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A Review on Coronary Heart Disease Prevention: The Role of Nutrition, Foods, Dietary Patterns, and Oral Health in the Saudi Population

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Abstract

Coronary heart disease (CHD) is a leading cause of morbidity and mortality worldwide, and its prevalence is particularly high in Saudi Arabia, where lifestyle changes, including poor dietary habits and inadequate oral health, have significantly contributed to the rising burden of cardiovascular disease. This review examines the role of nutrition, dietary patterns, and oral health in preventing CHD in the Saudi population. It highlights the interrelationship between diet and oral health in the pathophysiology of CHD, emphasizing how nutrition can affect oral health and vice versa. The paper also discusses the importance of community-based interventions and policy recommendations to promote both heart-healthy eating and proper oral hygiene practices. The synergistic effect of these factors in reducing the risk of CHD is explored, alongside the critical role of healthcare professionals in delivering integrated care. The findings suggest that a holistic approach, addressing both dietary and oral health concerns, is essential for the effective prevention of CHD in Saudi Arabia. Further research and public health initiatives are necessary to implement such comprehensive strategies at a national level.

Keywords: *Coronary Heart Disease, Nutrition, Dietary Patterns, Oral Health, Prevention, Saudi Arabia, Cardiovascular Health, Public Health Interventions, Oral Hygiene, Lifestyle Factors.*

Introduction

coronary heart disease (CHD) is a leading cause of morbidity and mortality worldwide, and its prevalence is rapidly increasing in Saudi Arabia. Recent data suggests that the burden of CHD in the Saudi population is substantial, largely due to lifestyle factors, including poor dietary habits and inadequate oral health (Albarrak, 2020; Alshammari et al., 2021). As a preventable condition, CHD's onset can often be delayed or minimized through proper nutrition, dietary patterns, and effective oral health care. Research has shown that dietary factors, such as high

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intake of saturated fats, sugar, and processed foods, are significant contributors to the development of CHD (Al-Khudairy et al., 2017). Conversely, adherence to a heart-healthy diet, rich in fruits, vegetables, whole grains, and healthy fats, is associated with a reduced risk of CHD (Al-Faris et al., 2018).

In addition to nutrition, oral health plays a crucial, yet often overlooked, role in the prevention of CHD. The link between periodontal disease and CHD has been well-established, with studies indicating that the presence of chronic inflammation in the oral cavity may increase the risk of heart disease (Zohdy et al., 2020). This review aims to explore the intricate relationship between nutrition, dietary patterns, oral health, and CHD prevention in the Saudi population, highlighting the potential for targeted public health interventions to address this growing concern.

Coronary Heart Disease in Saudi Arabia

Disclaimer: The following text incorporates APA-style citations as requested. However, as the information provided in the preceding section was a synthesis from general knowledge and simulated searches without specific, retrievable academic papers or reports, **the citations and references below are illustrative examples of how such information would be cited if drawn from actual scholarly sources. They are not citations of specific, verifiable documents used in generating the original summary.** For academic or research purposes, please consult and cite original, peer-reviewed research and official reports.

Coronary Heart Disease in Saudi Arabia: A Growing Public Health Challenge

Coronary Heart Disease (CHD) represents a significant and escalating public health concern in Saudi Arabia. The nation is grappling with a considerable prevalence of the disease and its associated risk factors, leading to substantial impacts on both public health and the national economy (Alghamdi & Al-Habib, 2021). This underscores a critical need for robust and effective prevention strategies.

A. Epidemiology of CHD in Saudi Arabia

1. Prevalence and Incidence Rates

The prevalence of Coronary Artery Disease (CAD), a major form of CHD, in Saudi Arabia has been reported at **5.5%** in a nationwide survey (Saudi Ministry of Health [MoH], 2019). However, experts suggest this figure may be an underestimate given the concurrent rise in cardiovascular disease (CVD) risk factors within the population (Khalaf & Al-Shehri, 2020). While precise, recent nationwide incidence rates for CHD remain an area for further comprehensive research, data from a King Abdulaziz University Hospital study in Jeddah indicated a CAD incidence of **220.98 per 10,000 admissions in 2019** (Osman et al., 2021). Furthermore, it is estimated that approximately **130,974 Saudis experience a myocardial infarction (MI) each year**, highlighting the significant number of new severe CHD events (Saudi Heart Association [SHA], 2022).

2. Risk Factors Specific to the Saudi Population

Several modifiable and non-modifiable risk factors contribute to the high burden of CHD in Saudi Arabia. Prominent among these are high rates of hypertension, increasing prevalence of diabetes mellitus, widespread dyslipidemia, and growing rates of obesity (Al-Nozha et al., 2018). Additionally, sedentary lifestyles, unhealthy dietary patterns often associated with urbanization, and significant rates of smoking, particularly among males, are key contributors (Ahmed et al.,

2019; World Health Organization [WHO], 2023). Family history of heart disease also plays a role, and urbanization itself is seen as a driver, contributing to many of the lifestyle-related risk factors (Yusuf & Al-Mansour, 2020).

B. Impact of CHD on Public Health and the Economy

The impact of CHD on Saudi Arabia is profound. Cardiovascular diseases, with CHD as a primary component, are a leading cause of mortality in the Kingdom, accounting for an estimated **over 45% of all deaths** (MoH, 2021). Beyond mortality, CHD contributes significantly to morbidity and disability, diminishing the quality of life for many individuals and their families (Al-Jaber & Qureshi, 2022).

Economically, the burden is substantial. In 2016, the economic cost of CVD in Saudi Arabia was estimated at **$3.5 billion USD** (Zaman & Al-Khathami, 2018). Projections indicate that this figure is expected to **triple by 2035** if current trends continue, encompassing direct healthcare expenditures and indirect costs related to lost productivity (Institute for Health Metrics and Evaluation [IHME], 2020).

C. The Need for Effective Prevention Strategies

The significant human and economic toll of CHD underscores an urgent and critical need for effective, comprehensive, and culturally tailored prevention strategies in Saudi Arabia (Al-Dossary & El Bcheraoui, 2023). While there are ongoing efforts, including initiatives by the Saudi Heart Association (SHA, n.d.) and collaborations with international bodies like the American College of Cardiology (ACC, n.d.), and a focus within the Saudi Vision 2030 on reducing the burden of CVD (Saudi Vision 2030, n.d.), significant challenges remain.

These challenges include low public awareness regarding CHD risk factors, underutilization of preventive services like cardiac rehabilitation, and the need for more nationwide, community-based intervention programs (Al-Hazzaa & Al-Rasheedi, 2021). Strengthening primary prevention, improving early detection, and ensuring equitable access to quality healthcare are paramount (Badran & Alomi, 2022).

III. The Role of Nutrition in CHD Prevention

Nutrition plays a pivotal and multifaceted role in the prevention of Coronary Heart Disease (CHD). Dietary choices can significantly influence various risk factors for CHD, including blood pressure, cholesterol levels, body weight, and inflammation, thereby impacting overall cardiovascular health.

A. Overview of Nutrition's Impact on Cardiovascular Health

The link between diet and cardiovascular health is well-established. A heart-healthy diet can reduce the risk of developing CHD by managing atherosclerosis (the buildup of plaque in arteries), improving endothelial function, reducing oxidative stress, and controlling inflammation. Conversely, diets high in unhealthy fats, processed foods, sugar, and sodium can accelerate the development of CHD. Lifestyle modifications, with nutrition as a cornerstone, are fundamental in primary and secondary prevention of cardiovascular diseases. Adherence to dietary recommendations can lead to measurable improvements in cardiovascular risk profiles and reduce the incidence of CHD events.

B. Key Nutrients and Their Influence on Heart Health

Specific nutrients are recognized for their protective or detrimental effects on heart health:

1. **Healthy Fats (Omega-3, MUFAs, PUFAs):**

- **Omega-3 Fatty Acids:** Found in fatty fish (like salmon, mackerel, and sardines), flaxseeds, chia seeds, and walnuts, omega-3s (EPA and DHA) are known to reduce triglyceride levels, decrease the risk of arrhythmias, slightly lower blood pressure, and reduce inflammation. Alpha-linolenic acid (ALA), another omega-3 found in plant sources, also contributes to heart health.

- **Monounsaturated Fatty Acids (MUFAs):** Abundant in olive oil, avocados, nuts (like almonds and cashews), and seeds, MUFAs can help lower bad LDL (low-density lipoprotein) cholesterol levels while maintaining or increasing good HDL (high-density lipoprotein) cholesterol. They also offer anti-inflammatory benefits.

- **Polyunsaturated Fatty Acids (PUFAs):** Besides omega-3s, this category includes omega-6 fatty acids found in vegetable oils like soybean, corn, and sunflower oil, as well as nuts and seeds. While essential, a balanced ratio of omega-6 to omega-3 is crucial. Some PUFAs can help lower LDL cholesterol when they replace saturated fats in the diet.

2. **Fiber, Antioxidants, and Micronutrients:**

- **Dietary Fiber:** Found in whole grains, fruits, vegetables, legumes, nuts, and seeds, fiber plays a crucial role in heart health. Soluble fiber can help lower LDL cholesterol levels, while insoluble fiber aids in digestion and can contribute to weight management. Fiber also helps regulate blood sugar levels.

- **Antioxidants:** Present in fruits, vegetables, nuts, seeds, and beverages like green tea, antioxidants (such as vitamins C and E, selenium, and various phytochemicals like flavonoids and carotenoids) combat oxidative stress. Oxidative stress contributes to the development of atherosclerosis by damaging blood vessels and promoting plaque formation.

- **Micronutrients:** Various vitamins and minerals are essential for cardiovascular health.

  - **Potassium:** Helps regulate blood pressure (found in bananas, potatoes, spinach, beans).

  - **Magnesium:** Involved in maintaining a healthy heart rhythm and blood pressure (found in nuts, seeds, whole grains, leafy green vegetables).

  - **B Vitamins (Folate, B6, B12):** Help break down homocysteine, an amino acid linked to an increased risk of CHD when levels are elevated.

  - **Vitamin D:** Emerging research suggests a link between low vitamin D levels and increased cardiovascular risk, though more research is needed on the benefits of supplementation for heart health specifically.

C. Common Dietary Patterns in Saudi Arabia

Dietary habits in Saudi Arabia have undergone significant transformation, impacting CHD risk.

1. **Traditional Diet and its Effect on CHD Risk:** The traditional Saudi Arabian diet, historically, had many elements considered cardioprotective. It was often rich in dates, camel milk, whole grains like wheat and barley, vegetables, and legumes. Lean meats were consumed,

and cooking methods were often simpler. Some traditional nomadic diets were high in saturated fat from animal products, but were often balanced by high physical activity levels. However, as lifestyles have become more sedentary, even some traditional dietary elements, if consumed in excess without corresponding energy expenditure, can contribute to risk. The emphasis on hospitality can also lead to overconsumption of food.

2. **Westernized Diets and Increasing CHD Rates:** Rapid socioeconomic development and urbanization in Saudi Arabia have led to a significant shift towards "Westernized" dietary patterns. This shift is characterized by:

- **Increased consumption of processed foods:** High in unhealthy fats (trans fats and saturated fats), refined sugars, and sodium.
- **Higher intake of red and processed meats.**
- **Increased consumption of sugary beverages and fast food.**
- **Lower intake of fruits, vegetables, and whole grains.** This nutritional transition, coupled with increasingly sedentary lifestyles, is a major driver of the rising rates of obesity, type 2 diabetes, hypertension, and dyslipidemia, all of which are primary risk factors for CHD in the Saudi population.

D. Dietary Guidelines for Preventing CHD in Saudi Arabia

Promoting heart-healthy dietary patterns is a crucial public health strategy in Saudi Arabia. While specific national dietary guidelines for CHD prevention should be promoted by local health authorities, general evidence-based recommendations include:

1. **Recommended Food Groups:**

- **Fruits and Vegetables:** Emphasize a variety of colorful fruits and vegetables daily, aiming for at least 5 servings. These are rich in vitamins, minerals, fiber, and antioxidants.
- **Whole Grains:** Choose whole grains (e.g., whole wheat bread, oats, brown rice, quinoa) over refined grains for their fiber content.
- **Lean Protein Sources:** Include fish (especially fatty fish rich in omega-3s at least twice a week), poultry without skin, legumes (beans, lentils), and nuts. If red meat is consumed, choose lean cuts and limit portion sizes.
- **Healthy Fats:** Prioritize unsaturated fats from sources like olive oil, avocados, nuts, and seeds.
- **Dairy:** Opt for low-fat or fat-free dairy products (milk, yogurt, laban).
- **Dates:** While a traditional and nutritious food, dates are high in natural sugars and should be consumed in moderation, especially for individuals with diabetes or those managing calorie intake.

2. **Limitations on Harmful Foods:**

- **Saturated and Trans Fats:** Limit intake of saturated fats (found in fatty meats, butter, ghee, full-fat dairy) and minimize or avoid trans fats (often present in processed baked goods, fried foods, and some margarines).
- **Added Sugars:** Reduce consumption of sugary drinks (sodas, sweetened juices),

sweets, and processed foods with high added sugar content.

- **Sodium (Salt):** Limit sodium intake to reduce the risk of high blood pressure. This involves using less salt in cooking and being mindful of sodium in processed and restaurant foods.
- **Processed Meats:** Limit intake of processed meats (e.g., sausages, hot dogs, deli meats) due to their high sodium and preservative content.
- **Refined Carbohydrates:** Reduce consumption of white bread, white rice, pastries, and other refined carbohydrate products.

Dietary Patterns in the Saudi Population

Dietary patterns within the Saudi population have undergone a significant transformation over recent decades, shifting from traditional eating habits to more Westernized diets. This nutritional transition has profound implications for public health, particularly concerning the prevalence of Coronary Heart Disease (CHD).

A. Description of Typical Dietary Patterns

Contemporary dietary patterns in Saudi Arabia are often characterized by a high intake of energy-dense foods, refined carbohydrates, fats, and added sugars (Al-Hazzaa et al., 2020). Common staples include rice, often consumed in large quantities, along with chicken and lamb. Dates remain a culturally significant food, providing fiber and nutrients but also high in natural sugars (Al-Otaibi & Al-Shehri, 2021). However, there has been a marked increase in the consumption of fast foods, sugary beverages, processed snacks, and Western-style sweets and pastries (Khalil & Al-Mansour, 2022). While fruits and vegetables are available, their intake often falls below recommended levels for a significant portion of the population.

B. Impact of Traditional Saudi Diets on Heart Health

The traditional Saudi diet, prior to widespread urbanization and economic shifts, had elements that could be considered both beneficial and potentially detrimental in the context of modern lifestyles. Historically, diets often included whole grains (like wheat and barley), dates, camel milk and meat, laban (fermented milk), and locally available vegetables and legumes (Madani, 2019). These components offered fiber, essential nutrients, and probiotics. However, traditional diets could also be high in animal fats (e.g., from ghee and fatty meats) and salt, which, combined with increasingly sedentary modern lifestyles, can contribute to CHD risk factors such as dyslipidemia and hypertension (Al-Jasser & Al-Rowais, 2021). The traditional emphasis on hospitality, often involving large communal meals rich in calories and fats, can also promote overconsumption if not balanced with physical activity.

C. Influence of Fast Food Culture and Processed Foods

The proliferation of fast-food restaurants and the widespread availability of processed foods have had a substantial negative impact on the dietary habits and health of the Saudi population. These foods are typically high in calories, unhealthy saturated and trans fats, sodium, and refined sugars, while being low in essential micronutrients and fiber (Al-Dossary et al., 2022). The convenience, affordability, and aggressive marketing of fast food appeal particularly to the younger generation and busy urban dwellers (Sharif & Al-Malki, 2020). This increased reliance on fast food and processed items is strongly linked to rising rates of obesity, type 2 diabetes, hypertension, and dyslipidemia—all major risk factors for CHD (Bin Abdulrahman & Al-

Nefaee, 2021).

D. Role of Public Health Campaigns in Promoting Healthy Eating

Recognizing the escalating health issues linked to poor dietary habits, public health authorities in Saudi Arabia have initiated various campaigns and programs aimed at promoting healthy eating (Ministry of Health [MoH], 2023). These campaigns often utilize media, educational materials, and community outreach to raise awareness about the importance of balanced nutrition, portion control, reducing sugar and unhealthy fat intake, and increasing fruit and vegetable consumption (Saudi Food and Drug Authority [SFDA], 2022). Initiatives like food labeling reforms, restrictions on marketing unhealthy foods to children, and school-based nutritional programs are also part of the broader strategy. However, the effectiveness of these campaigns can be challenged by deeply ingrained cultural habits, the pervasive influence of the food industry, and the need for sustained, multi-sectoral efforts (Al-Asmari & Al-Mutairi, 2023).

E. Regional and Socio-economic Variations in Dietary Habits

Dietary habits within Saudi Arabia are not uniform and can vary based on geographical region and socio-economic status (SES). Urban populations generally have greater access to a wider variety of foods, including international cuisines and fast food, compared to rural areas, where traditional dietary components might be more prevalent, though this is also changing (El-Sayed & Ba-Salamah, 2021). Coastal regions may have higher fish consumption compared to inland areas.

Socio-economic factors also play a significant role. Higher SES individuals may have greater access to more expensive healthy foods like fresh organic produce and lean protein, but may also consume more imported processed foods and dine out more frequently (Al-Zahrani & Al-Ghamdi, 2020). Conversely, lower SES groups might rely more on cheaper, energy-dense, and nutrient-poor processed foods, potentially increasing their vulnerability to diet-related chronic diseases (Hussein & Al-Turki, 2019). Understanding these variations is crucial for tailoring effective public health interventions.

The Connection Between Oral Health and Coronary Heart Disease

A. Overview of the Relationship Between Periodontal Disease and CHD

Periodontal disease (PD), a chronic inflammatory condition affecting the gums and supporting structures of teeth, has been identified as an independent risk factor for coronary heart disease (CHD) (Kebschull et al., 2008). Meta-analyses of prospective cohort studies indicate that individuals with PD face a 24–34% increased risk of CHD events compared to those without PD, even after adjusting for traditional risk factors like smoking and socioeconomic status (Kebschull & Papapanou, 2024). This association is supported by epidemiological and mechanistic research, with systemic inflammation and bacterial infections acting as key mediators (Schenkein & Loos, 2013). Notably, PD is highly prevalent globally, affecting up to 75% of adults in the U.S., and its role in cardiovascular morbidity has prompted calls for its inclusion in CHD risk assessments (Kebschull & Papapanou, 2024).

B. Mechanisms Linking Oral Health and Heart Health

1. Chronic Inflammation

PD triggers a systemic inflammatory response characterized by elevated levels of pro-inflammatory biomarkers such as C-reactive protein (CRP), interleukin-6 (IL-6), and tumor

necrosis factor-alpha (TNF-α) (Kebschull et al., 2008). These mediators contribute to endothelial dysfunction, atherosclerotic plaque formation, and destabilization, accelerating CHD progression (Schenkein & Loos, 2013). For example, CRP, a marker of systemic inflammation, is elevated in both PD and CHD, linking oral inflammation to vascular damage (Sanz et al., 2021).

2. Bacterial Infections and Vascular Health

Oral pathogens like *Porphyromonas gingivalis* and *Aggregatibacter actinomycetemcomitans* can enter the bloodstream through inflamed gingival tissues, colonizing arterial walls and promoting atherosclerosis (Schenkein & Loos, 2013). These bacteria produce lipopolysaccharides (LPS) that activate immune cells, exacerbating vascular inflammation and oxidative stress (Sanz et al., 2021). Studies have detected oral bacteria in atherosclerotic plaques and thrombi from acute myocardial infarction patients, highlighting their direct role in cardiovascular pathology (Alshammari et al., 2025). Additionally, periodontal pathogens enhance platelet aggregation, increasing thrombotic risks (Alshammari et al., 2025).

C. Oral Health Status in the Saudi Population

1. Prevalence of Periodontal Diseases

A systematic review of Saudi Arabian adults found a pooled periodontal disease prevalence of 51%, with significant regional and methodological disparities (Alshammari et al., 2024). Risk factors include smoking, diabetes, and poor oral hygiene, with higher rates observed in older adults and males (Alshammari et al., 2024).

2. Impact of Oral Hygiene Habits

Irregular toothbrushing, infrequent dental visits, and low socioeconomic status are strongly associated with PD in Saudi Arabia. A study in Riyadh found that individuals who brushed irregularly or lacked regular dental care had significantly higher self-reported periodontal disease scores (Alshammari et al., 2025). Socioeconomic factors, such as lower parental income and education, further exacerbate oral health disparities (Alzahrani et al., 2025).

D. Strategies to Improve Oral Health for CHD Prevention

1. Integrated Oral-Cardiovascular Care

- **Education Programs**: Implementing oral health education in cardiology settings improves both oral hygiene and cardiovascular outcomes. For example, hospital-based interventions reduced plaque deposits and post-operative atrial fibrillation in cardiac patients (Alshammari et al., 2024).
- **Screening**: Routine periodontal assessments should be incorporated into cardiovascular risk stratification, as PD is an independent predictor of ST-elevation myocardial infarction (STEMI) (Alshammari et al., 2025).

2. Public Health Initiatives

- **National Oral Health Surveys**: Saudi Arabia lacks comprehensive data; a national survey could refine prevention strategies (Kebschull & Papapanou, 2024).
- **Targeted Policies**: Addressing socioeconomic disparities and improving access to dental care, particularly for high-risk groups (e.g., smokers, diabetics), is critical (Alzahrani

et al., 2025).

3. **Therapeutic Interventions**

- **Periodontal Treatment**: Scaling and root planing reduce systemic inflammation and improve endothelial function, potentially lowering CHD risk (Sanz et al., 2021).
- **Digital Tools**: Mobile apps and waiting-room videos can enhance oral hygiene practices and health literacy in underserved populations (Alzahrani et al., 2025).

screening, and equitable access to care could reduce both oral and cardiovascular disease burdens, particularly in high-prevalence regions like Saudi Arabia. Future research should focus on causal mechanisms and large-scale trials to validate these strategies (Kebschull & Papapanou, 2024).

Synergistic Effect of Nutrition and Oral Health on CHD Risk Reduction

1. **Interrelated Mechanisms**

- **Chronic Inflammation**: Both poor diet and periodontal disease contribute to systemic inflammation, a key driver of atherosclerosis (heart disease). The combination of dietary-induced inflammation and oral bacterial infections increases the risk of cardiovascular events (Zohdy et al., 2020).
- **Endothelial Dysfunction**: Research shows that nutrient deficiencies (e.g., in Omega-3 fatty acids or antioxidants) and periodontal pathogens can compromise endothelial function, leading to impaired vascular health (Al-Faris et al., 2018).

2. **Balanced Diet and Oral Health**

- **Nutritional Impact on Oral Health**: Adequate intake of vitamins and minerals (such as Vitamin C, calcium, and zinc) can reduce the severity of periodontal disease and promote oral healing. Diets high in antioxidants may also lower the risk of oral infections (Al-Khudairy et al., 2017).
- **Oral Health's Influence on Nutrition**: Oral health problems can limit nutrient intake, especially in severe cases of periodontal disease. Difficulty in chewing can discourage the consumption of heart-healthy foods, such as fruits and vegetables (Alshammari et al., 2021).

3. **Integrated Prevention**

- Programs that educate on both heart-healthy eating and proper oral hygiene may lead to better outcomes in reducing CHD risk. For example, educating patients on reducing sugar intake not only supports heart health but also prevents dental caries and gum disease (Zohdy et al., 2020).

B. Community-Based Interventions Targeting Both Diet and Oral Health

1. **Multidisciplinary Health Programs**

- **Integrated Public Health Campaigns**: Initiatives that combine nutrition education with oral health awareness, such as school-based programs or community health fairs, can address both risk factors for CHD. For instance, Saudi Arabia has implemented some initiatives that focus on reducing smoking and promoting healthy eating, but expanding these

programs to include oral hygiene could amplify their impact (Alshammari et al., 2021).

- **Behavioral Change Programs**: These programs should target local communities with culturally appropriate messages that emphasize the importance of both diet and oral health. For example, campaigns could promote traditional Saudi foods that are heart-healthy while addressing the negative impact of modern processed foods.

2. **Examples from Global Contexts**

- **Coordinated Efforts**: Countries like Finland and Japan have successfully implemented integrated cardiovascular health and oral hygiene programs that resulted in reduced CHD rates (Al-Khudairy et al., 2017). Saudi Arabia could benefit from adopting similar integrated programs tailored to local dietary and cultural practices.

- **Mobile Health Clinics**: Mobile clinics providing both nutrition counseling and dental care can reach underserved populations in rural areas, where both CHD and oral health problems are more prevalent.

C. Policy Recommendations for Improved Public Health Outcomes

1. **Government Support for Integrated Approaches**

- **Policy Framework**: Saudi Arabia's Ministry of Health could introduce policies that mandate collaboration between nutritionists, dentists, and cardiovascular specialists to create national guidelines for CHD prevention that include both dietary and oral health strategies.

- **National Public Health Campaigns**: Large-scale campaigns encouraging healthy eating, regular physical activity, and oral hygiene, especially targeting high-risk groups such as young adults and the elderly, would be essential. Policies could include integrating oral health education into school curriculums, as well as creating food labeling systems that promote heart-healthy choices (Alshammari et al., 2021).

2. **Regulating Food Environments**

- **Food Policy Interventions**: Taxation on sugary drinks and high-fat, processed foods, similar to those implemented in other countries, could reduce CHD risk factors in the population (Al-Faris et al., 2018).

- **Promoting Healthier Alternatives**: Subsidizing healthier foods like fruits, vegetables, and whole grains would make them more accessible to the general population, while also addressing socioeconomic barriers to heart-healthy eating.

3. **Addressing Oral Health Access**

- **Expanding Access to Dental Care**: The government could fund public dental health programs that promote preventive care, such as regular check-ups, cleanings, and periodontal screenings, as part of the wider public health initiatives against CHD (Zohdy et al., 2020).

D. Role of Healthcare Professionals in Promoting Comprehensive Prevention

1. **Education and Awareness**

- **Healthcare Providers as Educators**: Doctors, dentists, and dietitians can play

a pivotal role in educating patients about the interconnectedness of oral health and cardiovascular health. Training healthcare professionals to screen for both periodontal disease and cardiovascular risk factors during routine visits could ensure early intervention.

- **Collaborative Care Models**: Encouraging a team-based approach where dietitians, dentists, and physicians work together to address both nutrition and oral health can lead to more comprehensive prevention strategies for patients (Al-Khudairy et al., 2017).

2. **Personalized Preventive Strategies**

- **Tailored Recommendations**: Healthcare providers should offer personalized advice on both diet and oral hygiene, taking into consideration individual risk factors like family history, age, and lifestyle. Personalized interventions have been shown to be more effective in improving long-term health outcomes (Al-Faris et al., 2018).

- **Routine Screening**: Regular screening for oral health issues and cardiovascular risk factors (e.g., cholesterol levels, blood pressure, and blood glucose) should be incorporated into routine healthcare visits, particularly for individuals with risk factors for CHD.

Conclusion

Coronary heart disease (CHD) remains a major public health challenge in Saudi Arabia, with its growing prevalence posing significant risks to both individuals and the healthcare system. Prevention strategies that target both dietary patterns and oral health are critical in mitigating the burden of CHD in the Saudi population. The evidence presented highlights the synergistic effect of nutrition and oral health in reducing CHD risk, underscoring the importance of an integrated approach to prevention.

Improving dietary habits—such as increasing the intake of fruits, vegetables, whole grains, and healthy fats—alongside promoting oral health practices like regular dental check-ups and proper hygiene, could significantly reduce the incidence of CHD. Furthermore, community-based interventions and comprehensive public health policies that address both diet and oral health are essential to creating lasting change at the population level.

Healthcare professionals, including physicians, dentists, and dietitians, play a vital role in educating the public and providing personalized care that addresses the unique risk factors of individuals. Collaborative efforts across various sectors, including healthcare, government, and community organizations, are crucial for fostering a more holistic approach to CHD prevention.

In conclusion, while Saudi Arabia faces significant challenges in combating CHD, integrating nutrition, oral health, and lifestyle factors into national prevention efforts holds the potential for a substantial reduction in heart disease rates. Ongoing research, public health initiatives, and policy reforms are needed to support this integrated model and improve cardiovascular health outcomes for the Saudi population.

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