

Impact of Multidisciplinary Oral Health Screening in the Prevention of Complications in Patients with Cardiovascular Disease: A Collaborative Approach

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Abstract

This study aimed to evaluate the impact of a multidisciplinary oral health screening program on the prevention of complications in patients with cardiovascular disease. Conducted in a tertiary hospital over twelve months, the study included 200 patients who were assigned to an intervention group (receiving oral health screening and management) or a control group (receiving standard cardiovascular care). The multidisciplinary team consisted of dentists, nurses, pharmacists, and sonographers, contributing to different aspects of patient care. The results demonstrated significant improvements in both oral health and cardiovascular outcomes in the intervention group, including reduced systemic inflammatory markers and decreased incidence of cardiovascular events. Patient feedback indicated high satisfaction with the multidisciplinary approach, emphasizing the importance of integrating oral health into cardiovascular care. These findings suggest that a multidisciplinary model of care can enhance overall patient outcomes and reduce the risk of cardiovascular complications.

Keywords: Oral Health, Cardiovascular Disease, Multidisciplinary Care, Periodontal Disease, Systemic Inflammation, Patient Outcomes

Introduction

Oral health is increasingly recognized as an essential component of overall health, with substantial evidence supporting a bidirectional link between oral health and cardiovascular disease (CVD) (Lockhart et al., 2012; DeStefano et al., 1993). Chronic oral conditions, particularly periodontitis, have been associated with a higher risk of cardiovascular complications, such as atherosclerosis, myocardial infarction, and stroke (Joshipura et al., 1996; Blaizot et al., 2009). Poor oral health may contribute to systemic inflammation, potentially exacerbating cardiovascular disease through increased levels of inflammatory mediators like C-reactive protein (CRP) (Beck & Offenbacher, 2005). Despite this evidence, oral health management often remains an overlooked aspect of care for patients with cardiovascular conditions (Humphrey et al., 2008).

A multidisciplinary approach to oral health screening and management holds significant potential to address this gap and enhance patient outcomes (Garcia et al., 2001). In particular, collaboration among dentists, nurses, pharmacists, and sonographers can facilitate early detection and prevention of oral health issues that may complicate cardiovascular conditions. Dentists play a pivotal role in assessing and managing oral health problems, while nurses can help integrate oral health screenings as part of routine patient care, providing

education and supporting daily oral hygiene. Pharmacists contribute by identifying medications that may impact oral health or cardiovascular status and recommending appropriate preventive measures (Paes et al., 1997). Additionally, sonographers play a role in monitoring cardiovascular health, allowing for a more comprehensive understanding of the patient's condition.

The potential benefits of integrating oral health into cardiovascular care are underscored by studies demonstrating that effective oral health interventions can reduce systemic inflammation and improve cardiovascular outcomes (D'Aiuto et al., 2005; Pihlstrom et al., 2005). However, there remains a lack of practical implementation of multidisciplinary oral health screenings in cardiovascular care settings. This study aims to explore how a multidisciplinary team, consisting of dentists, nurses, pharmacists, and sonographers, can collaborate to prevent oral health complications in patients with cardiovascular disease, focusing on the impact of early detection and management on patient outcomes.

By investigating the effectiveness of a multidisciplinary approach to oral health screening in cardiovascular patients, this research aims to contribute valuable insights into improving patient care and preventing complications, ultimately advancing integrated healthcare practices.

Literature Review

The link between oral health and cardiovascular disease has been a subject of growing interest over the past few decades. Periodontal disease, characterized by chronic inflammation of the gums and supporting structures of the teeth, has been associated with an increased risk of cardiovascular complications, including atherosclerosis, myocardial infarction, and stroke (Joshi et al., 1996; Blaizot et al., 2009). The inflammatory processes involved in periodontitis may contribute to the development and progression of atherosclerosis by elevating systemic inflammatory markers such as C-reactive protein (CRP) and interleukin-6 (IL-6), which are known risk factors for cardiovascular disease (Beck & Offenbacher, 2005; D'Aiuto et al., 2005).

Lockhart et al. (2012) emphasized the importance of recognizing periodontal disease as a potential risk factor for cardiovascular conditions, highlighting the need for healthcare professionals to address oral health as part of cardiovascular disease prevention and management. Despite the evidence linking periodontal disease with cardiovascular events, oral health is often overlooked in cardiovascular care settings (Humphrey et al., 2008). This oversight may be due in part to the traditional separation between dental and medical care, which limits opportunities for comprehensive, multidisciplinary patient management (Garcia et al., 2001).

Multidisciplinary approaches have been shown to improve outcomes in various healthcare settings, particularly for patients with complex, chronic conditions (Garcia et al., 2001; Pihlstrom et al., 2005). For instance, Garcia et al. (2001) demonstrated that periodontal therapy could lead to improvements in systemic health outcomes, including reductions in healthcare costs for conditions such as diabetes and cardiovascular disease. Integrating oral health screening into cardiovascular care requires collaboration among different healthcare professionals, each of whom plays a vital role in patient care. Dentists can provide specialized knowledge in diagnosing and managing oral conditions, while nurses can assist in integrating oral health assessments into routine patient care (Paes et al., 1997).

Pharmacists also play a crucial role in the multidisciplinary team by identifying medications that may have adverse effects on oral health, such as those that cause xerostomia (dry mouth), which can increase the risk of periodontal disease and dental caries (Paes et al., 1997). By addressing these medication-related risks, pharmacists can contribute to better oral health outcomes and reduce the burden of cardiovascular complications. Moreover, sonographers, who are primarily responsible for assessing cardiovascular health, can provide valuable insights into the relationship between oral health and cardiovascular disease by monitoring changes in cardiovascular parameters that may be influenced by oral health status.

The potential for improved patient outcomes through a multidisciplinary approach to oral health screening is supported by several studies. D'Aiuto et al. (2005) found that intensive periodontal therapy led to a significant reduction in systemic inflammatory markers, which could have a positive impact on cardiovascular health. Similarly, Blaizot et al. (2009) conducted a meta-analysis of observational studies and concluded that there is a consistent association between periodontal disease and an increased risk of cardiovascular events. These findings underscore the importance of addressing oral health as part of a broader strategy for cardiovascular disease prevention and management.

Despite the evidence supporting the integration of oral health into cardiovascular care, there are several barriers to implementing such a multidisciplinary approach. One significant barrier is the lack of communication and collaboration between dental and medical professionals, which can limit the effectiveness of care (Lockhart et al., 2012). Additionally, healthcare systems often lack the infrastructure to support multidisciplinary teams, making it challenging to provide comprehensive care that addresses both oral and cardiovascular health (Humphrey et al., 2008).

In conclusion, the literature suggests that a multidisciplinary approach to oral health screening and management in patients with cardiovascular disease has the potential to improve patient outcomes by reducing systemic inflammation and preventing cardiovascular complications. By involving dentists, nurses, pharmacists, and sonographers in a collaborative care model, it is possible to provide more comprehensive and effective care for patients with cardiovascular disease. This study aims to build on the existing literature by exploring the impact of a multidisciplinary oral health screening program on cardiovascular patient outcomes, with a focus on early detection and prevention of complications.

Methodology

This study was conducted in a tertiary hospital over a period of twelve months. The aim was to evaluate the impact of a multidisciplinary oral health screening program on the prevention of complications in patients with cardiovascular disease. The multidisciplinary team consisted of dentists, nurses, pharmacists, and sonographers, each contributing to different aspects of patient care to ensure comprehensive management.

Study Design

A prospective cohort study design was used to assess the outcomes of the multidisciplinary oral health screening program. The study included adult patients with cardiovascular disease who were admitted to the hospital and consented to participate in the oral health screening and intervention program. Participants were divided into two groups: an intervention group that received the multidisciplinary oral health screening and management, and a control group that received standard cardiovascular care without specific oral health interventions.

Participants

The study included 200 patients with cardiovascular disease, aged between 40 and 75 years. Participants were recruited from the cardiology and internal medicine units of the tertiary hospital. Inclusion criteria were: diagnosis of cardiovascular disease, ability to provide informed consent, and willingness to participate in the oral health screening program. Exclusion criteria included patients with terminal illnesses or those who were unable to undergo oral examinations due to medical or cognitive limitations.

Intervention

The intervention involved a comprehensive oral health screening and management program conducted by the multidisciplinary team.

- Dentists performed detailed oral examinations, diagnosed oral health conditions, and provided necessary interventions, such as scaling, root planing, and treatment of dental caries or periodontal disease.
- Nurses integrated oral health assessments into routine patient care, provided patient education on oral hygiene practices, and assisted patients with daily oral care.
- Pharmacists reviewed patients' medication regimens to identify drugs that could negatively impact oral health, such as medications causing xerostomia, and provided recommendations for managing these side effects.
- Sonographers assessed the cardiovascular health of participants and monitored any changes in cardiovascular parameters that could be linked to oral health status.

The intervention group received tailored oral health education, preventive care, and treatment as needed, in addition to their standard cardiovascular care. The control group received only standard cardiovascular care without specific oral health interventions.

Data Collection

Data were collected at baseline and at three-month intervals for twelve months. The primary outcomes included the incidence of cardiovascular complications (e.g., myocardial infarction, stroke), levels of systemic inflammatory markers (e.g., CRP, IL-6), and oral health status (e.g., periodontal disease severity, dental caries index). Data were collected through clinical assessments, blood tests, and patient interviews. Oral health status was assessed using standardized periodontal and dental indices, while cardiovascular health was monitored through routine echocardiography and laboratory tests.

Data Analysis

Data analysis was performed using SPSS version 25. Descriptive statistics were used to summarize baseline characteristics of the participants. Differences between the intervention and control groups were analyzed using independent t-tests for continuous variables and chi-square tests for categorical variables. A multivariate regression analysis was conducted to evaluate the impact of the multidisciplinary oral health screening program on cardiovascular outcomes, adjusting for potential confounders such as age, gender, and baseline cardiovascular risk factors. Statistical significance was set at $p < 0.05$.

Ethical Considerations

The study was approved by the hospital's ethics committee. All participants provided written informed consent before enrollment. Participants were informed about the purpose of the study, the procedures involved, and their right to withdraw at any time without any impact on their standard care. Patient confidentiality was maintained throughout the study by de-identifying all data and storing it in a secure database.

Findings

The findings of this study demonstrated that the multidisciplinary oral health screening program had a positive impact on patient outcomes. The intervention group showed significant improvements in both oral health status and cardiovascular outcomes compared to the control group. The following tables summarize the key findings:

Table 1: Baseline Characteristics of Participants

Characteristic	Intervention Group (n=100)	Control Group (n=100)
Age (mean \pm SD)	62.3 \pm 8.5	61.8 \pm 9.1
Male (%)	56	58
Hypertension (%)	78	75
Diabetes Mellitus (%)	40	42
Smoking (%)	25	27

Table 2: Changes in Oral Health and Cardiovascular Outcomes

Outcome Measure	Intervention Group (Baseline)	Intervention Group (12 Months)	Control Group (Baseline)	Control Group (12 Months)
Periodontal Disease Severity	Moderate	Mild	Moderate	Moderate
Dental Caries Index (mean \pm SD)	3.5 \pm 1.2	1.8 \pm 0.9	3.4 \pm 1.3	3.2 \pm 1.4
CRP Levels (mg/L, mean \pm SD)	6.2 \pm 2.1	3.4 \pm 1.5	6.0 \pm 2.3	5.9 \pm 2.2
Incidence of Cardiovascular Events (%)	15	8	14	13

Table 3: Patient Feedback on Multidisciplinary Care

Feedback Category	Intervention Group (%)
Satisfaction with Oral Health Education	92
Improvement in Oral Hygiene Practices	85
Perceived Improvement in Overall Health	80

The intervention group experienced a significant reduction in periodontal disease severity and dental caries index compared to the control group. Additionally, the intervention group showed lower levels of systemic inflammatory markers (e.g., CRP) and a reduced incidence of cardiovascular events. Patient feedback highlighted a high level of satisfaction with the multidisciplinary care approach, particularly with the oral health education provided by the team.

Discussion

The findings of this study suggest that the integration of a multidisciplinary oral health screening program in cardiovascular care can lead to significant improvements in both oral and cardiovascular health outcomes. The reduction in systemic inflammatory markers and the decreased incidence of cardiovascular events in the intervention group highlight the potential benefits of addressing oral health as part of comprehensive cardiovascular care. The involvement of dentists, nurses, pharmacists, and sonographers ensured that patients received holistic care that addressed multiple aspects of their health, ultimately leading to better outcomes.

The significant reduction in periodontal disease severity and dental caries index observed in the intervention group indicates that early detection and management of oral health issues can contribute to improved overall health outcomes. This finding aligns with previous research showing that effective oral health interventions can reduce systemic inflammation and, consequently, lower the risk of cardiovascular complications (D'Aiuto et al., 2005; Blaizot et al., 2009). By incorporating oral health screening into cardiovascular care, healthcare providers can identify and manage oral health issues that may otherwise go unnoticed, ultimately reducing the burden of cardiovascular disease.

Another key finding was the reduction in systemic inflammatory markers, such as C-reactive protein (CRP), in the intervention group. Elevated CRP levels are associated with an increased risk of cardiovascular events, and reducing systemic inflammation is a crucial component of cardiovascular disease management (Beck & Offenbacher, 2005). The reduction in CRP levels observed in this study suggests that addressing oral health can help mitigate systemic inflammation, thereby improving cardiovascular outcomes. This finding underscores the importance of a multidisciplinary approach that addresses both oral and cardiovascular health to achieve optimal patient outcomes.

The decreased incidence of cardiovascular events in the intervention group further supports the benefits of integrating oral health screening into cardiovascular care. By addressing oral health issues, such as periodontal disease and dental caries, the multidisciplinary team was able to reduce the risk of cardiovascular complications, highlighting the potential for improved patient outcomes through comprehensive care. This finding is consistent with previous studies that have demonstrated a link between periodontal disease and an increased risk of cardiovascular events (Lockhart et al., 2012; Joshipura et al., 1996).

Patient feedback also indicated a high level of satisfaction with the multidisciplinary care approach, particularly with the oral health education provided by the team. The involvement of nurses in providing patient education and assisting with daily oral care likely contributed to the improved oral hygiene practices reported by patients. This highlights the importance of patient education in promoting positive health behaviors and improving long-term health outcomes. The role of pharmacists in reviewing medication

regimens and addressing medication-related oral health issues also contributed to the overall success of the intervention, as patients were better able to manage the side effects of their medications.

Despite the positive findings, there were several challenges and limitations to implementing the multidisciplinary oral health screening program. One major challenge was the need for effective communication and coordination among the different healthcare professionals involved in the program. The traditional separation between dental and medical care often poses a barrier to effective collaboration, and efforts are needed to foster better communication and teamwork among healthcare providers (Lockhart et al., 2012). Additionally, the lack of infrastructure to support multidisciplinary teams in many healthcare settings can make it challenging to implement similar programs on a larger scale (Humphrey et al., 2008).

Another limitation of this study was the relatively short follow-up period of twelve months. While the study demonstrated significant improvements in oral and cardiovascular health outcomes during this time, longer follow-up is needed to assess the sustainability of these improvements and determine the long-term impact of the multidisciplinary approach. Future studies should consider extending the follow-up period to better understand the long-term benefits of integrating oral health screening into cardiovascular care.

In conclusion, the findings of this study suggest that a multidisciplinary approach to oral health screening and management in patients with cardiovascular disease can lead to significant improvements in both oral and cardiovascular health outcomes. By involving dentists, nurses, pharmacists, and sonographers in a collaborative care model, it is possible to provide comprehensive care that addresses multiple aspects of patient health, ultimately improving outcomes and reducing the burden of cardiovascular disease. Future research should focus on addressing the barriers to implementation and exploring strategies to facilitate effective collaboration among healthcare providers in different settings.

Conclusion

The results of this study demonstrate the importance of a multidisciplinary approach to oral health screening and management in patients with cardiovascular disease. By involving a team of healthcare professionals with diverse expertise, it is possible to improve patient outcomes, reduce systemic inflammation, and prevent complications. Future studies should focus on further exploring the long-term benefits of such programs and identifying strategies to overcome barriers to implementation in different healthcare settings.

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ملخص

هدفت هذه الدراسة إلى تقييم تأثير برنامج فحص صحة الفم متعدد التخصصات على الوقاية من المضاعفات لدى مرضى أمراض القلب والأوعية الدموية. أجريت الدراسة في مستشفى ثالثي على مدى اثني عشر شهرًا، وشملت 200 مريض تم تعيينهم في مجموعة تدخل (تلقوا فحصًا وإدارة لصحة الفم) أو مجموعة تحكم (تلقوا رعاية القلب والأوعية الدموية القياسية). يتكون الفريق متعدد التخصصات من أطباء أسنان وممرضات وصيدلة وأخصائيي الموجات فوق الصوتية، مما يساهم في جوانب مختلفة من رعاية المرضى. أظهرت النتائج تحسنات كبيرة في كل من صحة الفم والنتائج القلبية الوعائية في مجموعة التدخل، بما في ذلك انخفاض العلامات الالتهابية الجهازية وانخفاض حدوث الأحداث القلبية الوعائية. أشارت ملاحظات المرضى إلى رضا كبير عن النهج متعدد التخصصات، مؤكدة على أهمية دمج صحة الفم في رعاية القلب والأوعية الدموية. تشير هذه النتائج إلى أن نموذج الرعاية متعدد التخصصات يمكن أن يعزز النتائج الإجمالية للمرضى ويقلل من خطر حدوث مضاعفات القلب والأوعية الدموية.

الكلمات المفتاحية: صحة الفم، أمراض القلب والأوعية الدموية، الرعاية متعددة التخصصات، أمراض اللثة، الالتهاب الجهازية، نتائج المرضى