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Interrelationship Between Periodontitis And Systemic Health Among Dental Practitioners: How Aware Are We?

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Abstract
Aim*: To assess the level of awareness regarding the interrelationship between periodontitis and systemic health among dental practioners in Raichur city.*
Materials and methods: *This crossectional survey included participants from two dental colleges of Raichur (AME'S and Navodaya Dental College). Total of 108 participants were involved in the study. The data pertaining to their knowledge and awareness of association between periodontal health and general health was gathered using a self administered questionnaire containing 20 questions. Data were presented in proportion. Comparison between health care providers was done by using chi-square test.*
Results*: Total of 108 subjects participated in the study among which 37 were interns, 36 were practitioners and 35 were final year students. Questionnaires were divided into different categories and answers.*
Conclusion*: Based on the observations from the present study it can be concluded that there remains a need to address the general dental practitioners, and increase the awareness about oral and systemic interrelationships, which not only will help in preventing systemic burden secondary to oral infection, abut also, helps in taking interventional steps in medically compromised patients like Diabetes thereby improving the glycemic conditions of patients.*
Kewords:*Dental practitioners; Periodontal-medicine; Periodontal-systemic interrelations; Systemic complications;*

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I. Introduction

Maintenance of oral health is an important factor in determining the overall health and wellbeing of an individual. Hence the oral cavity is considered as a mirror for general health. Since years, it is known that oral health affects the systemic health. The branch of Periodontics that focuses on the interrelationship between periodontal health or disease and systemic health or disease is called as 'Periodontal Medicine'. In the past, many systemic conditions have been studied in association with periodontitis, such as pre-term low birth weight infants, cardiovascular disease and related events such as angina, myocardial infarction, stroke, respiratory diseases, and diabetes mellitus.[1, 2] Hence, this study was undertaken to determine the level of awareness, concerning the interrelationship between oral and systemic health among the local dental practitioners of Raichur City.

II. Materials And Methods

The present study was a cross-sectional survey carried out among the dental practitioners of Raichur District in Karnataka, India. The study included interns and practitioners from two dental colleges of Raichur city (AME'S and Navodaya Dental College Raichur)

A total of 108 participants were involved in the study of which 37 were internees, 36 were practitioners and 35 were final year students. The data pertaining to their knowledge and awareness of the association between periodontal health and general health was gathered using a self-administered questionnaire consisting of 20 questions (Annexure 1).

2.1The questions were further divided into the following categories:

1. General questions: included the questions A, B, C, G, R and S.
2. Awareness about interrelation among Diabetes and periodontal health: Questions D, E, F, T
3. Awareness about interrelation among CVD and Periodontal health: K, L, Q
4. Awareness about interrelation among Respiratory disease and Periodontal health: H, I, J, P
5. Awareness about preterm low birth and periodontal health: O
6. Awareness about osteoporosis and periodontal health: M, N

III. Statistical Analysis

Data were presented in proportion. Comparison between health care providers was done by using chi-square test. A p-value less than 0.05 was considered as statistically significant. Questionnaires were divided into different categories and answers.

IV. Results

4.1 General Questions: It included the questions that determine the level of awareness among participants about systemic and periodontal interrelationship. **(Table 1, Graph 1)**

A. "Good general health without good oral health." Is it possible?

A) Yes B) No

Among the total of 108 subjects, 103 subjects i.e.95.4% said Yes. On the other hand, 5 subjects i.e. 4.6% of the study population said No to the question determining the awareness about the interrelation of good general health and good oral health with the r value of 0.14 & p-value of 0.68.

B. Is there a relationship between poor oral health and systemic diseases?

A) Yes B) No C) May be D) Don't know

For the question B, of the 108 participants, 89.8% said Yes, 0.9% said No and 9.3% said 'May be' there is a relationship between poor oral health and systemic disease with an r value of 2.24 and p-value of 0.13.

C. Is there an association between periodontal diseases and other chronic inflammatory conditions, such as diabetes, cardiovascular disease, and Alzheimer's disease?

A) Yes B) No C) May be D) Don't know

Of the total percentage 90.7% said Yes, 0% said No, 8.3% said 'May be' and 0.9% said Don't know with an r value of 0.16 and p-value of 0.68.

G. Is periodontal disease transmissible within family members?

A) Yes B) No C) May be D) Don't know

36.1% of the people were aware of the fact that periodontitis is transmissible within families. 25.9% people said that it is not transmissible, 37% said it may be transmissible and 0.9% did not know. This gave an r value of 1.39 with p-value of 0.85.

R. Is there a true interrelationship between oral health and systemic health or is it mainly the common risk factors that are shared by many of the chronic diseases

A) Yes B) No C) May be D) Don't know

84.3% of the participants said Yes, 2.8% of them said No and 10.2% said 'May be' and the remaining 2.8% of them were unaware whether there is any interrelationship between oral and systemic health or if there are any shared risk factors with an r-value of 3.5 and p-value of 0.17.

S. Does systemic antimicrobial therapy as an adjunct to scaling and root planing provide additional benefit to the periodontal condition?

A) Yes B) No C) May be D) Don't know

About the effect of systemic antibiotics as an adjunct to scaling and root planing, 90.7% of them said Yes, 1.9% of them said No, 6.5% of them said it may be reduced and 0.9% of them said they were unaware of this fact with an r value of 0.16 and p-value of 0.68.

4.2 Awareness about Interrelationship between Diabetes and Periodontal Health: (Table 2, Graph 2)

D. Does periodontitis decrease the insulin sensitivity thus increasing the risk of poor glycemic control in individuals with diabetes?

A) Yes B) No C) May be D) Don't know

69.4% of the people were aware of this fact, 12% of them said No, 7.4% of them said May be and 11.1% of them didn't know about this fact and the r value of 0.51 and p-value of 0.77.

E. Does periodontal treatment improves the glycemic control by reducing the bacterial burden and the inflammatory response?
A) Yes B) No C) May be D) Don't know
Among the total number of 108 participants about 78.7% of the participants agreed that there would be improvement in glycemic control following periodontal treatment, 9.3% of them said there won't be any influence of periodontal treatment on glycemic control and 7.4% of them said it may or may not have any influence and remaining 4.6% of them were unaware of this fact. R value of 1.93 and *p*-value of 0.38.

F. Is it necessary to refer a case of CVD and DM with poor oral health to specialists like periodontists?
A) Yes B) No C) May be D) Don't know
88% of the study participants told they would refer such a case to a periodontist, 4.6% of them said no need, 6.5% of them responded that they may refer the cases if necessary and 0.9 % of them were unaware of the fact that they have to refer such cases to specialists. R value of 1.77 and p value of 0.41.

T. Periodontitis is the sixth complication of diabetes mellitus.
A) Yes B) No C) May be D) Don't know
76.9% of the participants were aware of the fact periodontitis is the 6^{th} complication of diabetes mellitus, 3.7% of them said No, 10.2% of them said 'may be' and the remaining 9.3% of the population of study said that they are not aware of this interrelationship with r value of 3.3 and p-value of 0.51.

4.3Awareness about interrelation among CVD and Periodontal health (Table 3, Graph .3)
K. People with periodontal disease are twice as likely to suffer from CAD as those without periodontal disease.
A) Yes B) No C) May be D) Don't know
55.6% of the study participants said Yes that people with periodontal disease are twice as likely to suffer from CAD as those without periodontitis.17.6% of them said 'No', 20.4% of them said 'may be' and the remaining 6.5% of them said they do not know about this interrelationship with an r value of 1.56 and p-value of 0.81.

L. Do periodontal pathogens increase the risk of atheroma formation and so the risk for CVD.
A) Yes B) No C) May be D) Don't know
62% of the participants said that periodontal pathogens increase the risk of atheroma formation and so the risk for CVD, 9.3% of them said No, 17.6% of them said 'may be' and remaining 11% said they do not know about this relation with r value of 2.76 and p-value of 0.25.

Q. Is obesity a risk factor for periodontal disease?
A) Yes B) No C) May be D) Don't know
51.9% of the study participants said that yes obesity is a risk factor for periodontitis, 19.4% of them said no, 17.6% of them said 'may be' and the remaining 11.1% of them said that they are unaware of this interrelationship with an r value of 3.47 and p-value of 0.48.

4.5 Awareness about interrelation among Respiratory disease and Periodontal health: (Table 4, Graph 4)
H. Does periodontal disease increase person's risk for chronic obstructive pulmonary disease?
A) Yes B) No C) May be D) Don't know
Among the total participants of the study, 54.6% of them agreed with the fact that periodontitis increases the risk for COPD. 20.4% of them said no, 15.7% of them said 'may be' and remaining 9.3% of them said that they are not aware of this interrelationship with r-value of 3.28 and p-value of 0.34.

I. Is there a relationship between oral infection and respiratory disease, in particular, COPD and pneumonia.
A) Yes B) No C) May be D) Don't know
51.9% of the participants said Yes there is a relationship between oral diseases and respiratory diseases, 14.8% of them did not agree with this, 18.5% of them were of the dilemma that it may or may not have any influence and 14.8% of them were unaware of this interrelationship with r value of 6.8 and p-value of 0.34.

J. Can dental biofilm be a reservoir of respiratory pathogens in addition to oral pathogens.
A) Yes B) No C) May be D) Don't know
73.1% of the study participants said Yes, 5.6% of them said No, 14.8% of them said 'may be' and remaining 6.5% of them said that they do not know about this interrelationship. With an r value of 7.69 and p-value of 0.005.

P. Is it possible for the respiratory bacteria that have colonized the oral cavity to pose a potential threat for lung infection?

A) Yes B) No C) May be D) Don't know

65.7% of the study participants consider that respiratory bacteria that colonise the oral cavity can be potential threat for lung infection, 11.1% of them said No, 16.7% of them said 'may be' and remaining 6.5% of them said they were unaware of this fact with an r value of 1.16 and p-value of 0.55.

4.6Awareness about preterm low birth and periodontal health: (Table 5, Graph 5)

O. Pregnant women suffering from periodontal disease are more likely to have preterm labor and low birth weight infants.

A) Yes B) No C) May be D) Don't know

Among the total participants of the study, 61.1% of the participants said Yes, 13% of them said No, 13.9% of them said 'may be' and the remaining 12 % of the participants were unaware of this interrelationship with r value of 0.79 and p-value of 0.67.

4.7Awareness about osteoporosis and periodontal health (Table 6, Graph 6)

M. Is there a link between osteoporosis and bone loss in the jaws.

A) Yes B) No C) May be D) Don't know

79.6% of the participants were aware of the fact that osteoporosis has as an effect on the bone loss in jaws and 2.8% of them said that there is no relation between the two, 12% of them said there may or may not be any interrelationship between the two conditions and 5.6% said they are unaware of this interrelationship with the r value of 8.6 and p-value of <0.01.

N. Does osteoporosis lead to tooth loss.

A) Yes B) No C) May be D) Don't know

79.6% of the study population said that osteoporosis leads to tooth loss, 7.4% of them said no 11.1% of them said that it may lead to tooth loss and remaining 1.9% of the participants said that they are unaware of this relationship between osteoporosis and tooth loss with an r value of 2.8 and p-value of 0.24.

V. Discussion

Periodontal medicine is an emerging branch of Periodontics that deals with the study of the association between periodontitis and other systemic diseases and vice versa. Periodontitis is an infectious, immuno-inflammatory disease of the supporting tissues of the teeth and is the most common oral disease.[3] Host response against the periodontal pathogens and their endotoxins in an attempt to wall off the infection not only results in local tissue destruction but also exerts certain systemic effects on distant organs.[4, 5]

The prevalence of periodontitis in India is reaching epidemic proportions and it is also exerting serious implications for general health.[6]Periodontitis has been considered as an important risk factor for many systemic diseases in the recent years, such as type II diabetes, cardio vascular diseases, preterm low birth weight infants, stroke etc.[7, 8]For the convenience of the study, participants of the study and questions were categorized under different subheadings. These questions included general questions regarding overall awareness and in particular interrelationship between Diabetes mellitus, CVD, Respiratory disease, PTLBW, Osteoporosis and Periodontitis.This inter relationship between oral health and systemic health dates back to Focal infection theory that was initially put forward by *W.D Miller in early 1890's* and *William Hunter in 1901*. This theory proposed that oral microbiota act as a reservoir of infection for other distant and systemic diseases such as rheumatoid arithritis.[9, 1]This concept led to multiple tooth extractions so as to eliminate the oral source of infection; however this approach did not have any scientific evidence and was ethically questioned. Moreover, many patients who went for full mouth extractions were not relieved of their chronic systemic condition even after eliminating the oral source. Subsequently, in 1952 an editorial in the *Journal of the American Medical Association* stated that 'many patients with diseases caused by foci of infection have not been relieved of their symptoms by removal of the foci. Many patients with these same diseases have no evident focus of infection; also, foci of infection are as common in healthy persons as those with disease'. Hence this hypothesis fell from reputation. The focal infection theory was not revisited for the next 50yrs. The theory began to re-emerge when *Mattila and colleagues* published an "Association between Dental Health and Acute Myocardial Infarction" in *1989*. And a scientific basis was laid down for the oral and systemic interrelationship. As of today many dental practitioners are unaware of this inter relationship**.** Hence this study was undertaken to determine the level of awareness about this inter relationship among the dental practitioners within Raichur city. As a result of the general questionnaire attempted to assess the level of awareness, there was a mixed response among the study participants as shown in Table 1.

VI. Diabetes And Periodontitis

Diabetes and periodontitis are the two most common chronic diseases which have been considered to be biologically linked to each other. Diabetes is a group of metabolic disorders characterized by persistent hyperglycemia. In addition to the 5 classical complications of diabetes, periodontitis is considered as the sixth complication of diabetes. [11] In the present study 76.9% of the participants are aware of the fact that periodontitis is the 6th complication of diabetes mellitus.3.7% of them were not aware, 10.2% of them said there might be a relationship and the remaining 9.3% of the population said they were not aware of this interrelationship.DM not only has an influence on the prevalence and severity of periodontitis, but it also plays a role in the progression of the disease. Increased severity of periodontal disease in diabetic subjects owing to genetic predisposition, show exaggerated immune responses to bacterial challenge contributing to increased tissue destructive processes.[12]In the present study, the level of awareness about the effect of periodontitis on insulin sensitivity was also observed. According to the analysis, 69.4% of the people were aware of this fact, 12% of them were not, 7.4% of them said 'may be' and 11.1% of them didn't know about this fact. Observations from previous studies have shown that increase in the levels of serum proinflammatory mediators such as TNF-α, IL-6, and resistin in chronic periodontitis patients, in turn, may increase the risk of insulin resistance thereby increasing the risk for type II diabetes.[5] Diabetic subjects with severe periodontitis at baseline had a six-fold increased risk of worsening of glycemic control over time compared to diabetic subjects without periodontitis.[13]Among the total number of 108 participants about 78.7% of the participants agreed that there would be improvement in glycemic control following periodontal treatment, 9.3% of them said there won't be any influence of periodontal treatment on glycemic control and 7.4% of them said it may or may not have any influence and remaining 4.6% of them were unaware of this fact. However, evidence from previous studies shows that periodontal treatment in a cohort of patients with type 2 diabetes mellitus and periodontal disease improved the glycemic control (HbA1c reduction from 7.3% to 6.5%) 3 months after treatment.[14, 15]

With antimicrobial periodontal therapy, there was significant reduction in the number of microorganisms in periodontal pockets, circulating TNF-α levels and HbA1c value.[16]Thus it is concluded that antimicrobial periodontal therapy is effective in improving metabolic control in diabetics, possibly through reduced serum TNF-α and improved insulin resistance. Thus from the evidence available it is to be noted that Diabetes increases the risk for periodontitis (particularly if poorly controlled) and evidence suggests that advanced periodontitis also compromises glycemic control. Periodontal treatment has been associated with improvements in glycemic control (with HbA1c reductions of approximately 0.4% reported in systematic reviews and meta-analyses). [17]Oral health (including periodontal health) is a fundamentally important component of general health, and particularly so in diabetes. Periodontal assessment is important in people with diabetes and they should be made aware of their increased risk for periodontal disease. Hence, the dental team has an important role to play in the management of diabetic patients.

6.1cvd And Periodontal Disease:

Cardiovascular disease (CVD) is a common cause of death, accounting for 29% of deaths worldwide.[18] Evidence for an association between periodontitis and atherosclerotic vascular disease, including stroke, myocardial infarction, comes from more than 50 prospective cohort and case-control studies undertaken during the past 25 years.[19, 20] After adjustment for other risk factors, studies indicate that severe periodontal disease is associated with a 25% to 90% increase in risk for CVD.[21] Hence this study also included questionnaires to assess the level of awareness about the interrelationship of CVD and periodontitis. 55.6% of the study participants said yes that people with periodontal disease are twice likely to suffer from coronary artery disease as those without periodontitis.17.6% of them said no, 20.4% of them said 'may be' and the remaining 6.5% of them said they do not know about this interrelationship. Observations of the studies indicate that periodontal disease is characterized by systemic inflammatory host responses that contribute to an elevation of C-reactive protein (CRP), a predictor of increased risk for cardiovascular disease [22]. In a clinical study by *Genco et al*, the treatment of periodontal disease caused a 65% reduction in the levels of CPR at 3 months, which showed a decline even after 6 months. [23]

This indicates that periodontal disease induces the rise in CRP levels and possibly other proinflammatory mediators, which are known to be independent risk factors for heart disease. They postulated that periodontal disease results in bacteremias and stimulates the production of factors such as TNF-alpha and IL-6, which likely stimulate the liver in the production of CRP. Etiologically, the chronic presence of periodontal microbes can lead to atherogenesis via two pathways: (1) direct invasion of the arterial wall and (2) the release, in response to infection, of systemic inflammatory mediators with atherogenic effects.[24]

6.2obesity And Periodontitis

In the present study, study population showed mixed response regarding the awareness about the interrelationship between obesity and periodontitis.

For many years, adipose tissue was considered as an inert organ that stored triglycerides. It is now clear that adipose tissue is a complex and metabolically active endocrine organ that secretes numerous immunomodulatory factors and plays a major role in regulating metabolic and vascular biology. Obesity which is an important risk factor for type II diabetes has also been linked to periodontitis as well.[25]Obesity is characterized by an increase in the adipose tissue which is an important source of various proinflammatory cytokines such as TNF-α, IL-6, visfatin, adiponectin, and resistin. It is also characterized by the presence of chronic subclinical inflammation with increased concentration of the above-mentioned proinflammatory cytokines.[26]A systematic review based on 26 cross-sectional studies, 6 case-control studies and 1 cohort study concluded that there was a positive association between obesity and periodontitis.[27] In a recent study done to determine the prevalence of CP and to assess the predictors for CP among the obese Malaysian population, it was observed that the prevalence of CP was high among this group. GBI (gingival bleeding Index) and VPI (visible plaque Index) were potential predictors for CP in this obese population.[28] Hence based on the results of the available literature it can be concluded that the obese patients are at higher risk of periodontitis than non-obese.

6.3 Periodontitis And Copd

In individuals with periodontitis, bacteria present in the gingival sulcus or the subsequently formed periodontal pockets, may have easy access to the blood vessels. The microorganisms may also enter the lungs by inhalation, but the most common route of infection is an aspiration of oropharyngeal secretions. Therefore, it is plausible that oral microorganisms might infect the respiratory tract, causing COPD.However, there is yet no direct evidence for a causal relationship between periodontal disease and respiratory diseases. In contrast, there is extensive evidence available indicating that a greater burden of oral infection (e.g. as indicated by plaque accumulation) in a particular susceptible host (e.g. medically compromised elders, ICU patients) may increase the risk for certain community-acquired or nosocomial pneumonia and for exacerbations of COPD.[29] In a nationwide study done to assess the risk of periodontal diseases in patients with COPD after adjusting for other risk factors, it was observed that the overall incidence of periodontal diseases was 1.19-fold greater in the COPD group than in the comparison group.[30] However, observations of the present study show that there is insufficient awareness of the effect of oral health and periodontal pathogens on the development of COPD. Thus by increasing the awareness about this interrelationship the burden of oral infection especially in hospitalized patients, and consequently the risk of COPD can be reduced.

6.4 Periodontitis And Preterm Low Birth Weight (Ptlbw)

Preterm infants are born prior to completion of 37 weeks of gestation.[31, 32] Global incidence of preterm birth is around 9.6% of the total number of newborns representing 12.9 million births with regional disparities. As first reported by *Offenbacher et al.* in *1996* a relationship exists between maternal periodontal disease and delivery of a preterm infant.[33]Hence this study included a questionnaire to assess the awareness about the interrelationship between periodontitis and PTLBW. However, from assessment, it was observed that 12% of the study participants were unaware about the interrelationship between these two conditions. Pathophysiology of this interrelationship is mainly explained by the up-regulation of proinflammatory cytokines resulting from the normal host response to an infectious agent, and this represents the key mechanism linking periodontal disease to PTLBW. Microbiological products such as endotoxins will trigger a host immune response, causing both local inflammation and activation of soluble proinflammatory mediators such as IL-1, TNF-alpha, MMPs and prostaglandins which are responsible for premature labor. These inflammatory markers have been shown to cross the placental barrier and to cause fetal toxicity, resulting in preterm delivery and low birth weight babies. Hence efforts to increase this awareness may prove valuable in improving preventive care during pregnancy thereby reducing the risk of PTLBW infants.[34]

In a recent study done to determine the connection between periodontal disease of women during their pregnancy and the weight of newborn infants, it was observed that periodontitis was significantly associated with low birth weight (OR = 4 [2.3 - 5.7] 4) after adjusting for other risk factors such as age, BMI, and other periodontal indices.[35]Thus by increasing the awareness of this interrelationship among the dental practitioners, early interventional procedures can be initiated in pregnant women, thus assisting in reducing the risk of PTLBW. This would also reduce the economic burden and infant morbidity rate to a great extent.

6.5 Periodontitis And Osteoporosis

Results from our study showed that about 5.6% of the study participants were unaware of this interrelationship and 1.9% of them were unaware that osteoporosis can also be one of the risk factors for tooth loss. Periodontitis and osteoporosis are two diseases found worldwide having the main characteristic of increasing intensity with age. Periodontitis is associated with resorption of the alveolar bone. The risk for the periodontal disease may increase due to osteoporosis which is characterized by brittle and fragile bones.

Alternatively, the bones become more susceptible to resorption owing to co-existing or precedent periodontal infection and inflammation. As per the gathered literature, though osteoporosis does not initiate periodontal disease, it may affect the course of the disease by reducing the trabecular bone mass and density.However, as per the literature derived from various studies, it has been observed that subjects with osteoporosis show increased incidence and severity of periodontal disease compared to healthy subjects.

Hence, increasing the awareness among the oral health care providers about this interrelationship may not only help in taking preventive and interventional measures but also help in reducing the risk of osteoporosis as well as periodontitis.[36, 37]

VII. Conclusion

Observations from this study reveal that there is a lack of complete awareness about the effect of oral health on the overall health status among the general dental practitioners. However, the evidence from the literature available and the recent studies conducted, make it clear that there exists a strong relationship between optimum oral health and systemic health. Early detection, prevention, and interception of oral infections and periodontitis would greatly reduce the risk of some highly destructive and fatal systemic conditions.

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VIII. Annexure, Tables And Graphs:

ANNEXURE 1: QUESTIONNAIRE

A. Good general health without good oral health. Is it possible?
B. Is there a relationship between poor oral health and systemic diseases?
C. Is there an association between periodontal diseases and other chronic inflammatory conditions, such as diabetes, cardiovascular diseases, and Alzheimer's disease?
D. Does periodontitis decrease the insulin sensitivity thus increasing the risk of poor glycemic control in individuals with diabetes?
E. Does periodontal treatment improve the glycemic control by reducing the bacterial burden and the inflammatory response?
F. Is it necessary to refer a case of Cardiovascular Disease (CVD) and Diabetes Mellitus (DM) with poor oral health to specialists like periodontists?
G. Is periodontal disease transmissible within family members?
H. Does periodontal disease increase patient's risk for chronic obstructive pulmonary disease (COPD)?
I. Is there a relationship between oral infection and respiratory diseases, in particular, COPD and pneumonia?
J. Can dental biofilm be a reservoir of respiratory pathogens in addition to oral pathogens?
K. People with periodontal disease are twice as likely to suffer from coronary artery disease as those without periodontal disease. Is it true?
L. Do periodontal pathogens increase the risk of atheroma formation, hence the risk of CVD?
M. Is there a link between osteoporosis and bone loss in the jaws?
N. Does osteoporosis lead to tooth loss?
O. Pregnant women suffering from periodontal disease are more likely to have preterm labor and low birth weight infants. Is it true?
P. Is it possible for the respiratory bacteria that have colonized the oral cavity to pose a potential threat for lung infection?
Q. Is obesity a risk factor for periodontal disease?
R. Is there a true interrelationship between oral health and systemic health or is it mainly the common risk factors that are shared by many of the chronic diseases?
S. Does systemic antimicrobial therapy as an adjunct to scaling and root planing provide additional benefit to the periodontal condition?
T. Periodontitis is the sixth complication of diabetes mellitus.

Question	**Response**	**Total (n=108)**	**%**	**Interns (n=37) (%)**	**Practioners (n=36) (%)**	**Final years (n=35) (%)**	**χ^2 value**	**p-value**
A								
	Yes	103	95.4	36 (33.3)	34 (31.5)	33 (30.6)	0.14	p=0.68
	No	5	4.6	1 (0.9)	2 (1.9)	2 (1.9)		
B								
	Yes	97	89.8	31 (28.7)	34 (31.5)	32 (29.6)	2.24	p=0.13
	No	1	0.9	1 (0.9)	0	0		
	May be	10	9.3	5 (4.6)	2 (1.9)	3 (2.8)		
C								
	Yes	98	90.7	33 (30.6)	33 (30.6)	32 (29.6)	0.16	p=0.68

	No	0	0	0	0	0		
	May be	9	8.3	4 (3.7)	3 (2.8)	2 (1.9)		
	Don't know	1	0.9	0	0	1 (0.9)		
G								
	Yes	39	36.1	12 (11.1)	14 (13)	13 (12)	1.39	p=0.85
	No	28	25.9	11 (10.2)	10 (9.3)	7 (6.5)		
	May be	40	37	14 (13)	12 (11.1)	14 (13)		
	Don't know	1	0.9	0	0	1 (0.9)		
R								
	Yes	91	84.3	28 (25.9)	31 (28.7)	32 (29.6)	3.5	p=0.17
	No	3	2.8	2 (1.9)	0	1 (0.9)		
	May be	11	10.2	4 (3.7)	5 (4.6)	2 (1.9)		
	Don't know	3	2.8	3 (2.8)	0	0		
S								
	Yes	98	90.7	33 (30.6)	33 (30.6)	32 (29.6)	0.16	p=0.68
	No	2	1.9	0	1 (0.9)	1 (0.9)		
	May be	7	6.5	3 (2.8)	2 (1.9)	2 (1.9)		
	Don't know	1	0.9	1 (0.9)	0	0		

Table 1: Awareness about interrelation among oral and systemic health

Graph 1: Awareness about interrelation among oral and systemic health

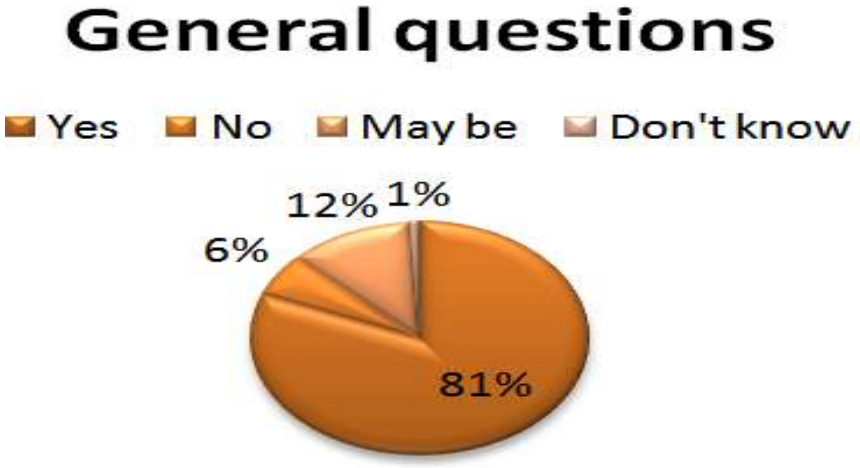


Table 2: Awareness about interrelation among Diabetes and periodontal health

Question	**Response**	**Total (n=108)**	**%**	**Interns (n=37) (%)**	**Practioners (n=36) (%)**	**Final years (n=35) (%)**	**χ^2 value**	**p-value**
D								
	Yes	75	69.4	25 (23.1)	25 (23.1)	25 (23.1)	0.51	p=0.77
	No	13	12	4 (3.7)	4 (3.7)	5 (4.6)		
	May be	8	7.4	2 (1.9)	4 (3.7)	2 (1.9)		
	Don't know	12	11.1	7 (6.5)	3 (2.8)	2 (1.9)		
E								
	Yes	85	78.7	29 (26.9)	26 (24.1)	30 (27.8)	1.93	p=0.38
	No	10	9.3	3 (2.8)	4 (3.7)	3 (2.8)		
	May be	8	7.4	5 (4.6)	2 (1.9)	1 (0.9)		
	Don't know	5	4.6	0	4 (3.7)	1 (0.9)		
F								
	Yes	95	88	31 (28.7)	33 (30.6)	31 (28.7)	1.77	p=0.41
	No	5	4.6	2 (1.9)	2 (1.9)	1 (0.9)		
	May be	7	6.5	4 (3.7)	2 (1.9)	1 (0.9)		
	Don't know	1	0.9	0	1 (0.9)	0		
I								
	Yes	56	51.9	17 (15.7)	16 (14.8)	23 (21.3)	6.8	p=0.34

	No	16	14.8	8 (7.4)	4 (3.7)	4 (3.7)		
	May be	20	18.5	6 (5.6)	10 (9.3)	4 (3.7)		
	Don't know	16	14.8	6 (5.6)	6 (5.6)	4 (3.7)		
T								
	Yes	83	76.9	28 (25.9)	26 (24.1)	29 (26.9)	3.3	p=0.51
	No	4	3.7	2 (1.9)	1 (0.9)	1 (0.9)		
	May be	11	10.2	3 (2.8)	5 (4.6)	3 (2.8)		
	Don't know	10	9.3	6 (5.6)	2 (1.9)	2 (1.9)		

Graph 2: Awareness about interrelation among Diabetes and periodontal health

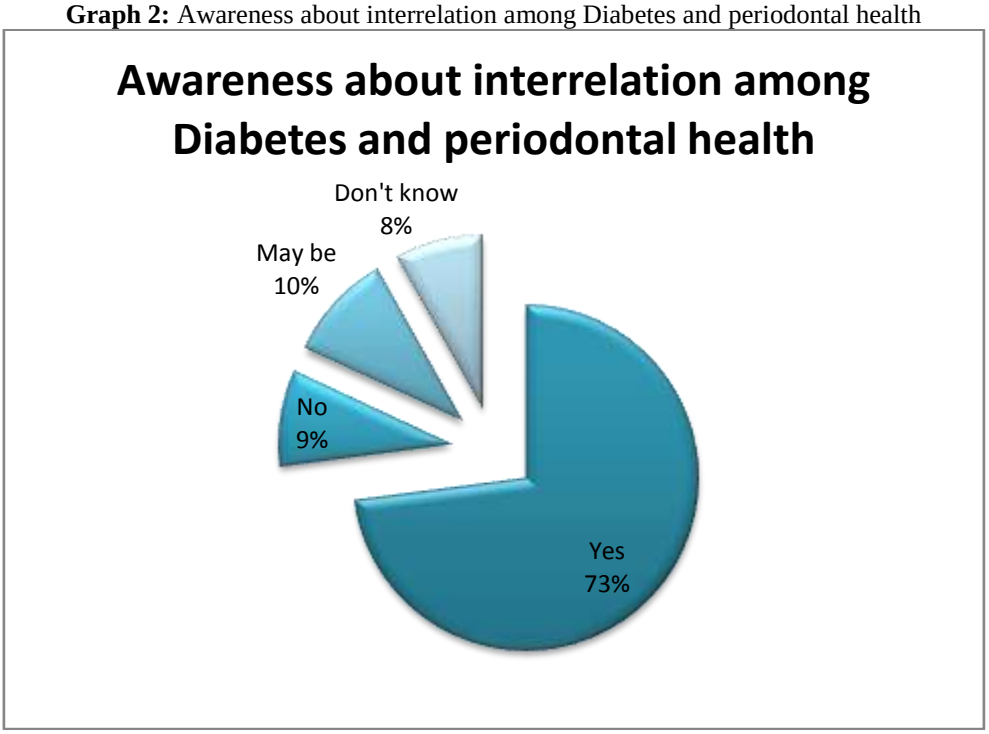


Table 3: Awareness about interrelation among CVD and Periodontal health

Question	**Response**	**Total (n=108)**	**%**	**Interns (n=37) (%)**	**Practioners (n=36) (%)**	**Final years (n=35) (%)**	**χ^2 value**	**p-value**
K								
	Yes	60	55.6	18 (16.7)	20 (18.5)	22 (20.4)	1.56	p=0.81
	No	19	17.6	8 (7.4)	6 (5.6)	5 (4.6)		
	May be	22	20.4	5 (4.6)	10 (9.3)	7 (6.5)		
	Don't know	7	6.5	6 (5.6)	0	1 (0.9)		
L								
	Yes	67	62	19 (17.6)	24 (22.2)	24 (22.2)	2.76	p=0.25
	No	10	9.3	3 (2.8)	5 (4.6)	2 (1.9)		
	May be	19	17.6	9 (8.3)	5 (4.6)	5 (4.6)		
	Don't know	12	11.1	6 (5.6)	2 (1.9)	4 (3.7)		
Q								
	Yes	56	51.9	15 (13.9)	20 (18.5)	21 (19.4)	3.47	p=0.48
	No	21	19.4	10 (9.3)	6 (5.6)	5 (4.6)		
	May be	19	17.6	7 (6.5)	7 (6.5)	5 (4.6)		
	Don't know	12	11.1	5 (4.6)	3 (2.8)	4 (3.7)		

Graph 3: Awareness about interrelation among CVD and Periodontal health

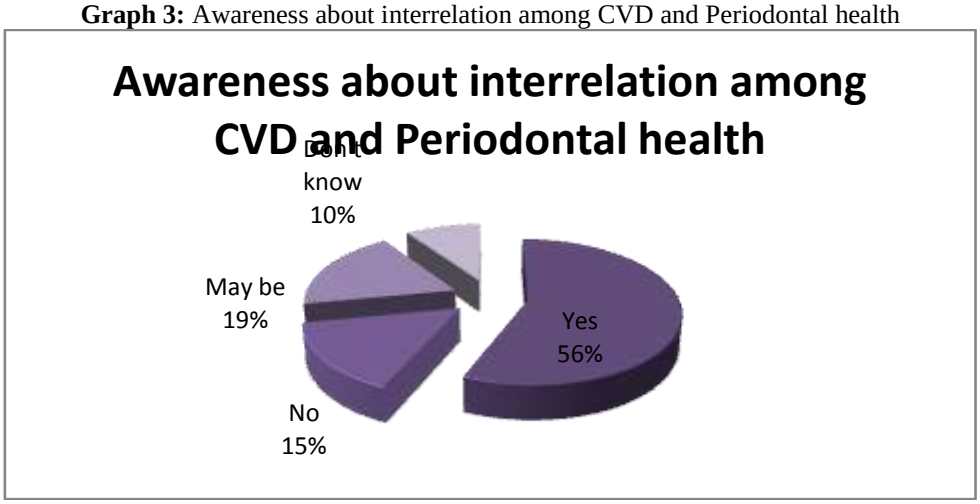


Table 4: Awareness about interrelation among respiratory disease and periodontal health

Question	Response	Total (n=108)	%	Interns (n=37) (%)	Practioners (n=36) (%)	Final years (n=35) (%)	χ^2 value	p-value
H								
	Yes	59	54.6	19 (17.6)	19 (17.6)	21 (19.4)	3.28	p=0.51
	No	22	20.4	9 (8.3)	5 (4.6)	8 (7.4)		
	May be	17	15.7	4 (3.7)	9 (8.3)	4 (3.7)		
	Don't know	10	9.3	5 (4.6)	3 (2.8)	2 (1.9)		
I								
	Yes	56	51.9	17 (15.7)	16 (14.8)	23 (21.3)	6.8 p=0.34	
	No	16	14.8	8 (7.4)	4 (3.7)	4 (3.7)		
	May be	20	18.5	6 (5.6)	10 (9.3)	4 (3.7)		
	Don't know	16	14.8	6 (5.6)	6 (5.6)	4 (3.7)		
J								
	Yes	79	73.1	21 (19.4)	29 (26.9)	29 (26.9)	7.69	p<0.005
	No	6	5.6	3 (2.8)	1 (0.9)	2 (1.9)		
	May be	16	14.8	10 (9.3)	4 (3.7)	2 (1.9)		
	Don't know	7	6.5	3 (2.8)	2 (1.9)	2 (1.9)		
P								
	Yes	71	65.7	22 (20.4)	24 (22.2)	25 (23.1)	1.16	p=0.55
	No	12	11.1	4 (3.7)	4 (3.7)	4 (3.7)		
	May be	18	16.7	8 (7.4)	5 (4.6)	5 (4.6)		
	Don't know	7	6.5	3 (2.8)	3 (2.8)	1 (0.9)		

Graph 4: Awareness about interrelation among respiratory disease and periodontal health

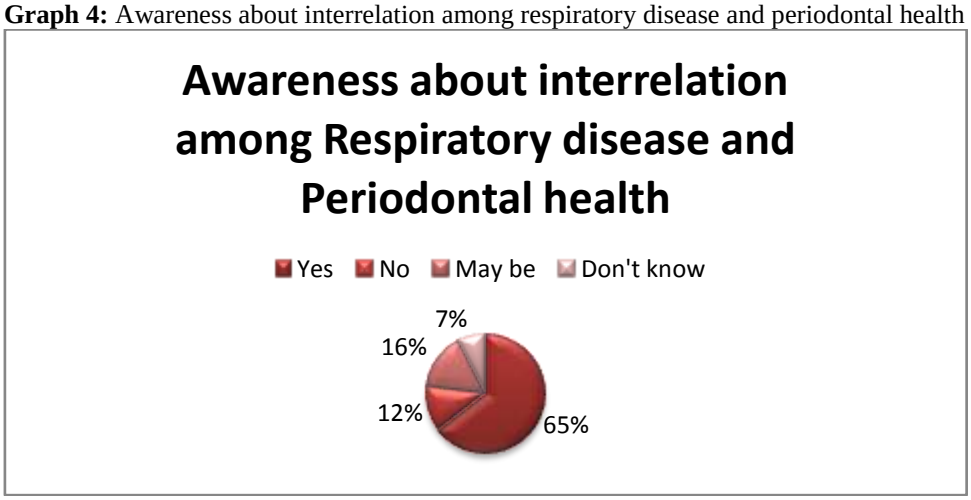


Table 5: Awareness about preterm low birth and periodontal health

Question	Response	Total (n=108)	%	Interns (n=37) (%)	Practioners (n=36) (%)	Final years (n=35) (%)	χ^2 value	p-value
O								
	Yes	66	61.1	23 (21.3)	20 (18.5)	23 (21.3)	0.79	p=0.67
	No	14	13	3 (2.8)	6 (5.6)	5 (4.6)		
	May be	15	13.9	5 (4.6)	6 (5.6)	4 (3.7)		
	Don't know	13	12	6 (5.6)	4 (3.7)	3 (2.8)		

Graph 5: Awareness about preterm low birth and periodontal health

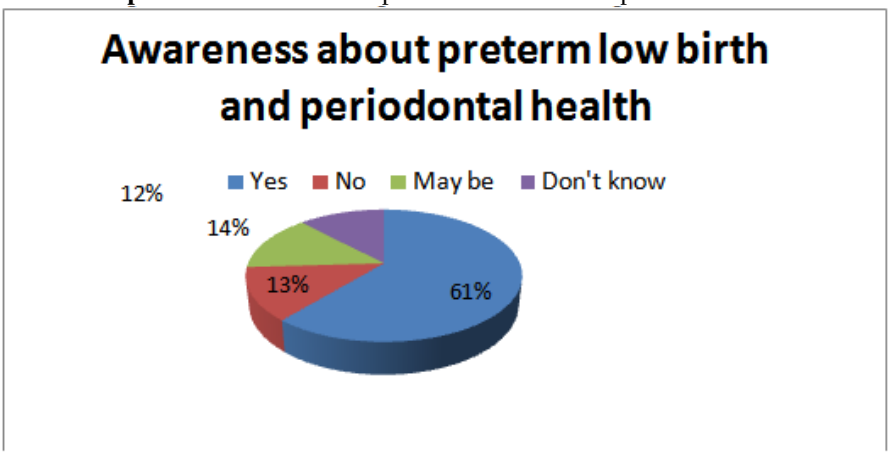
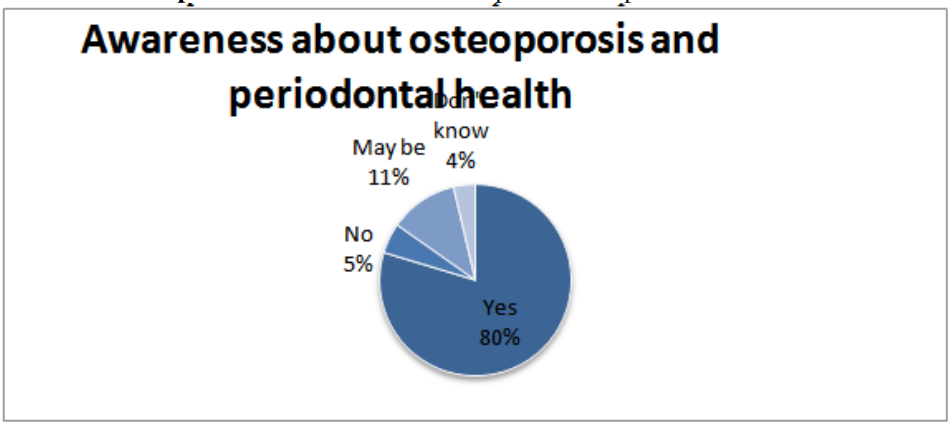


Table 6: Awareness about osteoporosis and periodontal health

Question	Response	Total (n=108)	%	Interns (n=37) (%)	Practioners (n=36) (%)	Final years (n=35) (%)	χ^2 value	p-value
M								
	Yes	86	79.6	24 (22.2)	31 (28.7)	31 (28.7)	8.6	p<0.01
	No	3	2.8	1 (0.9)	1 (0.9)	1 (0.9)		
	May be	13	12	9 (8.3)	3 (2.8)	1 (0.9)		
	Don't know	6	5.6	3 (2.8)	1 (0.9)	2 (1.9)		
N								
	Yes	86	79.6	27 (25)	28 (25.9)	31 (28.7)	2.8	p=0.24
	No	8	7.4	4 (3.7)	2 (1.9)	2 (1.9)		
	May be	12	11.1	5 (4.6)	5 (4.6)	2 (1.9)		
	Don't know	2	1.9	1 (0.9)	1 (0.9)	0		

Graph 6: Awareness about osteoporosis and periodontal health



*Archana Devanoorkar. "Interrelationship Between Periodontitis And Systemic Health Among Dental Practitioners: How Aware Are We?" IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) 16.12 (2017): 64-75