

Influence of Oral Status on Cardiovascular Disease in Saudi Population

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Abstract

The aim of this study was to investigate the association among oral status indexes and CVD in 533 patients aged more than 35 years attending in Saudi German General Hospital Jeddah. A cross-sectional study consists of patients diagnosed with CVD among the age groups of 30 - 55 years old were included in the study. DMFT indexes and CPI were measured in the study groups to determine the oral health status. Odds ratios (ORs) and stepwise logistic regression were used to calculate risk estimates; the independent variables: age, gender, DMFT, CPI index, and tooth loss will be included in the statistical model. Furthermore, Questionnaires in relevance to oral health significance, the importance of maintaining oral health habits, implications of current oral health practices in cardiac settings, acceptability, and credibility of cardiac nurses engaging in promoting oral health were directed to these patients. DMFT index was relatively higher in CVD patients in comparison to the normal population but the number of filled teeth and decayed teeth were observed equally in both normal and CVD patients. Recommendations from this study is Effective collaboration is required among dental and medical professionals. There must be special centers to treat the periodontal and oral health diseases for the CVD patients. Incidences of tooth loss were significantly higher in CVD patients. Periodontal health plays a potential role in controlling CVD condition.

Keywords: Oral Status; Cardiovascular Diseases (CVD); DMFT Index

Introduction

Oral diseased conditions have been found linked with cardiovascular diseases (CVD). CVD is the most frequent cause of death in elderly population. Based on the statistics formulated by the World Health Organization (WHO), CVD contributes to 31% of all deaths globally. Moreover, family history of CVD, diabetes, hypertension, hyperlipidemia, tobacco use, limited physical activity, obesity, and poor dietary intake is the major contributing risk factors of CVD [1]. In addition, available scientific evidence in the literature revealed that Periodontal diseases may be considered a potential risk factor that might aid in the development of CVD. Periodontal diseases induce a systemic inflammatory response that might be associated with the development of CVD. Periodontal diseases were found to increase the likelihood of a recurrent coronary artery event by nearly 1.5 times in patients with established coronary heart diseases [2].

A joint consensus report by the European Federation of Periodontology and American Academy of Periodontology drawn a shred of strong conclusive evidence that patients with periodontal diseases are at higher risk of developing CVD and the association was independent of the other cardiovascular risk factors. The current view of the underlying mechanism depicts that periodontal diseased causing bacteria might enter into the circulatory system which in turn activates a host inflammatory response that results in exacerbation,

maturation and ultimately leads to atheroma formation that increases the risk of CVD. However, current evidence suggests to include oral health care as part of cardiovascular care. Moreover, only a few patients with CVD seek dental care and the relative reasons were lack of dental care access, as well as lack of oral health awareness [3].

Several studies have been available in the literature that revealed the possible correlations, particularly in relevance of the high incidence of oral diseased conditions in conjunction with the CVD. Moreover, there is still considerable uncertainty regarding the existing associations among oral health conditions and CVD [4].

Therefore, oral health education is beneficial for patients with cardiovascular diseases that may, in turn, improves the quality of life and potentially reduces the progression of CVD. It's evident from the available literature that Poor oral health is linked to CVD. Therefore, Patients with cardiovascular diseases should be referred to dental professionals for regular check-ups. Effective collaboration is required among the Medical and Dental Professionals when encountering CVD patients. Nevertheless, affordable and accessible dental care services should be provided for patients with cardiovascular diseases by the health services in Saudi Arabia [5].

Aim of the Study

The aim of this study was to investigate the association among oral status indexes and CVD in patients aged more than 35 years attending Saudi German General Hospital Jeddah.

Materials and Methods

A cross-sectional study consists of 533 patients diagnosed with CVD among the age groups of 30-55 years old were included in the study. Patients below 30 years or those with underlying systemic diseases and mental disabilities were excluded from the study. Patients with a previous history of Juvenile Periodontics or acute periodontal lesions or a history of trauma were also excluded from the study. Initially, DMFT indexes and CPI were measured in the study groups to determine the oral health status. Odds ratios (ORs) and stepwise logistic regression were used to calculate risk estimates; the independent variables: age, gender, DMFT, CPI index, and tooth loss will be included in the statistical model. Furthermore, Questionnaires in relevance to oral health significance, the importance of maintaining oral health habits, implications of current oral health practices in cardiac settings, acceptability, and credibility of cardiac nurses engaging in promoting oral health were directed to these patients. Informed consent was obtained from the participants included in the study. Ethical approval following the guidelines of Helsinki was approved from the scientific committee of the Saudi German Hospitals group. Data analysis was done using the statistical method.

Results

DMFT index was relatively higher in CVD patients in comparison to the normal population. The number of filled teeth and decayed teeth were observed equally in both normal and CVD patients. The CPI index was moderate to severe in CVD groups while in Non - CVD group CPI index was mild to moderate according to the periodontal disease classification system of the American Academy of Periodontology.

Discussion

The study was directed to evaluate the relationship between periodontal diseases, including gingivitis, bone loss, and missing teeth. Hence, periodontal disease is an independent, though relatively weak, a risk factor for CVD. The various measures of periodontal disease confer approximately a 24 - 35% increase in the risk of CHD [8].

Moreover, there is limited evidence that depicts these acute and chronic changes will either increase or reduce CVD burden of individuals suffering from periodontitis on the long-term basis as the patients were discharged after a week of treatment [9].

CVD is a common cause of morbidity and mortality in the Middle East, North America, and Europe, it is unlikely that knowledge of periodontal disease biased the ascertainment of CVD [10].

There are numerous limitations to our study. First, the CVD was diagnosed by the Cardiologists. As it was mentioned earlier, there is no indication that bias in ascertaining outcome played a role in our findings. It is more plausible that exposure misclassification resulted in under-estimation of the true risk associated with periodontal disease. Although standardized charts were given to the dentists performing all the clinical examination. However, there is still uncertainty that each dental professional evaluated periodontal disease differently [11].

We evaluated the importance of periodontal disease in the general population compared to the CVD patients rather than in populations selected for coronary artery disease only which, by design, represent survival cohorts and address primary rather than secondary prevention [12].

Our study determined the association between CVD and various measures of periodontal disease; that showed a strong positive association after adjustment of Framingham risk factors as well as socioeconomic status.

There are several biological mechanisms by which periodontal disease might be etiologically associated with CVD. Studies have suggested that periodontal disease represents a chronic infection resulting in a chronic inflammatory state. Recently, a randomized controlled trial conducted among individuals with periodontal disease showed that intensive periodontal treatment resulted in improvement of endothelial function 6 months after therapy [13].

A second biological consideration is intermittent bacteremia associated with periodontal disease and its possible role either in the chronic inflammatory state or more directly on endothelial tissue surfaces. Recently in one study, 80% of carotid endarterectomy specimens were positive for one or more PCR assays of various oral pathogens. In addition, data from the prospective ARIC study have shown that carotid artery intima-media wall thickness was associated with severe periodontal disease. Some studies have shown increased platelet activation *in vivo* in association with periodontal disease, which could contribute to plaque instability and thrombosis [14].

If periodontal disease is not causally related to CVD, our data suggest it may be a marker of risk. This hypothesis implies that unexplained confounding by a factor associated with both periodontal disease and CVD explains the relationship. The most likely known contenders include smoking, diet, diabetes, and socio-economic factors.

To clarify the link between CVD and periodontal disease will require a consistent body of evidence from longitudinal studies with standardized measures of periodontal disease and careful follow-up. The ideal longitudinal study would start in childhood and account very carefully for socioeconomic status since this CHD risk factor could confound the identified relationship. From a public health perspective, if further studies consistently identify the periodontal disease as a risk factor for CVD and treatment studies show benefit, the implications are significant since periodontal disease is mostly avoidable and treatable when not prevented. Additionally, good preventive dental care has multiple other benefits and it improves the quality of life. Furthermore, identifying individuals at higher risk for CVD than predicted by traditional risk factors could facilitate treatment of risk factors known to decrease CVD events in high-risk individuals, such as those with hyperlipidemia [15].

Thus, the best intervention trial would be one that began in early childhood rather than adult life. However, in our studies we gathered enough data through DMFT index, periodontal charting and comparisons that lead to a clear relationship between CVD and periodontal diseases. In its absence, however, if the benefit were shown in an adult primary prevention treatment trial, the potential impact on public health and specifically CVD might be significant given the high prevalence of periodontal disease in the population and the common problem of CVD.

Conclusion

Effective collaboration is required among dental and medical professionals.

There must be special centers to treat the periodontal and oral health diseases for the CVD patients.

Incidences of tooth loss were significantly higher in CVD patients. Periodontal health plays a potential role in controlling CVD condition.

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