



ASSESSMENT OF KNOWLEDGE AND AWARENESS ABOUT PERIODONTAL ORAL HEALTH AMONG MEDICAL PROFESSIONALS

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ABSTRACT

There has been an increase in the awareness of the link between the oral health and the systemic health in recent years. While the questions exist about the relationship of oral disease to cardiovascular conditions. So, this study examined the knowledge, opinions and practice regarding periodontal disease and cardiovascular disease amongst the medical professionals from Punjab and Himachal region. This survey was conducted from 16th July 2020 to 30th August 2020. A cross-sectional survey was conducted on 529 medical professionals. A detailed questionnaire was provided to them via survey heart.com through online mode. The results of the questionnaire were calculated and analyzed.

KEYWORDS : Cardiovascular disease, Oral Health, Periodontal health

INTRODUCTION

Oral systemic health has been a topic that is gaining more attention in recent years in the world. The Institute of Medicine (IOM) 2011 report on advancing oral health in America concluded that in order to enhance the delivery of oral health care; a collaborative effort across multidisciplinary health related fields is necessary.¹ U.S. surgeon general's report noted that there is an association between chronic oral infection and diseases such as diabetes, heart disease and preterm low birth weight babies.² The report also states that there is a lack of knowledge or training of non-dental health care providers in the area of oral health care. The IOM committee concluded that non dental health care providers could have an increased role in oral health care. It also stated that interprofessional, team-based care could provide the best care to patients.¹

Periodontal disease is a common oral disease that affects approximately 47.2% of the adult population in the U.S. and 95% of the population in India.³ Periodontitis is a bacterial induced, chronic inflammatory disease that destroys the supporting tissues surrounding teeth. A general dentist or periodontist clinically diagnoses periodontal disease using variable such as tooth loss, recession, clinical attachment loss, periodontal pocket probing, tooth mobility, and radiographic bone loss.⁴⁻¹⁰ Factors such as smoking, type 1 and 2 diabetes mellitus, cardiovascular disease, and obesity have also been linked to the risk associated with developing periodontal disease.^{6,10-17}

The cardiovascular disease is the leading cause of mortality in the US., with approximately 11.5% of Americans have been diagnosed. Cardiovascular diseases are estimated to have led to 1.59 million deaths in India in year 2000 and this figure is projected to increase to 2.03 million for the year 2010. High blood pressure, low density lipoproteins and smoking all risk factors are associated with cardiovascular disease.¹⁸ Several studies have been reported that the periodontal disease

pathogens and inflammatory markers are common between cardiovascular disease and periodontal disease.^{6-9,20-21}

ETIOLOGY OF ATHEROSCLEROSIS, CARDIOVASCULAR DISEASE, AND STROKE

The major contributing factor in the majority of cases of cardiovascular disease and cerebrovascular disease (stroke) is atherosclerosis. One of the outcome of this disease process is the narrowing of the arteries resulting from subendothelial deposition of cholesterol, cholesterol esters and calcium within the calcium walls. These cholesterol-rich plaques also contain a variety of cell types, including fibroblasts and immune cells.²² Rupture of the atherosclerotic plaques yield thrombi that travel distally to occlude the artery, resulting in myocardial infarction or stroke.

Several factors increase the risk for atherosclerosis including a predisposition for elevated level of cholesterol and triglyceride in the blood; high blood pressure; diabetes; and cigarette smoking.

Normal cells obtain most of the cholesterol they need for normal functioning by taking up cholesterol from the blood through the receptor - mediated endocytosis. Cholesterol is transported in the blood bound to low density lipoproteins, or LDLs. These LDLs bind to specific transmembrane receptor proteins for transport into the cell. Cholesterol uptake is blocked in some people (e.g., due to apolipoprotein E defect), and excess cholesterol is accumulated in the blood to eventually form atherosclerotic plaques. If these plaques occlude blood flow in brain arteries, the result can be stroke; if they occur in coronary arteries, it can lead to myocardial infarction.²³

CARDIOVASCULAR DISEASE AND PERIODONTAL DISEASE

Cardiovascular disease and periodontal disease have many of the same contributing risk factors such as smoking,

diabetes and age. It has been suggested that periodontal disease is a direct pathway by which two diseases could be associated. Mucci et al hypothesized that inflammatory mediators that react in response to periodontal pathogens could have a possible effect on the systemic inflammatory response to the development of atherosclerotic plaque. Periodontal infections could be a casual pathway to cardiovascular disease though bacteremia or inflammatory mediator provoked in response to the pathogens. Therefore, this systemic response may induce the development of atherosclerotic plaque.¹⁶

Blaziot et al conducted a meta-analysis of observational studies using a methodological process of 215 epidemiological studies.⁵ The meta-analysis examined the association between exposure to periodontitis and cardiovascular disease. This analysis provided evidence that many of the risk factors associated with cardiovascular disease and periodontal disease are independent of each other. It concluded that further research is needed to examine the pathophysiological process between the two.

Poor oral hygiene is the major cause of periodontal disease. This chronic oral infection is related to a systemic inflammatory response. Periodontal disease has been reported to cause an increase in the C-reactive protein levels in patients. Systemic inflammation could signify the mechanism that links periodontal disease and cardiovascular disease.²¹ de Oliveira et al conducted a survey to measure if self-reported tooth brushing and oral hygiene was associated with an increase in cardiovascular disease.²¹ The results indicated that persons with reported poor oral hygiene had a higher risk of cardiovascular disease and low-grade inflammation but the causal nature was yet to be determined.

Another meta-analysis focused on prospective cohort studies conducted among the general population. The purpose of this meta-analysis was to determine the relationship between periodontal disease and coronary heart disease. This analysis also reported that biological markers such as C-reactive protein serve as an indicator for additional coronary heart disease. It reported that periodontal disease results in approximately a 24 to 35% increased risk for coronary heart disease.⁸ With the potential effect for periodontal disease to increase risk for cardiovascular disease, it is important for the dental and medical professions to work together to help reduce the risk for adverse outcomes for patients.

In 2009, a set of clinical recommendations for patients with periodontal disease and/or cardiovascular disease was published.²⁴ These recommendations were established to provide guidance to both cardiologists and periodontists regarding the link between cardiovascular disease and periodontitis and a potential approach to reducing the risk for cardiovascular disease in patients who have periodontitis. The recommendations were important because they represented the first of its kind between cardiologists and periodontists.

In 2012, the American Heart Association (AHA) issued a scientific statement regarding the association between cardiovascular disease and periodontal disease. Health care professionals from dentistry, infectious diseases, cardiology and epidemiology formed a group to assess and measure the scope of evidence for an association or causality between the 2 diseases. A total of 282 pre reviewed publications were selected for a literature review.²⁵ The AHA statement suggests that there are significant gaps in the scientific understanding of the interaction of oral health and cardiovascular disease. Therefore, it is stated that while there is an association between cardiovascular disease and periodontal disease, there is not a causal relationship.²⁵

The goal of this systematic review was to identify all literature pertinent to this issue, to critically evaluate it and understand the current state of knowledge on this subject and to point out the directions for additional research.

AIMS AND OBJECTIVES

This study was conducted to examine the knowledge, opinions and practice regarding periodontal disease and cardiovascular disease amongst the medical professionals from Punjab and Himachal region.

METHODS AND MATERIALS

Study population and recruitment

A cross-sectional survey was designed to assess Himachal and Punjab region medical professionals knowledge, opinions and practice behaviors regarding the relationship between cardiovascular disease and periodontal disease. The questionnaire was distributed to random subjects among medical professionals out of which the participants who responded were 264 males and 263 females.

Structured questionnaire

A structured questionnaire was developed in English and tested on a pilot population prior to its administration in this study. The questionnaire was distributed online. The responses were evaluated and modifications were made as required. Twenty nine questions were included and divided into 6 sections that included the following topics:

1. Practice setting
2. Oral examinations
3. Oral and systemic health
4. Opinions about periodontal disease
5. Education
6. Demographics

The questions called for a yes /no and sometimes do not know answers. A tick box layout was used for the provision of the appropriate answer. Simple descriptive statistics as a frequency distribution and percentages were calculated for the study variables.

QUESTIONNAIRE :

DEMOGRAPHIC QUESTIONS :

1. Gender
2. Age
3. When did you graduate from the medical faculty?
4. What is your institution?
5. What is your medical speciality?

SURVEY QUESTIONS

1. Have you ever referred your patients to dentists?
2. For what reason you have referred your patient to dentist?
3. Speciality dealing with gum diseases is?
4. What is a primary clinical symptom of periodontal diseases?
5. Have you ever heard of the term periodontal medicine?
6. Do you have professional education, including the oral health content in the curriculum.
7. Regarding your medical training, rate the quality of oral health education you received?
8. Did you have any clinical experience with dentists or dental hygienist?
9. Do you usually ask about dental or oral problems from patients with cardiovascular diseases?
10. Relationship between the systemic and periodontal diseases.
11. Which systemic disease/conditions are related with periodontal diseases?
12. Inflammation is a key component between periodontal disease and cardiovascular disease?
13. Controlling periodontal infection and inflammation is

important for managing cardiovascular diseases.

14. Patients with periodontal disease are more likely to have increased atherosclerosis and risk for myocardial infarction.
15. Did you know that porphyromonas gingivalis is pathogen of plaque?
16. Did you know porphyromonas gingivalis is the major etiologic agent and has been identified in human atherosclerotic plaques by PCR and immunostaining?
17. Did you know about CRP and its types?
18. Which CRP test is used for the periodontal and cardiovascular diseases?
19. What are the normal highly sensitive CRP levels?
20. Did you know that elevated CRP is associated with the periodontal pathogens?
21. Did you know that highly sensitive CRP can be reduced by the periodontal therapy?
22. Which main calcium channel blocker drug leads to gingival overgrowth?
23. Did you know that treatment of periodontal disease can decrease patients risk for cardiovascular diseases?
24. It is important for cardiologists and periodontists to work together to educate their patients on these diseases?

RESULT

A total of 529 surveys were completed as requested and were useable for data analysis. Demographic data is reported in table 1 . 50.68% of respondents have been providing patient care for less than 10 years and 49.32% reported providing care more than 10years to patients with cardiovascular disease. 50.09% were male and 49.91% were female and 67.56% respondents were between 25-45 years old.

TABLE 1 : Demographics of Respondents

	Counts	Percentage of respondents
Age (in yrs)		
25 – 45 yrs	354	67.56%
Above 45 yrs	51	9.73%
Gender		
Male	264	50.09%
Female	263	49.91%
Others	0	0.00%
Practice Setting		
Public	120	23.12%
Private	250	48.17%
University	149	28.71%
Years providing care to patients with cardio vascular diseases		
< 10 yrs	259	50.68%
> 10 yrs	252	49.32%

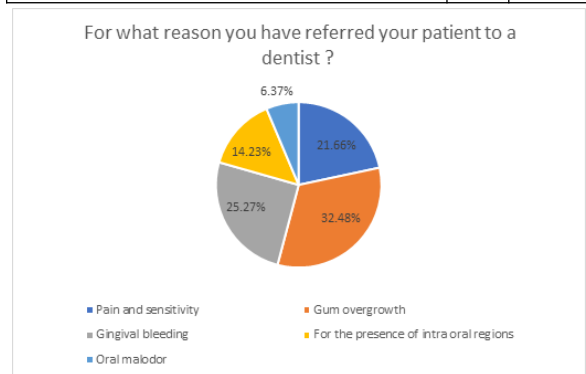
Practice behaviors and oral examinations

76.45% of cardiologists refer patients to a dental facility when they express concerns about their mouth. However 23.55% never refer patients to a dental clinic or facility . Respondents answers were different for referring a patient . 21.66% patients were referred for pain and sensitivity ,32.48% for gum overgrowth , 25.27% for gingival bleeding, 14.23% for the presence of intra oral lesions and 6.37% for the malodor.

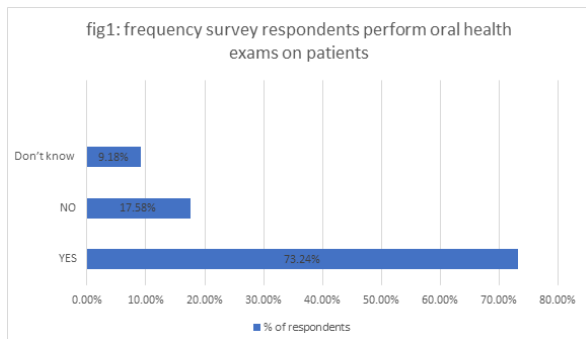
TABLE 2 : Survey respondents` patients with cardiovascular diseases referred to dental faculty

	Counts	Percentage of respondents
Have you referred patients with periodontal diseases		
YES	396	76.45%
NO	122	23.55%
For what reason you have referred your patient to a dentist ?		
Pain and sensitivity	102	21.66%

Gum overgrowth	153	32.48%
Gingival bleeding	119	25.27%
For the presence of intra oral regions	67	14.23%
Oral malodor	30	6.37%



Physicians were asked how often they perform oral examinations on their patients , and 73.24% perform oral examination on their patients and 17.58% never perform oral examination on their patients (fig 1) and 9.18% were not sure about the examination .



Knowledge and opinions about periodontal disease and systemic health

Cardiologists knowledge about periodontal disease was moderate , with 36.09% reporting that malodor describes the periodontal disease and 48.52% of respondents answered correctly about the first sign of periodontal disease are being the bleeding gums, and 48.43% were aware that periodontal disease is an infection of gums . And forty six percent respondents have the correct knowledge that there is a two-way relationship between the systemic and periodontal diseases.

TABLE 3 : Opinions about periodontal diseases & systemic health

	YES	NO	Don't know
Inflammation is a key component b/w periodontal disease & cardiovascular disease	78.17% (n = 401)	9.36% (n = 48)	12.48% (n = 64)
Have of heard of the term periodontal medicine	61.60% (n = 316)	12.87% (n = 66)	25.54% (n = 131)
Controlling periodontal infection & inflammation is important for managing cardio vascular diseases	80.08% (n = 410)	8.20% (n = 42)	11.72% (n = 60)
Patients with periodontal disease are more likely to have increased atherosclerosis and risk for myocardial infarction	78.24% (n = 399)	8.24% (n = 42)	13.53% (n = 69)
Did you know porphyromonas gingivalis is the major etiologic agent and has been identified in	57.98% (n = 298)	24.32% (n = 125)	17.70% (n = 91)

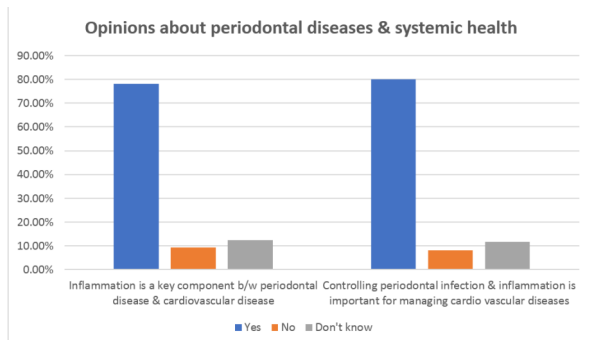
human atherosclerotic plaques by PCR & immunostaining			
Did you know that elevated CRP is associated with the periodontal pathogens	54.99% (n = 281)	6.65% (n = 34)	38.36% (n = 196)
Did you know that the treatment of periodontal disease can decrease patients risk for cardiovascular diseases	70.12% (n = 359)	7.03% (n = 36)	22.85% (n = 117)
It is important for cardiologists & periodontists to work together to educate their patients on these diseases	80.90% (n = 415)	4.29% (n = 22)	14.81% (n = 76)

The majority 78.17% of cardiologists agreed that inflammation is a key component between periodontal disease and cardiovascular disease, and 80.08% agree that controlling infection and inflammation is important for managing cardiovascular disease .when asked about their knowledge about the studies regarding an association between cardiovascular and periodontal disease 57.98% agree and 24.32% disagree and 17.70% were unsure about it.

When asked if patients with periodontal disease were more likely to have increased atherosclerosis and risk for myocardial infarction 78.24% agreed (table 3).

70.12% agreed that treatment of periodontal disease could decrease a patients risk for cardiovascular diseases.

The majority of physicians 80.90% agreed , it is important for cardiologists and periodontists to work together to educate their patients about oral systemic disease risks (table 3).

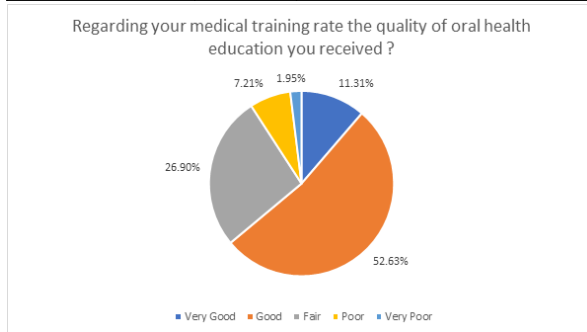


Physicians education

76.76% physicians reported that their professional education included the oral health content. 53.35% respondents reported that they have clinical experience with the dentists and dental hygienist. When asked to rate the quality of their oral health education, 52.63% reported it as good and 26.90% reported it as fair . (table 4)

Did your professional education include oral health content in the curriculum?		
	Counts	Percentage ofrespondents
YES	393	76.76%
NO	77	15.04%
Don't know	42	8.20%
Did you receive any clinical experiences with dentists and dental hygienist?		
	Counts	Percentage of respondents
YES	271	53.35%
NO	237	46.65%
Regarding your medical training rate the quality of oral health education you received?		

	Counts	Percentage of respondents
Very Good	58	11.31%
Good	270	52.63%
Fair	138	26.90%
Poor	37	7.21%
Very Poor	10	1.95%



DISCUSSION

This study was to question cardiologists about their knowledge and behaviors regarding periodontal disease and the potential association with cardiovascular diseases. While studies have been conducted with other health care providers, cardiologists have not been investigated.^{27,28,33,34} It has been determined that individuals who have cardiovascular disease and periodontal disease share many of the same risk factors such, as smoking, diabetes, obesity and age.^{6,16-17} There is evidence that periodontal bacteria and the byproducts of the bacteria have a detrimental effect on distant sites.^{21,24} Although the specific mechanism has yet to be confirmed, scientists agree that there is an association between periodontitis and cardiovascular diseases.²⁵ When other health care providers have been questioned about their knowledge regarding the etiology of periodontal disease, most have some knowledge of the bacteria and their detrimental effects. For example , recent study of internists and endocrinologists found physicians knew that bacteria was related to the etiology of periodontal diseases (86%) and bone loss around teeth is a description of periodontal disease (77%) .²⁷ 48.52% knew that bleeding gums were a first sign of periodontitis . But 36.09% physicians also thought that malodor was a sign of periodontitis . while their knowledge is high in some areas , most studies of other health care providers have reported that they view their oral health education in professional school as being poor and they are interested in learning more about oral disease.

The most recent statement from the AHA regarding the association of periodontal disease to atherosclerotic vascular disease has gained much attention since it was published in May, 2012; however, the cardiologists in this study did not seem aware of the statement and indicated it had not changed the way they view the importance of oral health. While a cause and effect has not been established between periodontal disease and cardiovascular disease, the statement does support an association between the 2 conditions.²⁵ Clearly more work needs to be done to educate cardiologists about periodontal disease and the potential detrimental effects to systemic health. The relationship between oral health care providers and medical providers is an area that needs improvement. Wooten et al reported that 62% of nurse practitioners and certified nurse midwives conduct an oral exam as part of routine care at initial visits.²⁸ Practitioners stated that it is the responsibility of the dentist to perform the exam. Another reason for not doing an exam is that they simply do not know what it entails. This is an area that could be incorporated into medical school education through interprofessional education.

With an increase in oral systemic disease, it is important to examine the need for interprofessional education. Wilder et al

recommended that faculty development, curricular changes and interprofessional education initiatives be incorporated into dental education. Dental schools should seek relationships with local clinics and private practice dentists and other health professionals.³⁵ The paper reinforces that the Commission on Dental Accreditation recommendation that states students should be encouraged and participate in service learning (Haden, personal communication, December 2007). Lopes et al reported that only 21% of diabetes educators received formal education on oral health.³³ The current study reported similar findings and concluded that while the majority of respondents did not receive oral health education, they believe it is an important area for students to work collaboratively. An interprofessional education curriculum would provide the atmosphere for collaboration to occur.

Interprofessional practice can be improved by providing options for continuing education in the area of oral systemic health. Higher education administrators and leaders should begin examining these areas and incorporating them into health professions curricula. In 1989, Rutgers School of Biomedical and Health Sciences began implementing oral health modules into the second, third and fourth years of medical school. Modules in head/neck examination and oral cancer screenings were incorporated into the curriculum along with rotations throughout the dental school to learn more about oral conditions.³⁶ This study, along with other studies, concluded that oral health is an important part of overall health.^{27,28,33-36} To provide the best care and practices for patients, multidisciplinary fields need to collaborate.

Limitations of this survey include a low response rate. Cartwright investigated response rates of physicians from 19 professional groups. The response rate varied from 56 to 99%.³⁷ Factors affecting response rates included length of questionnaire and the available time to complete it. While the method used for the conduct of the survey was a recommended procedure for survey research,³² it is also recognized that busy physicians may not take the time to complete a longer questionnaire or the physicians may not actually see the survey if they do not review the mail. In addition, this sample of Himachal and Punjab medical professionals may not be representative of all professionals, thus limiting the external validity.

However, the study does provide a view of how oral health is incorporated (or not incorporated) into the clinical practices of medical professionals. Other studies might evaluate scenarios where oral health care (dentists and dental hygienists) and medical providers work collaboratively in providing patient care.

CONCLUSION

This study found that Himachal and Punjab medical professionals have some knowledge about periodontal disease but are unclear in other areas. Half of them surveyed were unsure that treatment of periodontal disease can decrease a patient's risk for cardiovascular disease. Approximately 76.45% respondents referred patients to a dental facility for either tooth decay or periodontal disease. Further education in oral diseases will help physicians refer patients to the appropriate oral health care provider. The majority were interested in learning more about the association between the 2 diseases. Respondents agreed that it is important for health care providers to work together to educate patients on systemic diseases.

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