LMICs): Disease prevalence, determinants, perception, and practices. PLoS ONE. 2024;19:e0309319. https://doi.org/10.1371/JOURNAL.PONE.0309319.
16. Foláyan MO, Bhayat A, Mikhail SS, Ndembi N, El Tantawi M. Resources for oral health in Africa. Front Oral Health. 2025;6:1540944. https://doi.org/10.3389/FROH.2025.1540944/TEXT.
17. Okyere Boadu KA, Okyere Boadu R, Danquah EPB, Oti NA, Owusu Quarshie JB, Owusu-Ankomah NB, Addo MY. Patients perceived challenges in seeking dental care in Komfo Anokye Teaching Hospital. PLoS ONE. 2025;20:e0325136. https://doi.org/10.1371/JOURNAL.PONE.0325136.
18. Wen PYF, Chen MX, Zhong YJ, Dong QQ, Wong HM. Global Burden and Inequality of Dental Caries, 1990 to 2019. J Dent Res. 2022;101:392–9. https://doi.org/10.1177/00220345211056247. ;REQUESTEDJOURNAL:JOURNAL:JDRB;JOURNAL:JOURNAL:JDRB;PAGE:STRING:ARTICLE/CHAPTER.
19. Asgary S, Baghban AA, Afsah FM. Global Burden of Dental Caries and Oral Disorders: A 31-Year Comparative Analysis of Trends in Iran, North Africa and Middle East. Arch Iran Med. 2025;28:324–33. https://doi.org/10.34172/aim.33209.

20. Hamaya R, Yonetsu T, Aoyama N, Shiheido-Watanabe Y, Tashiro A, Niida T, Isobe M, Maejima Y, Iwata T, Sasano T. Contribution of periodontal health in cardiovascular secondary prevention: Analyses on hospitalized patients in cardiology units. J Clin Periodontol. 2023;50:708–16. https://doi.org/10.1111/JCPE.13792.
21. Sermsuti-Anuwat N, Nampikul N, Suwannimit R, Panthueng W. Self-rated oral health among elderly patients attending a university dental hospital in Thailand: a telephone-based cross-sectional survey study. PeerJ. 2022;10:e14191. https://doi.org/10.7717/PEERJ.14191/SUPP-2.
22. Venegas-Sanabria LC, Moreno-Echeverry MM, Borda MG, Chavarro-Carvajal DA, Cano-Gutierrez CA. Oral health and self-rated health in community-dwelling older adults in Colombia. BMC Oral Health 2023 23:1 2023;23:772-. https://doi.org/10.1186/S12903-023-03401-4
23. Ponomarenko M, Kaifie A. Oral health, stress and barriers accessing dental health care among war-affected Ukrainian refugees in Germany. BMC Oral Health. 2023;23. https://doi.org/10.1186/S12903-023-03513-X. :1 2023;23:804-.
24. Crocombe LA, Chrisopoulos S, Kapellas K, Brennan D, Luzzi L, Khan S. Access to dental care barriers and poor clinical oral health in Australian regional populations. Aust Dent J. 2022;67:344–51. https://doi.org/10.1111/ADJ.12930.
25. Church LA, Robins L, Xu F, Qin L, Tran A, Wallace JP, King S. Oral health education strategies for patients living with cardiovascular disease within hospital settings: a scoping review. Front Public Health. 2024;12:1389853. https://doi.org/10.3389/FPUBH.2024.1389853/TEXT.
26. Hussain A, Jaimes SB, Crizzle AM. Predictors of self-rated oral health in Canadian Indigenous adults. BMC Oral Health 2021 21:1 2021;21:430-. https://doi.org/10.1186/S12903-021-01796-6
27. Tiwari T, Kelly A, Randall CL, Tranby E, Franstve-Hawley J. Association Between Mental Health and Oral Health Status and Care Utilization. Front Oral Health. 2021;2:732882. https://doi.org/10.3389/FROH.2021.732882/TEXT.

# Figures

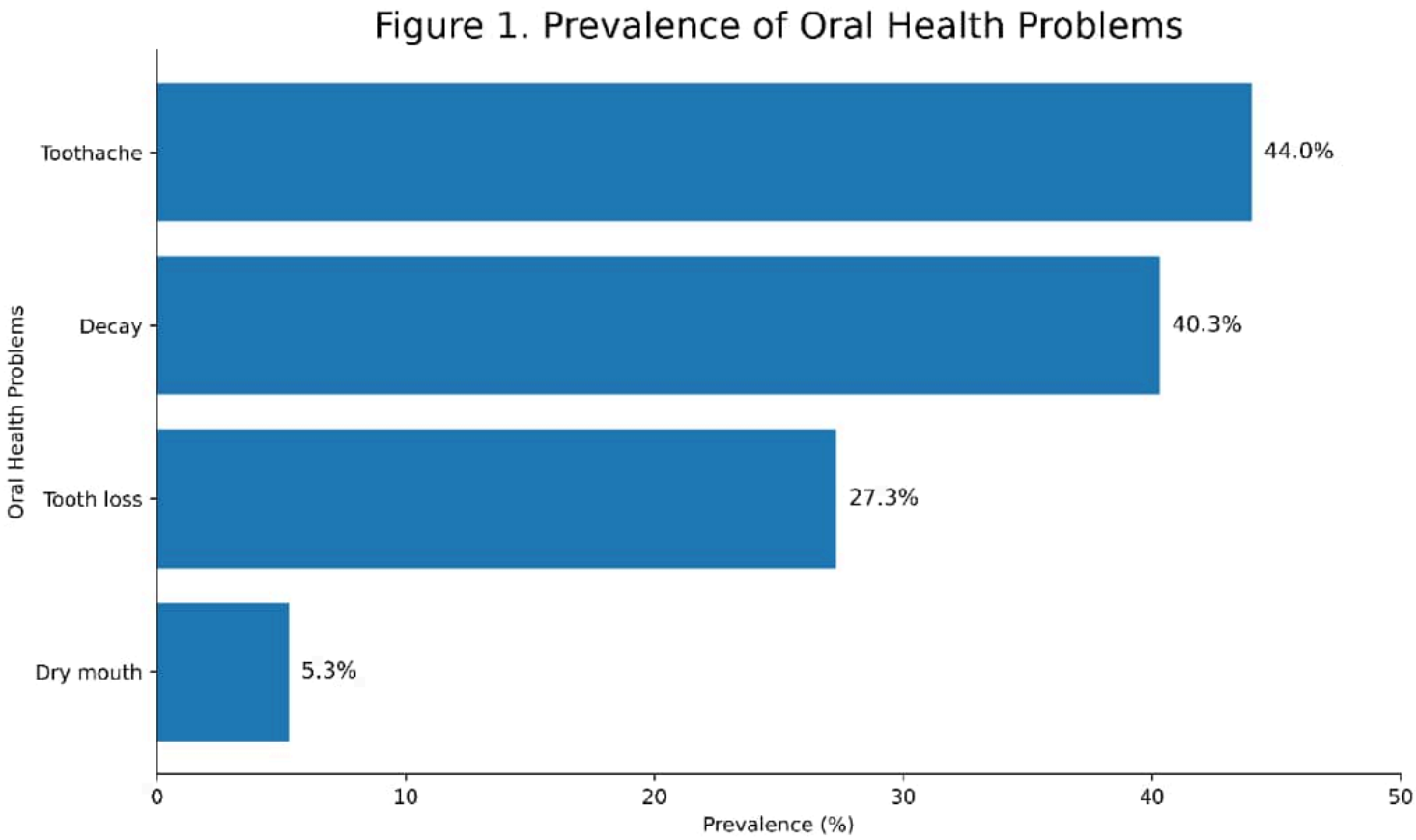



**Figure 1**

See image above for figure legend.