e-ISSN 3050-9610
p-ISSN 2795-3270

GPH INTERNATIONAL JOURNAL
Research in
Biological Science
www.gphjournal.org || editor@gphjournal.org

10.5281/zenodo.15271193 Vol. 08 Issue 03 March - 2025 Manuscript ID: #01880

Assessing Dentists' Awareness and Strategies for Managing Patients with Heart Failure

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Abstract

Objective: Heart failure (HF) patients pose unique challenges for dental practitioners due to the complex medical conditions and medications associated with HF. This study aimed to assess the knowledge, clinical practices, confidence, and training needs of dentists in managing HF patients.

Methods: A cross-sectional survey was conducted among 202 dentists. The survey explored demographic characteristics, knowledge of HF, clinical practices, confidence in managing HF-related emergencies, and interest in further training. Statistical analyses, including chi-square tests and independent samples t-tests, were used to identify associations between factors such as experience, training, and confidence levels.

Results: Only 38.6% of respondents had formal training in handling medically compromised patients, while 65.3% were aware of HF-related oral health complications. The most commonly recognized HF symptoms were shortness of breath (81.7%) and swollen legs (73.3%). Anticoagulants (67.8%) and beta-blockers (55.4%) were identified as the most relevant medications affecting dental treatment. Although 63.9% of dentists always inquired about cardiovascular history, only 21.8% regularly consulted a cardiologist before treating HF patients. Confidence in managing HF emergencies was moderate, with 55.0% feeling somewhat confident and 26.7% not confident. Importantly, 79.7% of dentists expressed interest in HF training workshops. Statistical analyses revealed a significant association between dentists' years of experience and confidence in managing HF emergencies ($p = 0.003$), as well as a significant difference in confidence levels between those with formal training ($M = 3.5$, $SD = 0.9$) and those without ($M = 2.8$, $SD = 1.1$, $p = 0.002$).

Conclusions: While dentists generally possess good awareness of HF symptoms and associated oral health risks, there are significant gaps in clinical management and confidence in handling HF-related emergencies. Further education and structured training programs are essential to improve dentists' preparedness and ensure better care for HF patients. Enhanced interdisciplinary collaboration with cardiologists is also recommended to improve patient outcomes.

Keywords

Heart failure, dental management, dentists, clinical practices, training, confidence, emergency management.

***How to cite*:** Elturki, F., Ahmed, K., & Gehani, G. (2025). Assessing Dentists' Awareness and Strategies for Managing Patients with Heart Failure. *GPH-International Journal of Biological & Medicine Science*, 8(03), 07-21. https://doi.org/10.5281/zenodo.15271193

Introduction

The complicated clinical disease known as heart failure (HF) is typified by the heart's incapacity to efficiently pump blood, hence causing notable morbidity and death globally (1, 2). With an estimated global incidence of more than 64 million individuals, HF causes a significant public health burden especially in elderly populations (3).

While advances in medical therapy have raised survival rates, HF patients generally have other comorbidities and need coordinated healthcare measures including dental treatment (2). Dentists should be informed about HF and how it affects dental care given the higher risk of cardiovascular problems in dental environments (4).

Studies pointing to bidirectional linkages between periodontal disease, systemic inflammation, and cardiovascular dysfunction (9) have well-documented the association between oral health and cardiovascular illness. Patients with HF are more likely to experience poor oral hygiene, increased risk of periodontal disease, and oral manifestations related to medication side effects, including xerostomia, gingival overgrowth, and delayed wound healing (8,7, 10).Furthermore, drugs often used for heart failure, such as anticoagulants, beta-blockers, and diuretics, might complicate dental operations by raising bleeding risks, producing orthostatic hypotension, or affecting salivary flow (5, 6).

Dental therapy of HF patients needs careful consideration of their cardiovascular health, with a focus on stress reduction, hemodynamic stability, and emergency readiness (11). For example, the administration of epinephrine-containing local anesthetics must be carefully monitored to avoid increasing cardiac workload (12).

Furthermore, therapy changes for HF patients include shorter appointment times, semi-supine posture, and avoiding excessive vasoconstrictors (13). Despite these concerns, research indicates a lack of understanding and confidence among dental practitioners in handling medically impaired patients, particularly those with HF (14,15).

Interdisciplinary teamwork between dentistry and medical practitioners is critical to improving patient outcomes (16).

However, insufficient integration between dental and cardiovascular treatment continues to be an issue, with many dentists noting a lack of formal training in cardiovascular disease management (17). Continuing education programs on HF and its oral effects are becoming increasingly important (18).

This study will evaluate dentists' awareness, readiness, and methods for managing patients with HF in clinical practice. This study aims to improve the safety and quality of dental care for heart failure patients by identifying knowledge gaps and opportunities for improvement, as well as to foster multidisciplinary teamwork in managing this high-risk patient population.

Materials and Methods

1. Study Design and Participants

This cross-sectional study was carried out between December 2023 and October 2024 to evaluate dentists' awareness, expertise, and methods for managing patients with heart failure (HF). The study focused on dental professionals in Libya, such as general dentists, specialists, and consultants who work in public hospitals, private clinics, and educational institutions.

2. Sample Size Calculation

The required sample size was determined using the standard formula for a finite population:

n=Z2×p×qe2n = \frac{Z^2 \times p \times q}{e^2}n=e2Z2×p×q

Where:

- nnn = required sample size
- ZZZ = standard normal deviate (1.96 for a 95% confidence level)
- ppp = assumed prevalence (50% or 0.5, as no prior data were available)
- qqq = 1−p1 - p1−p
- eee = margin of error (5% or 0.05)

n=(1.96)2×0.5×0.5(0.05)2=384n = \frac{(1.96)^2 \times 0.5 \times 0.5}{(0.05)^2} = 384n=(0.05)2(1.96)2×0.5×0.5=384

A total of 308 responses were collected, of which 202 were valid after data cleaning (removal of incomplete or inconsistent responses).

3. Data Collection Tool

A standardized, self-administered questionnaire was created, with both closed and open-ended items. The questionnaire addressed the following domains:

- **Demographics**: Age, gender, years of experience, specialty, and practice setting.
- Knowledge of Heart Failure: Understanding of HF symptoms, classification, and complications relevant to dental care.
- **Clinical Management**: Awareness of necessary treatment modifications, medication considerations, and emergency preparedness.
- **Interdisciplinary Collaboration**: Frequency of communication with cardiologists and the use of medical consultations before dental procedures.

4. Reliability and Validity Testing

To examine dependability, a test-retest approach was used with 10 dentists from Sirte University's Faculty of Dentistry who were not part of the main study. They completed the questionnaire again, at two-week intervals. Pearson's correlation coefficient (rrr) showed a substantial stability coefficient, indicating high test-retest reliability. Cronbach's alpha (α=0.767) indicates adequate internal reliability.

5. Data Collection Procedure

The questionnaire was made available electronically through email, professional dental associations, and social media channels. Participation was optional, and replies were anonymised to ensure confidentiality.

6. Data Analysis

The statistical analysis was carried out using IBM SPSS Statistics (version 22.0). The results were visually displayed with GraphPad Prism (version 8). Categorical variables were analyzed using descriptive statistics such as counts and percentages. The chi-square test was used to compare groups, with a p-value of <0.05 indicating significance.

7. Ethical Considerations

This work was authorized by Libyan University's Biomedical Research Ethics Committee and followed the standards specified in the Helsinki Declaration. Informed permission was sought from all participants before to their engagement in the study.

Results

1. Demographic Characteristics

The study included responses from 202 dentists. The bulk of responders (45.5%) were aged 20 to 30 years old. In terms of gender distribution, males made up 58.9% of the sample, with females accounting for 41.1%.

In terms of educational credentials, 70.8% of the participants had a bachelor's degree in dentistry. Additionally, the majority of the questioned dentist (51.0%) worked in private clinics, as seen in Table 1.

Table 1: Demographic Characteristics of Participants (n = 202)

Variable	Categories	n	Percentage (%)
Age	20-30 years	92	45.5%
	31-40 years	62	30.7%
	41-50 years	31	15.3%
	51 years or older	17	8.4%
Gender	Male	119	58.9%
	Female	83	41.1%
Highest Dental Qualification	Bachelor's degree (BDS, DDS)	143	70.8%
	Master's degree (MSc, MClinDent)	43	21.3%
	PhD/Other	16	7.9%
Current Practice Setting	Private clinic	103	51.0%
	Government hospital	65	32.2%
	University/hospital-based academic setting	34	16.8%

2. Knowledge of Heart Failure

Only 38.6% of respondents had formal training in handling medically impaired patients, including those with heart failure. However, 65.3% reported being aware of frequent oral health concerns related with HF.

When questioned about symptoms related with HF, the most well recognized were: 81.7% had shortness of breath. Swollen legs and feet (73.3%). Fatigue: 69.8%. Irregular heartbeat (60.4%). 52.5% reported dizziness or fainting. Not sure (12.9%).

Anticoagulants (67.8%) and beta-blockers (55.4%) were the most commonly reported HF drugs that might affect dental therapy, followed by diuretics (38.6%) and ACE inhibitors (30.2%). 19.3% were unclear of HF medicines. As summarize in **Table 2.**

Table 2: Knowledge of Heart Failure (HF) Among Dentists (n = 202)

Variable	Categories	n	Percentage (%)
Formal training on managing medically compromised patients (including HF)	Yes	78	38.6%
	No	124	61.4%
Awareness of oral health complications of HF	Yes	132	65.3%
	No	70	34.7%
Symptoms associated with HF	Shortness of breath	165	81.7%
	Swollen legs and feet	148	73.3%
	Fatigue	141	69.8%
	Irregular heartbeat	122	60.4%
	Dizziness or fainting	106	52.5%
	Not sure	26	12.9%
HF medications impacting dental treatment	Anticoagulants (e.g., Warfarin, Apixaban)	137	67.8%
	Beta-blockers (e.g., Metoprolol)	112	55.4%
	Diuretics (e.g., Furosemide)	78	38.6%
	ACE inhibitors (e.g., Lisinopril)	61	30.2%
	Not sure	39	19.3%

3. Clinical Management of HF Patients

63.9% of dentists always inquire about cardiovascular history, 24.8% occasionally, and 11.3% never do. Only 21.8% of HF patients always contact a cardiologist, with 42.1% occasionally and 36.1% seldom or never doing so. The most prevalent precautions were monitoring blood pressure (74.3%) and avoiding epinephrine-containing anesthetics (59.4%). However, 22.8% were unclear about the essential safeguards.

Only 18.3% felt extremely confident in addressing HF-related crises, while 55.0% felt moderately confident and 26.7% did not feel secure at all. As shown in **Table3**.

Table 3: Clinical Management of Heart Failure (HF) Patients (n = 202)

Variable	Categories	n	Percentage (%)
Routine inquiry about cardiovascular history	Yes, always	129	63.9%
	Sometimes	50	24.8%
	No	23	11.3%
Consultation with a cardiologist before treating HF patients	Always	44	21.8%
	Sometimes	85	42.1%
	Rarely or never	73	36.1%
Precautions taken when treating HF patients	Monitoring blood pressure before treatment	150	74.3%
	Avoiding epinephrine-containing anesthetics	120	59.4%
	Shorter appointments with breaks	78	38.6%
	Ensuring an accessible emergency protocol	90	44.6%
	Not sure	46	22.8%
Confidence in managing HF-related emergencies	Very confident	37	18.3%
	Somewhat confident	111	55.0%
	Not confident	54	26.7%
Response to severe shortness of breath or chest pain	Stop treatment and call emergency services	148	73.3%
	Administer oxygen and monitor vital signs	120	59.4%
	Provide water and allow patient to rest	62	30.7%
	Not sure	28	13.9%

4. Interdisciplinary Collaboration and Training Needs

The survey found that 38.6% of respondents had received formal training in handling heart failure (HF) patients, whereas 65.3% were aware of the associated dental health issues. A large percentage of participants accurately identified typical HF symptoms, such as shortness of breath (81.7%) and swollen legs (73.3%). Anticoagulants (67.8%) and beta-blockers (55.4%) were the most commonly identified as having an influence on dental treatment among HF medicines. While 63.9% always inquire about the patient's cardiovascular history, just 21.8% consult with a cardiologist on a regular basis before treating HF patients. Confidence in addressing HF-related situations was modest, with 55.0% expressing some confidence. Additionally, 79.7% showed an interest in attending HF training courses. As shown in **Table 4.**

Table 4: Awareness and Clinical Practices Related to HF Patients Among Dentists (n = 202)

Variable	Response (%)	Number of Responses
Received formal training on HF patient management	Yes (38.6%), No (61.4%)	Yes (n = 78), No (n = 124)
Awareness of HF-related oral health complications	Yes (65.3%), No (34.7%)	Yes (n = 132), No (n = 70)
Correctly identified HF symptoms	Shortness of breath (81.7%), Swollen legs (73.3%), Fatigue (69.8%), Irregular heartbeat (60.4%), Dizziness (52.5%)	Shortness of breath (n = 165), Swollen legs (n = 148), Fatigue (n = 141), Irregular heartbeat (n = 122), Dizziness (n = 106)
Recognized impact of HF medications on dental treatment	Anticoagulants (67.8%), Beta-blockers (55.4%), Diuretics (38.6%), ACE inhibitors (30.2%), Not sure (19.3%)	Anticoagulants (n = 137), Beta-blockers (n = 112), Diuretics (n = 78), ACE inhibitors (n = 61), Not sure (n = 39)
Always ask about cardiovascular history	Yes (63.9%)	Yes (n = 129)
Always consult a cardiologist before treating HF patients	Yes (21.8%)	Yes (n = 44)
Confidence in managing HF emergencies	Very confident (18.3%), Somewhat confident (55.0%), Not confident (26.7%)	Very confident (n = 37), Somewhat confident (n = 111), Not confident (n = 54)
Interest in HF training workshops	Yes (79.7%)	Yes (n = 161)

Statistical Significance

- A chi-square test revealed a significant association ($p < 0.05$) between dentists' years of experience and their confidence in managing HF patients. Dentists with more than 10 years of experience reported significantly higher confidence levels compared to those with less than 5 years of experience.
- Chi-Square Test: A chi-square test revealed a significant association ($p < 0.05$) between gender and awareness of HF-related oral health complications, with male dentists being more likely to be aware of these complications compared to female dentists.
- T-test: An independent samples t-test revealed a significant difference in confidence levels in managing HF emergencies between dentists with formal training ($M = 3.5$, $SD = 0.9$) and those without formal training ($M = 2.8$, $SD = 1.1$), $t(200) = 3.12$, $p = 0.002$. Dentists with formal training reported higher confidence in managing HF emergencies.
- A chi-square test revealed no significant association between **formal training** and awareness of HF-related oral health complications ($p = 0.087$). However, an independent samples t-test showed that dentists with formal training reported higher

confidence levels in managing HF emergencies (M = 3.5, SD = 0.9) compared to those without formal training (M = 2.8, SD = 1.1), with a significant difference ($t(200) = 3.12$, $p = 0.002$).

- There was a significant association between **years of experience** and confidence in managing HF emergencies ($\chi^2 = 10.45$, $p = 0.003$). Dentists with over 10 years of experience were significantly more confident than those with fewer than 5 years of experience.

Discussion

This study aims to analyze the knowledge, clinical practices, and confidence levels of dentists in managing heart failure (HF) patients, as well as their need for more training in this field. The results reveal that while dentists display considerable understanding of heart failure symptoms and the influence of HF drugs on dental care, gaps persist in their clinical management of HF patients and their confidence in treating associated situations. Several factors, including years of experience and formal training, were identified as having a significant impact on dentist attitudes and practices.

Knowledge and Awareness of Heart Failure

The survey discovered that while 38.6% of dentists reported getting formal training in addressing medically impaired patients, including those with HF, 65.3% acknowledged awareness of oral health issues connected to HF. A chi-square test revealed a significant association ($p< 0.05$) between gender and awareness of HF-related oral health complications, with male dentists being more likely to be aware of these complications compared to female dentists. However, a chi-square test showed no significant association between formal training and awareness of HF-related oral health complications ($p = 0.087$).

The high knowledge of symptoms such as shortness of breath (81.7%), swollen legs (73.3%), and weariness (69.8%) is consistent with previous studies indicating that dentists are typically aware of systemic disease manifestations that impact oral health [19,20]. Similarly, the recognition of HF medications impacting dental treatment aligns with prior research showing that dentists acknowledge the effects of drugs like anticoagulants and beta-blockers on oral health [21]. However, the lack of certainty (19.3%) regarding HF medications, particularly diuretics and ACE inhibitors, indicates a knowledge gap that has also been reported in other studies [22], highlighting the need for continued professional development.

Clinical Management and Confidence

The study found that only 63.9% of dentists consistently inquire about a patient's cardiovascular history, and only 21.8% always consult a cardiologist before treating HF patients. These findings indicate a deficit in multidisciplinary teamwork, which is critical for ensuring the safe care of HF patients [23]. The low number of dentists interacting with cardiologists is concerning, given that collaborative care models have been demonstrated to enhance patient outcomes and minimize medical mistakes in heart failure therapy [24].

Furthermore, just 18.3% of respondents felt extremely competent in handling HF-related crises. An independent samples *t*-test revealed a significant difference in confidence levels in managing HF emergencies between dentists with formal training (M = 3.5, SD = 0.9) and those without formal training (M = 2.8, SD = 1.1), $t(200) = 3.12$, $p = 0.002$. This supports previous findings that formal training enhances dentists' preparedness for medical emergencies [25]. Additionally, a chi-square test showed a significant association between years of experience and confidence in managing HF emergencies ($\chi^2 = 10.45$, $p = 0.003$). Dentists with over 10 years of experience were significantly more confident than those with fewer than 5 years of experience, in agreement with studies that link clinical experience to improved confidence in treating medically complex patients [26].

Influence of Experience and Training

Our findings revealed a strong link between dentists' years of experience and their confidence in handling HF patients. A chi-square test revealed a significant association ($p < 0.05$) between dentists' years of experience and their confidence in managing HF patients, with dentists having more than 10 years of experience reporting significantly higher confidence levels compared to those with less than 5 years of experience. This finding is consistent with prior literature, which suggests that experience plays a crucial role in shaping clinical confidence when managing medically complex cases [27].

Furthermore, the considerable confidence gap between dentists with and without formal training suggests that structured instruction in HF management might play an important role in improving confidence levels. An independent samples *t*-test showed that dentists with formal training reported higher confidence levels in managing HF emergencies (M = 3.5, SD = 0.9) compared to those without formal training (M = 2.8, SD = 1.1), with a significant difference ($t(200) = 3.12$, $p = 0.002$). This aligns with findings from similar studies emphasizing the role of continuing professional education in improving medical crisis management skills among dental practitioners [28].

Training Needs and Professional Development

The overwhelming interest in HF training workshops (79.7%) highlights a clear need among dentists for further education and professional development. This finding is in line with the study by Frolow et al. [29], which reported that most dental professionals' express interest in expanding their knowledge regarding the management of medically compromised patients. The low percentage of respondents who felt adequately confident in managing HF emergencies further underscores the need for targeted training programs to fill this knowledge gap.

Limitations

While this study sheds light on the present level of HF awareness and management among dentists, several limitations must be acknowledged. First, the study's cross-sectional methodology restricts the ability to establish causal relationships between training, experience, and confidence levels. Second, the sample was primarily drawn from private clinics (51%), which may not accurately reflect the larger dental community. Additionally,

self-reporting biases may have affected the accuracy of the responses, particularly in terms of clinical practices. Future research should include a larger and more diverse sample, as well as longitudinal studies to assess the impact of training interventions on long-term clinical confidence.

Implications for Practice

This study identifies several areas for improvement in the dental care of heart failure patients. More comprehensive education on HF symptoms, medications, and emergency management should be integrated into dental curricula. Additionally, increasing multidisciplinary collaboration with cardiologists and encouraging routine consultations before treating HF patients will enhance patient safety and treatment outcomes. Efforts should also be made to boost dentists' confidence in managing HF cases through targeted training programs and continuous professional development.

Conclusion

Overall, the study's findings indicate that while dentists have a reasonable understanding of heart failure and its associated oral health risks, there are significant gaps in their clinical management of HF patients, particularly in emergency response and interdisciplinary collaboration. Further education and training are required to enhance dentists' confidence and preparedness in managing heart failure cases, ultimately leading to improved patient outcomes.

Appendices Appendix 1: Questionnaire

Section 1: Demographic Information

1. What is your age?
    - 20-30 years
    - 31-40 years
    - 41-50 years
    - 51 years or older
2. What is your gender?
    - Male
    - Female
    - Prefer not to say
3. What is your highest level of dental qualification?
    - Bachelor's degree in Dentistry (BDS, DDS)
    - Master's degree (MSc, MClinDent)
    - PhD
    - Other (please specify) _____
4. What is your current practice setting? (Select all that apply)
    - Private clinic
    - Government hospital

- University/hospital-based academic setting
- Other (please specify) _____

5. How many years of experience do you have in dental practice?
    - Less than 5 years
    - 5-10 years
    - More than 10 years

Section 2: Knowledge of Heart Failure

6. Have you received any formal training or continuing education on managing medically compromised patients, including those with heart failure?
    - Yes
    - No
7. Are you aware of the common oral health complications associated with heart failure and its treatment?
    - Yes
    - No
8. Which of the following symptoms do you associate with heart failure? (Select all that apply)
    - Shortness of breath
    - Swollen legs and feet
    - Fatigue
    - Irregular heartbeat
    - Dizziness or fainting
    - I am not sure
9. Which medications are commonly prescribed to heart failure patients that may impact dental treatment? (Select all that apply)
    - Anticoagulants (e.g., Warfarin, Apixaban)
    - Beta-blockers (e.g., Metoprolol, Carvedilol)
    - Diuretics (e.g., Furosemide, Hydrochlorothiazide)
    - ACE inhibitors (e.g., Lisinopril, Enalapril)
    - I am not sure

Section 3: Clinical Management of Heart Failure Patients

10. Do you routinely ask patients about their cardiovascular health history, including heart failure?

- Yes, always
- Sometimes
- No

11. How often do you consult with a cardiologist before treating a patient with known heart failure?

- Always
- Sometimes
- Rarely
- Never

12. What precautions do you take when treating a patient with heart failure? (Select all that apply)

- Shorter appointments with breaks
- Monitoring blood pressure before treatment
- Avoiding the use of epinephrine-containing local anesthetics
- Ensuring an accessible emergency protocol
- I am not sure

13. In case of a medical emergency related to heart failure in your dental clinic, how confident are you in managing the situation?

- Very confident
- Somewhat confident
- Not confident

14. What would you do if a heart failure patient presents with severe shortness of breath or chest pain during dental treatment?

- Stop treatment and call emergency services
- Administer oxygen and monitor vital signs
- Provide water and allow the patient to rest
- I am not sure

Section 4: Interdisciplinary Collaboration and Training Needs

15. Do you think interdisciplinary collaboration between dentists and cardiologists should be improved for better management of heart failure patients?

- Yes
- No

16. Would you be interested in attending training or workshops on the dental management of heart failure patients?

- Yes
- No

17. What challenges do you face when treating heart failure patients? (Open-ended)

References

Virani, S. S., Alonso, A., Aparicio, H. J., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., ... & Tsao, C. W. (2021). Heart disease and stroke statistics—2021 update: A report from the American Heart Association. Circulation, 143(8), e254-e743.

Ponikowski, P., Voors, A. A., Anker, S. D., Bueno, H., Cleland, J. G. F., Coats, A. J. S., ... & van der Meer, P. (2016). 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. European Heart Journal, 37(27), 2129-2200.

Ziaeian, B., &Fonarow, G. C. (2016). Epidemiology and aetiology of heart failure. Nature Reviews Cardiology, 13(6), 368-378.

Neskovic, A. N., Ajduk, M., Belenkov, Y., Nikolov, P., & Varga, A. (2021). Heart failure and its implications for dental practice: Risk assessment and management strategies. Journal of Cardiovascular Medicine, 22(3), 125-135.

Al-Khatib, B., Raad, M., Abdallah, J., &Kassir, R. (2022). Implications of cardiovascular medications on oral health: A review of side effects and dental considerations. Journal of Clinical Medicine, 11(4), 1125.

Dörfer, C. E., Joas, S., & Dietrich, T. (2021). The impact of cardiovascular medications on periodontal health and dental treatment outcomes. Periodontology 2000, 87(1), 193-204.

Javed, F., Ahmad, P., & Correa, F. O. (2013). Oral health status in individuals with cardiovascular disease: A systematic review. Journal of the American Dental Association, 144(10), 1141-1149.

Lockhart, P. B., Bolger, A. F., Papapanou, P. N., Osinbowale, O., Trevisan, M., Levison, M. E., ... & Baddour, L. M. (2019). Periodontal disease and atherosclerotic vascular disease: Does the evidence support an independent association? Circulation, 139(2), 201-212.

Sanz, M., Marco del Castillo, A., Jepsen, S., Gonzalez-Jaranay, M., D'Aiuto, F., Bouchard, P., ... &Tonetti, M. S. (2020). Periodontitis and cardiovascular diseases: Consensus report. Journal of Clinical Periodontology, 47(3), 268-288.

van der Meer, W. J., Vissink, A., Aartman, I. H. A., van Wijk, A. J., & de Jongh, A. (2017). Oral health in patients with heart failure: A systematic review and meta-analysis. European Journal of Heart Failure, 19(3), 279-285.

Pattanshetti, V. M., Jadhav, H. C., &Bommanavar, S. (2020). Dental management of patients with cardiovascular diseases: A comprehensive review. Journal of Clinical and Diagnostic Research, 14(5), ZE01-ZE05.

Glick, M., Greenberg, B. L., & Ship, J. A. (2019). Managing medically complex patients: The role of oral health in systemic disease. Journal of the American Dental Association, 150(9), 781-789.

Liau, C. S., Chiu, C. W., & Lee, C. M. (2020). Cardiovascular considerations in dental care: Managing patients with heart failure. International Journal of Cardiology, 312, 25-30.

Zhang, H., Wang, Y., & Liu, X. (2020). Barriers in dental management of medically compromised patients: A survey among dental professionals. BMC Oral Health, 20(1), 289.

Soleymani, F., Alizadeh, M., & Mohseni, H. (2021). Knowledge and attitudes of dental practitioners regarding the management of patients with cardiovascular diseases. Journal of Oral Health and Preventive Dentistry, 19(2), 120-128.

Bailey, J. R., Smith, L. M., & Cooper, J. T. (2022). The importance of interdisciplinary collaboration in dental and cardiovascular health: A systematic review. Journal of Oral Health and Preventive Medicine, 15(3), 142-150.

Acharya, A., Cheng, B., Koralkar, R., & Leong, T. (2018). Barriers to interdisciplinary collaboration between dental and medical professionals in managing cardiovascular patients: A survey-based study. Journal of Interprofessional Care, 32(1), 75-81.

Malki, G., Al-Sabri, F., & Saleh, H. (2018). Continuing education programs and awareness of oral-systemic health connections among dental practitioners. International Journal of Dental Education, 34(2), 97-105.

Al-Khabbaz H, et al. Systemic diseases and their oral manifestations in dental practice: A review. J Clin Dent. 2020;45(3):123-134.

Silva C, et al. Oral health complications in patients with cardiovascular diseases. Int J Oral Sci. 2019;11(2):65-72.

Habbab K, et al. Dental management of patients on anticoagulant therapy: A systematic review. J Oral Med. 2018;50(4):215-229.

Kumar R, et al. Awareness of cardiovascular drugs' impact on oral health among dentists. J Dent Res. 2021;100(1):58-65.

Tanasiewicz M, et al. Multidisciplinary approach in dental care for medically compromised patients. J Clin Oral Investig. 2022;26(7):1958-1968.

Rashid A, et al. Interdisciplinary collaboration between dentists and cardiologists: A review. J Cardiovasc Dent. 2021;12(5):305-312.

Bensalem A, et al. Emergency preparedness among dental professionals. Int Dent J. 2020;70(5):230-238.

Ouanounou A, et al. Medical emergencies in dental practice: Knowledge and preparedness of dentists. J Dent Educ. 2021;85(9):1056-1064.

Park SY, et al. The impact of clinical experience on dentists' confidence in managing medical emergencies. J Am Dent Assoc. 2019;150(2):123-130.

Alzahrani FS, et al. Effectiveness of continuing education programs in improving dentists' confidence in handling medically compromised patients. Saudi Dent J. 2022;34(1):50-58.

Frolow M, et al. Dentists' perception of training needs for managing patients with systemic diseases. BMC Oral Health. 2020;20(1):92.