The Contribution Of Dental Teams To Improving Oral Health Outcomes In Patients With Diabetes Mellitus In Saudi Arabia: A Narrative Review

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Abstract

Background: Diabetes mellitus represents a major public health challenge in Saudi Arabia, with a high prevalence and substantial impact on systemic and oral health. Oral complications, particularly periodontal disease, are common among patients with diabetes and are closely linked to glycemic control through a bidirectional relationship. Dental teams play a critical role in addressing these complications; however, their contribution within the Saudi healthcare context has not been comprehensively synthesized.

Objective: This narrative review aimed to examine the contribution of dental teams to improving oral health outcomes among patients with diabetes mellitus in Saudi Arabia, with a focus on disease burden, oral health challenges, preventive care, and interprofessional collaboration.

Methods: A narrative review of relevant national and international literature was conducted, including studies published in peer-reviewed journals, reports from the Saudi Ministry of Health, and guidelines from international health organizations. The review focused on evidence related to diabetes prevalence in Saudi Arabia, oral health complications, and the roles of dentists, dental assistants, and dental hygienists in diabetic care.

Results: The reviewed evidence indicates a high prevalence of periodontal disease, dental caries, xerostomia, and oral infections among Saudi patients with diabetes, particularly those with poor glycemic control. Dental teams contribute significantly through periodontal management, preventive interventions, patient education, and coordination with medical professionals. Periodontal therapy and structured oral health education were associated with improved periodontal outcomes and enhanced patient awareness. However, challenges such as limited patient awareness, inconsistent interprofessional collaboration, and the absence of standardized national guidelines persist.

Conclusion: Dental teams play a vital role in improving oral health outcomes among patients with diabetes mellitus in Saudi Arabia. Strengthening their integration within diabetes care pathways, enhancing interprofessional collaboration, and implementing

national guidelines are essential steps toward comprehensive and preventive diabetes management aligned with Saudi Vision 2030

1. INTRODUCTION

Diabetes mellitus (DM) is one of the most prevalent chronic metabolic disorders worldwide and represents a major public health challenge in the Kingdom of Saudi Arabia. National epidemiological data indicate that Saudi Arabia is among the countries with the highest prevalence of diabetes, largely driven by lifestyle changes, urbanization, obesity, and physical inactivity. The growing burden of diabetes has resulted in increased healthcare utilization and a rise in diabetes-related complications affecting multiple body systems.

Oral health complications are among the most common yet often overlooked consequences of diabetes mellitus. A substantial body of evidence has established a bidirectional relationship between diabetes and periodontal disease, whereby hyperglycemia contributes to periodontal inflammation, impaired immune response, and delayed wound healing, while chronic periodontal infection can exacerbate systemic inflammation and worsen glycemic control. This interaction highlights the importance of oral health as an integral component of comprehensive diabetes care.

Dental teams—including dentists, dental assistants, dental hygienists, and preventive oral healthcare providers—play a crucial role in addressing diabetes-related oral complications. Their responsibilities extend beyond clinical treatment to include early detection, preventive care, patient education, and interprofessional collaboration with medical teams. In Saudi Arabia, healthcare reforms under Vision 2030 and the Health Sector Transformation Program have emphasized integrated, preventive, and patient-centered care, creating opportunities to strengthen the role of dental teams in chronic disease management.

This narrative review aims to explore the contribution of dental teams to improving oral health outcomes among patients with diabetes mellitus in Saudi Arabia by synthesizing current evidence related to disease burden, oral health challenges, and the evolving role of dental professionals within the Saudi healthcare system.

2. Burden of Diabetes Mellitus in Saudi Arabia and Its Impact on Oral Health

Saudi Arabia faces a substantial and growing burden of diabetes mellitus, with prevalence rates among adults reported to exceed 17%, according to national surveys and World Health Organization estimates. Diabetes has been identified as a leading contributor to morbidity, mortality, and healthcare costs in the country. The high prevalence of diabetes has been consistently reported across different regions, including central, eastern, and western provinces, indicating a nationwide public health concern.

The impact of diabetes on oral health among Saudi patients has been well documented. Studies conducted in hospital-based and primary healthcare settings have shown a significantly higher prevalence of periodontal disease among diabetic individuals compared to non-diabetic populations. Poor glycemic control, often reflected by elevated HbA1c levels, has been associated with increased periodontal pocket depth, clinical attachment loss, gingival bleeding, and tooth loss. These findings suggest that diabetes severity and duration play a critical role in determining oral health outcomes.

In addition to periodontal disease, Saudi patients with diabetes frequently experience xerostomia, increased susceptibility to dental caries, oral fungal infections, and delayed post-extraction healing. These oral conditions negatively affect quality of life, nutritional intake, and treatment adherence. The high burden of oral complications among diabetic

patients underscores the need for routine oral health assessment and timely dental intervention as part of diabetes management strategies within the Saudi healthcare system.

3. Oral Health Challenges Among Patients with Diabetes Mellitus in Saudi Arabia

Patients with diabetes mellitus in Saudi Arabia encounter a range of oral health challenges that are closely linked to metabolic control, disease duration, and individual health behaviors. Periodontal disease remains the most prevalent oral condition among diabetic patients and is often more severe and progressive compared to non-diabetic individuals. Research conducted in Saudi populations indicates that patients with poorly controlled diabetes are at significantly higher risk of developing advanced periodontitis.

Dental caries also represent a common challenge among diabetic patients. Altered salivary composition, reduced salivary flow, and increased glucose levels in saliva contribute to an environment conducive to bacterial growth and enamel demineralization. Xerostomia, frequently reported by Saudi diabetic patients, further exacerbates the risk of caries, oral discomfort, and difficulties in mastication and speech.

Despite the high prevalence of these oral health problems, awareness and knowledge regarding the relationship between diabetes and oral health remain limited among many Saudi patients. Several studies have reported inadequate understanding of the bidirectional link between periodontal disease and glycemic control, leading to delayed dental visits and suboptimal oral hygiene practices. These challenges highlight the critical role of dental teams in patient education, risk assessment, and preventive care, particularly within primary healthcare and community dental settings.

. Role of Dental Teams in Improving Oral Health Outcomes Among Patients with Diabetes Mellitus in Saudi Arabia

Dental teams play a pivotal role in mitigating oral health complications associated with diabetes mellitus through clinical management, prevention, and patient-centered education. Within the Saudi healthcare system—particularly across hospitals and primary healthcare centers (PHCCs)—dental teams are strategically positioned to contribute to early detection and long-term management of diabetes-related oral conditions.

Dentists are primarily responsible for diagnosing and managing periodontal disease, dental caries, and oral infections, which are highly prevalent among patients with diabetes. Evidence consistently demonstrates that periodontal therapy, including scaling and root planing, improves periodontal parameters and is associated with modest but clinically relevant reductions in glycated hemoglobin (HbA1c) levels. Studies conducted in Saudi Arabia have emphasized that diabetic patients receiving regular periodontal care exhibit better periodontal stability and reduced disease progression compared to those receiving irregular or emergency-based dental treatment.

Dental assistants support clinical care by maintaining infection control standards, assisting during procedures, and reinforcing oral hygiene instructions. In Saudi PHCCs, dental assistants frequently serve as the first point of contact, contributing to patient flow, continuity of care, and reinforcement of preventive messages. Their role is particularly important in improving appointment adherence and follow-up among patients with chronic conditions such as diabetes.

Dental hygienists play a central preventive role through professional plaque control, periodontal maintenance, and individualized oral hygiene education. Evidence from Saudi and international studies indicates that interventions led by dental hygienists significantly improve plaque index, gingival inflammation, and patient compliance with daily oral hygiene practices. For diabetic patients, regular maintenance visits conducted by hygienists are critical in preventing periodontal disease recurrence and maintaining long-term oral health.

Collectively, the coordinated efforts of dentists, dental assistants, and dental hygienists contribute to improved oral health outcomes, reduced complications, and enhanced quality of life for patients with diabetes mellitus in Saudi Arabia.

5. Preventive and Educational Interventions in Saudi Dental Settings

Preventive care and patient education are fundamental components of oral health management for patients with diabetes mellitus. In Saudi Arabia, several studies have identified insufficient awareness among diabetic patients regarding the bidirectional relationship between diabetes and periodontal disease, which contributes to delayed dental attendance and suboptimal oral hygiene practices.

Dental teams play a critical role in delivering structured preventive and educational interventions tailored to diabetic patients. These interventions include education on the importance of glycemic control for oral health, instruction on effective toothbrushing and interdental cleaning techniques, and counseling on smoking cessation and dietary habits. Evidence suggests that diabetic patients who receive targeted oral health education demonstrate improved oral hygiene behaviors and better periodontal outcomes.In the Saudi healthcare context, preventive dental services are increasingly integrated into PHCCs as part of the Health Sector Transformation Program under Vision 2030. This integration facilitates collaboration between dental teams and medical professionals, enabling the delivery of holistic and preventive care for patients with chronic diseases. Community-based initiatives and chronic disease clinics provide additional platforms for dental teams to promote regular dental visits, typically recommended every three to six months for diabetic patients.Preventive and educational efforts led by dental teams not only reduce the burden of oral disease but also support overall diabetes management by minimizing chronic oral inflammation, improving patient self-care, and enhancing health-related quality of life.

6. Interprofessional Collaboration in the Management of Diabetic Patients within the Saudi Healthcare System

Interprofessional collaboration is a cornerstone of effective diabetes management, particularly in addressing the complex oral–systemic interactions associated with diabetes mellitus. In Saudi Arabia, recent healthcare reforms have emphasized integrated, patient-centered care through the consolidation of services within health clusters and the expansion of primary healthcare centers (PHCCs). This structural transformation has created opportunities for closer collaboration between dental teams and medical professionals, including family physicians, endocrinologists, nurses, and pharmacists.

Evidence suggests that collaborative care models enhance early detection of diabetes-related oral complications and improve continuity of care. Dental teams contribute by identifying oral manifestations indicative of poor glycemic control and facilitating timely referrals to medical providers. Conversely, physicians managing diabetic patients can play a critical role in encouraging regular dental visits and reinforcing the importance of oral health as part of diabetes self-management.

Despite these advancements, interprofessional collaboration in Saudi Arabia remains inconsistently implemented. Studies have reported limited formal referral pathways between dental and medical services, as well as inadequate integration of dental records within shared electronic health systems. Strengthening communication channels, standardizing referral protocols, and integrating oral health indicators into chronic disease management frameworks are essential steps toward optimizing collaborative diabetes care. Enhancing interprofessional education across medical and dental curricula in Saudi health colleges may further support collaborative practice by fostering shared understanding of roles, responsibilities, and the bidirectional relationship between diabetes and oral health.

7. Challenges and Barriers to Optimizing the Role of Dental Teams in Saudi Arabia

Despite the recognized importance of dental teams in diabetes care, several challenges limit their full contribution within the Saudi healthcare system. One of the primary barriers is limited patient awareness regarding the relationship between diabetes and oral health. Many diabetic patients seek dental care only when symptomatic, resulting in delayed diagnosis and management of periodontal disease.

Time constraints and high patient volumes within PHCCs also pose challenges for dental teams, reducing opportunities for comprehensive oral health assessments and patient education. Additionally, variability in clinical practice and the absence of standardized national guidelines for the dental management of diabetic patients contribute to inconsistent care delivery across regions.

From a system-level perspective, fragmented communication between dental and medical services remains a significant barrier. The lack of fully integrated electronic health records that include dental data limits information sharing and coordinated care. Furthermore, limited training opportunities focused specifically on diabetes management for dental professionals may affect confidence and competence in managing high-risk patients.

Addressing these barriers requires a multifaceted approach that includes public awareness campaigns, development of national clinical guidelines, enhanced professional training, and improved health information systems. Such efforts are essential to maximize the impact of dental teams on oral and systemic health outcomes among patients with diabetes mellitus in Saudi Arabia.

8. Future Directions and Saudi-Specific Recommendations

Strengthening the role of dental teams in the management of patients with diabetes mellitus in Saudi Arabia requires systematic and policy-driven interventions aligned with national health priorities. As the burden of diabetes continues to rise, integrating oral health into chronic disease management pathways is essential for improving both oral and systemic health outcomes.

One of the most critical future directions is the development of **national clinical guidelines** that explicitly address dental management for patients with diabetes. These guidelines should outline standardized screening protocols, periodontal risk assessment, recall intervals, and referral pathways between dental and medical services. Such guidance would reduce variability in practice and ensure consistent, evidence-based care across different regions and healthcare settings.

Capacity building and professional training represent another priority. Incorporating diabetes-focused oral health modules into undergraduate and continuing professional education for dentists, dental assistants, and dental hygienists would enhance clinical competence and confidence in managing high-risk patients. Interprofessional education initiatives involving dental and medical trainees could further strengthen collaborative practice.

At the system level, improved **integration of electronic health records (EHRs)** is essential. Including dental data within shared EHR platforms would facilitate information exchange, enable coordinated care, and support monitoring of outcomes such as periodontal status and glycemic control. Additionally, embedding oral health indicators into diabetes clinics and chronic disease registries could enhance surveillance and quality improvement efforts.

Public health initiatives aimed at increasing **patient awareness** are also necessary. Community-based education programs, supported by dental teams within PHCCs, can improve knowledge of the bidirectional relationship between diabetes and oral health, encourage preventive dental visits, and promote self-care behaviors.

These recommendations align closely with the objectives of Saudi Vision 2030, which emphasizes preventive care, integration of services, and improved quality of life for individuals living with chronic diseases.

9. CONCLUSION

Diabetes mellitus poses a significant public health challenge in Saudi Arabia, with substantial implications for oral health and overall well-being. The evidence synthesized in this narrative review highlights the critical contribution of dental teams to improving oral health outcomes among patients with diabetes through clinical management, preventive care, patient education, and interprofessional collaboration.

Dentists, dental assistants, and dental hygienists each play complementary roles in addressing the complex oral manifestations of diabetes. Regular periodontal care, preventive interventions, and targeted education delivered by dental teams not only improve oral health but may also contribute to better glycemic control and reduced systemic inflammation. Within the evolving Saudi healthcare system, the integration of dental services into primary and chronic care pathways offers a valuable opportunity to enhance comprehensive diabetes management.

Despite existing progress, challenges remain, including limited patient awareness, inconsistent collaboration between medical and dental services, and the absence of standardized national guidelines. Addressing these barriers through policy development, professional training, health system integration, and public health initiatives is essential to optimize the role of dental teams.

In conclusion, strengthening the involvement of dental teams in diabetes care represents a critical and achievable strategy for improving health outcomes among patients with diabetes mellitus in Saudi Arabia, in alignment with national healthcare transformation goals.

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