

Original Article

Knowledge About The Interrelationship of Oral and Systemic Health Among Postgraduate Dental Students and General Dental Practitioners of West Tamil Nadu – A Questionnaire Study

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Received : 28 July 2023

Accepted : 16 August 2023

Published : 14 November 2023

DOI

10.25259/DJIGIMS_10_2023

Quick Response Code



ABSTRACT

Objectives: Oral health status is an integral component of general health. Many studies have shown that the oral cavity exhibits manifestations of many systemic diseases and acts as a predictor of oral health. The aim of the study is to assess the knowledge about the interrelationship of oral and systemic health among postgraduate dental students and general dental practitioners of west Tamil Nadu.

Material and Methods: Data was collected using a self-administered pilot tested questionnaire. Informed consent was obtained from all the participants and demographic details were collected for the participants of study. The questionnaire was sent through email. Study data obtained were entered into Statistical Package for the Social Sciences (SPSS) Version 25. Comparison between the variables was done using chi-square test. Level of significance was set at 5% ($p < 0.05$).

Results: The results were tabulated and comparison of knowledge about oral and systemic diseases among general practitioners and postgraduates were analyzed using nonparametric – Mann-Whitney test. General practitioners had comparatively better knowledge on inter-relationship of oral and systemic health than postgraduate students. 44.17% of respondents in general dental practice knew that a relationship exists between oral and general health, but application of this knowledge in treating medically complex patients was limited.

Conclusion: Greater emphasis should be placed on this association by interfiled (medical and dental) training from the undergraduate level which can be rectified by modifying the academic regulations. Continuing education programs should be frequently conducted on educating dental, medical and other healthcare professionals on the robust and latest evidence of the oral-systemic link.

Keywords: Postgraduates, general practitioners, oral health, systemic health

INTRODUCTION

Oral health status is an integral element of general health. On examination, the oral cavity could exhibit manifestations of underlying general systemic disease and acts as an indicator of overall health.^[1] A variety of epidemiological studies have recommended that oral infection could be a risk factor for systemic diseases. Oral lesions are caused by systemic diseases such as diabetes mellitus, rheumatoid arthritis (RA), respiratory disease or chronic obstructive pulmonary disease (COPD), cardiovascular disease (CVD), renal diseases, hematological diseases, and certain medications.^[2]

A myriad of oral mucosal lesions, including lichen planus and recurrent aphthous stomatitis, as well as gingivitis, periodontitis, dental caries, salivary dysfunction and oral infections such

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as candidiasis have been reported in people with diabetes mellitus. Previous studies have shown that DNA analysis of synovial joint fluid in RA patients exhibits oral pathogens suggesting their role in the etiology of RA.^[1] Oral and nasal bacterium have been identified in the COPD lung tissue microbiota suggesting aspiration of oral secretions as a major source of the COPD lung microbiota. Periodontitis results in the entry of bacteria into the circulatory system which in turn activates a host inflammatory response leading to exacerbation and thereby increasing the risk of CVD.^[3] Uremic stomatitis, mucositis, glossitis, dysgeusia, and candidiasis infections can develop due to the underlying renal disease.^[4] Patients with hematologic illnesses may present with gingival bleeding or glossitis depending on the etiology.^[4] So, it is necessary for dental professionals to update their knowledge about the management protocols of oral diseases of medically complex patients, and dentists have a pivotal role in educating patients regarding the link between oral foci of infection and systemic diseases, oral manifestations of systemic diseases and also the impact of oral health on the quality of life of individuals. Therefore, the objective of this study was to assess the knowledge about the interrelationship of oral and systemic health among postgraduate dental students and general dental practitioners of West Tamil Nadu.

MATERIAL AND METHODS

This online-based questionnaire survey was conducted with an estimated sample of 200 participants, and dentists who were inquisitive in the study were selected. The participants in this study were postgraduate students of various dental colleges and private and government dental practitioners of West Tamil Nadu, who were identified through Indian Dental Association (IDA) registered list. This study was approved by the Institutional Ethical Committee (VDCW/IEC/252/2021).

Postgraduate dental students from all specialties and general dental practitioners from private and government sectors, who were willing to take part in this study, were included in the study. Incomplete forms and subjects who refused to participate were excluded.

A self-administered close-ended questionnaire was developed from the literature research. The questionnaires were sent to faculty members of the Department of Oral Medicine for evaluation. Thirty dentists were chosen conveniently for the pilot test of the questionnaire.

Pilot test was conducted to ensure the content and face validity. The reliability was assessed, and Cronbach's Alpha was found to be 0.82. After assessing validity and reliability, the questionnaire for this study was created using a Google platform that included a demographic data section with details including type of job, basic dental qualification, work

experience, and questionnaire section for the evaluation of knowledge on oral health and systemic health link. Pilot-tested samples were not included in the main study. A consent statement was enclosed at the start of the questionnaire, and agreement was made prior to participation in the study. The study participants were postgraduate students of various dental colleges and private and government dental practitioners of West Tamil Nadu who were identified through Indian Dental Association's registered list. Surveys were distributed through email to them. The questionnaire was scored by YES or NO responses. Responses of the participants were categorized into three: poor knowledge (yes to <50%), fair knowledge (yes to 51–75%) and good knowledge (yes to >75%).

Data obtained from the study were entered into Microsoft Excel Software, which was exported to Statistical Package for Social Sciences (SPSS) Version 25, IBM Statistics, the USA. Descriptive Statistics (frequency and percentage) were obtained and presented in tables and graphs. Comparison between the variables was performed using chi-squared test. Level of significance was set at 5% ($P < 0.05$ = Statistically significant).

RESULTS

A total of 200 dentists participated in the study, among whom 100 were postgraduates and 100 were general practitioners [Table 1]. The age of the participants ranged from 21 to 60 years, and females (139) were more when compared to males (61).

Table 2 represents the association between knowledge about the systemic link and oral diseases based on occupational status, and had an insignificant P-value of 0.705.

Figure 1 data showed that the general practitioners and postgraduates had almost equal knowledge in the study.

The data in Table 3 revealed that the participants of our study had good knowledge about oral diseases in cardiovascular and respiratory systems and fair knowledge in diabetes mellitus, gastrointestinal, endocrine, and renal diseases and poor knowledge in liver, connective tissue disorders, and also about pregnancy.

Table 4 data shows that participants had comparatively good knowledge about the interrelationship between oral and systemic diseases regarding questions related to modern pacemakers, elective dental treatment in renal transplantation, and rheumatoid arthritis.

DISCUSSION

The oral cavity is considered as the “window to overall health.” It is known that neglect of dental problems can lead to serious oral complications and can affect patients' quality of life.^[1] However, the understanding of the link between oral and

Table 1: Frequency table for demographic details of the study participants.

Variables		Frequency (n)	Percentage (%)
Age	21–30 years	160	80.0
	31–40 years	23	11.5
	41–50 years	12	6.0
	51–60 years	5	2.5
	Total	200	100
Gender	Male	61	30.5
	Female	139	69.5
	Total	200	100
Educational level	BDS	63	31.5
	MDS	135	67.5
	PhD	2	1.0
	Total	200	100
Occupational status	Postgraduate students	100	54.5
	Working	90	40.5
	Others	10	5.0
	Total	200	100
Employment type	Undergraduates	94	47.0
	Academician	33	16.5
	Private Practitioners	50	25.0
	Consultants	9	4.5
	Others	14	7.0
	Total	200	100
Working sector	Postgraduate students	91	45.5
	Government	5	2.5
	Private	89	44.5
	Others	15	7.5
Total	200	100	
Working experience	Less than 1 year	100	50.0
	1–5 years	71	35.5
	6–10 years	17	8.5
	More than 10 years	12	6.0
	Total	200	100
Speciality	Not answered	83	41.5
	OMR	31	15.5
	Pedodontics	15	7.5
	Orthodontics	19	9.5
	Periodontics	21	10.5
	Endodontics	7	3.5
	PhD	4	2.0
	OMFS	9	4.5
	Oral path	11	5.5
	Total	200	100

BDS: Bachelor of Dental Surgery, MDS: Master of Dental Surgery, PhD: Doctor of Philosophy, OMR: Oral Maxillofacial Radiology, OMFS: Oral and Maxillofacial Surgery

systemic conditions is still emerging.^[2] In 1965, an article was published in the American Journal of Cardiology titled as “The necessity for effective dental health service in cardiology” that opened with the following statement: “In almost all ailments of

Table 2: Association of knowledge about oral diseases and systemic link and occupational status.

Knowledge	Occupational status		P
	General practitioners	Postgraduates	
Good	61	59	0.705
Fair	37	37	
Poor	2	4	
Total	100	100	

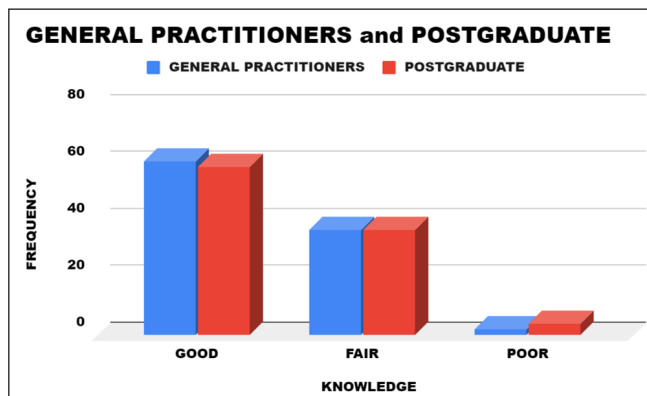


Figure 1: Knowledge of general practitioners and postgraduates.

Table 3: Knowledge of participants about the interrelationship between oral and systemic diseases in various systems.

System	Frequency (%)
Cardiovascular system	623 (84.1)
Respiratory system	617 (83.2)
Gastrointestinal system	310 (65.7)
Endocrine	481 (74.3)
Renal	309 (60.2)
Diabetic	159 (65.6)
Liver	154 (56.5)
Pregnancy	142 (54.5)
Connective tissue	282 (57.2)

the heart caused by microorganism, the source of the infection is known to be the pathologic and infected environment of the teeth.^[5] Physicians have an elementary role in oral health and need to possess a basic dental knowledge. The examination of oral cavity frequently for identification of oral diseases at initial stages is necessary and must be referred to the oral physician for treatment.^[6] Local inflammatory diseases, such as periodontal diseases, induce systemic inflammation which can aggravate systemic diseases such as cardiovascular and respiratory diseases, diabetes mellitus, adverse pregnancy outcome, and many more.^[7]

In our study, 90% of the participants stated that a possible relationship between oral and systemic health exists. The

Table 4: Question-wise comparison between two groups using non-parametric – Mann-Whitney U test.

Knowledge questions	GROUP 1: Postgraduates GROUP 2: General practitioners			P
	Good	Fair	Poor	
Q1	0.325	1.000	0.157	0.314
Q2	0.162	0.053	0.480	0.071
Q3	0.161	0.330	0.576	1.000
Q4	0.526	0.478	0.264	0.748
Q5	0.753	0.002	0.480	0.024*
Q6	0.347	0.053	0.264	0.600
Q7	0.496	0.298	0.264	0.248
Q8	0.797	0.351	1.000	0.412
Q9	0.496	0.262	0.264	0.223
Q10	0.184	0.139	0.157	0.260
Q11	0.381	0.019	0.114	0.109
Q12	0.327	0.034	0.576	0.030*
Q13	0.263	0.073	0.576	0.124
Q14	0.677	0.212	0.480	0.342
Q15	0.428	0.005	1.000	0.038*
Q16	0.161	0.230	0.157	0.856
Q17	0.327	0.454	0.264	0.548
Q18	0.086	0.038	0.576	0.063
Q19	0.203	0.006	0.157	0.002*
Q20	0.722	0.488	1.000	0.418
Q21	0.819	0.815	1.000	1.000
Q22	0.086	0.034	0.576	0.014*
Overall knowledge Q1–Q22	1.000	1.000	1.000	0.696

P < 0.05*; **0.024, 0.030, 0.038, 0.002** and **0.014** are significant P-values.

overall knowledge of oral and systemic diseases among postgraduate and general practitioners was not statistically significant, and generated a P-value of 0.705. A significantly higher number of general practitioners with a working experience of 6–10 years had good knowledge about the link between oral and systemic diseases [Table 2].

In our questionnaire study, knowledge-based questions about interrelationships of oral and cardiovascular diseases, respiratory diseases, gastrointestinal diseases, renal diseases, endocrine disorders, pregnancy, and autoimmune diseases were included [Figure 2].

The rate of knowledge about the association between oral and cardiovascular system in our study was 84.1%, which was in accordance with the study conducted by Rasouli-Ghahroudi *et al.* on oral health status, knowledge, attitude, and practice of patients with heart diseases. The study reported that 75.0% had moderate and good knowledge about oral health, 24.3% agreed that cardiovascular diseases cause oral diseases and 55% agreed that oral diseases cause cardiovascular diseases.^[8]

In our study, 60% of the participants had knowledge about the role of bacteria in the initiation of atherosclerosis. However, there was a lack of knowledge about antibiotic prophylaxis for infective endocarditis in patients with rheumatic heart diseases and prosthetic heart valves, and generated an insignificant P-value of 1 (<0.05) [Table 4].

In this study, 83% participants had good knowledge about oral and systemic link in respiratory diseases compared to

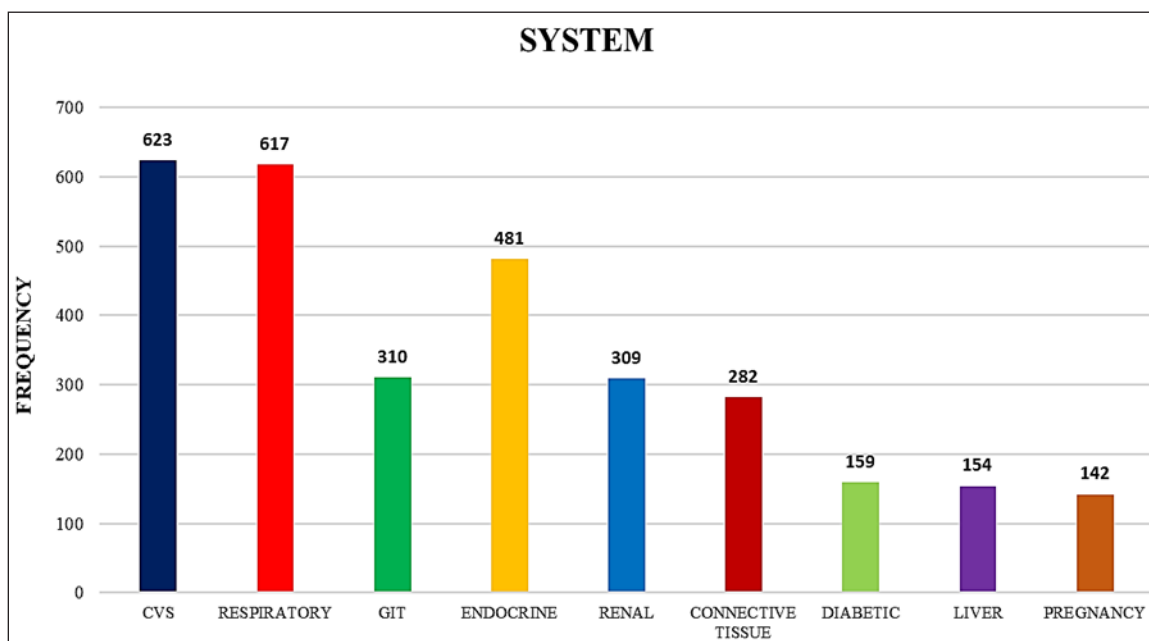


Figure 2: Association of knowledge about various systems among participants; CVS: Cardiovascular system, GIT: Gastro intestinal system

endocrine and gastrointestinal diseases. There was only a limited knowledge about the complications of aspiration of salivary secretions with an insignificant P-value of 0.402 (< 0.05) [Table 4].

About 65% of participants in our study had good knowledge about the link between the oral and gastrointestinal system, but minimum knowledge regarding the oral manifestations of gastrointestinal diseases. So, oral physicians must be knowledgeable on the oral manifestations and its impact on the gastrointestinal system.

Al-Khabbaz *et al.* conducted a comparative study on knowledge about the association between periodontal diseases and diabetes mellitus. Fifty percent of all study participants believed that patients with diabetes were more susceptible to tooth loss because of periodontal diseases, which was in association with our study.^[9] Parakh *et al.* conducted a study on comparing the knowledge between oral and systemic health and reported that there was an average knowledge (only 41% of participants) about the oral manifestations of diabetes.^[10]

Regarding the rate of knowledge in patients with renal problems in population of Davanagere, the study revealed a fair knowledge in dental interns regarding oral health problems among patients with renal problems.^[11] There was a good knowledge among participants regarding the elective treatment in renal transplantation with a P-value of 0.038 (< 0.05) that was statistically significant [Table 4]. However, there was lack of knowledge among postgraduates regarding the link between uremic stomatitis and ammoniacal odor in renal failure.

Deficient knowledge was observed among participants in our study regarding pregnancy and oral health. There was a lack of awareness about the link of oral and renal disorders in our study, which was only 60% and was in accordance with a cross-sectional study conducted by Yavagal *et al.* on knowledge and attitude of dental interns about oral health considerations and periodontal diseases as a risk factor for preterm or low birth weight babies among dentists. Knowledge about oral diseases during pregnancy can enable the dentist in educating and motivating pregnant patients for dental treatment and thus prevent pregnancy-associated complications. The results of our study regarding pregnancy were not in accordance with the Questionnaire survey conducted by James *et al.* among dental students of Mangalore city on knowledge, attitude, and practice in treating pregnant women that reported that only 39.3% of students had sufficient knowledge regarding management of pregnant women in a dental chair.^[12]

Alowaini *et al.* reported that half of the dentists in earlier studies mentioned that Cardiovascular Diseases and periodontal diseases are firmly linked, and around 20% of the

participants established the same concept. Lack of knowledge has been observed among the respondents regarding the substantial risk factors for periodontal diseases further leading to obesity, osteoporosis, and respiratory diseases.^[13]

AlJohani *et al.* and Al Sharrad *et al.* conducted a study with physicians and dentists. Both reported that lack of communication between physicians and dentists, insufficient knowledge or training in medical and dental schools or the lack of continuing education programmes resulted in improper management of serious chronic diseases in dental clinics as well as the neglect of oral health by physicians. Majority of the participants were aware about the relationship between periodontal and systemic conditions. Diabetes mellitus was the most frequent systemic disease (66.8%) that was known to be related to periodontal disease by the sample of medical doctors.^[14,15]

Both general practitioners and postgraduate students had insufficient knowledge and awareness about the interrelationship between lupus erythematosus and periodontal diseases, with a P-value of 1 (< 0.005) [Table 4].

Some of the limitations of our study included a chance of bias because the questionnaire survey was sent via email. Moreover, for optimal results, the study must be carried out with medical students and doctors of all medical specialties and with equal participation of all specialties of dentistry on a large sample.

CONCLUSION

To provide optimum oral healthcare to medically complex patients, it is necessary to enhance the knowledge of oral and systemic health interrelationship among dentists. Greater emphasis must be placed on this association by inter-field (medical and dental) training programmes from the undergraduate level itself or by modifying the academic regulations. The lack of time and knowledge were the most common barriers in educating patients on the oral systemic connection. In addition, it is also advisable to develop a strong speciality in oral medicine, which would upskill a dental professional caliber to serve as a capable partner to general physicians. Moreover, continuing education programmes should be frequently conducted on educating dental, medical and other healthcare professionals on the flavorsome and latest evidence of the oral-systemic link. Oral physicians should continually update themselves about the changing protocols in the management of medically complex patients. They should establish strong collaborations with medical professionals for an efficient referral system and thus provide a comprehensive dental care for the patient.

Ethical approval

The author(s) declare that they have taken the ethical approval from IEC (VDCW/IEC/252/2021).

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of Artificial Intelligence (AI)-Assisted Technology for manuscript preparation

The authors confirm that there was no use of Artificial Intelligence (AI)-Assisted Technology for assisting in the writing or editing of the manuscript and no images were manipulated using the AI.

REFERENCES

1. Nazir MA, Izhar F, Akhtar K, Alma K. Oral-system link and access to oral care. *J Family Community Med* 2019;26.
2. Taylor GW, Borgnakke WS. Periodontal disease: Associations with diabetes, glycemic control and complications. *Oral Dis* 2008;14:191–203.
3. Dhadse P, Gattani D, Mishra R. The link between periodontal disease and cardiovascular disease: How far we have come in last two decades? *J Indian Soc Periodontol* 2010;14:148.
4. Tavares M, Lindefeld Calabi KA, San ML. Systemic diseases and oral health. *Dent Clin N Am* 2014;58:797–814.
5. Ford PJ, Raphael SL, Cullinan MP, Jenkins AJ, West MJ, Seymour GJ. Why should a doctor be interested in oral disease? *Expert Rev Cardiovasc Ther* 2010;8:1483–93.
6. Bass CC. The necessity for effective dental health service in cardiology. *Am Heart J* 1965;69:718–9.
7. Morgan R, Tsang J, Harrington N, Fook L. Survey of hospital doctors' attitudes and knowledge of oral conditions in older patients. *Postgrad Med J* 2001;77:392–4.
8. Rasouli-Ghahroudi AA, Khorsand A, Yaghobee S, *et al.* Oral health status, knowledge, attitude and practice of patients with heart disease. *ARYA Atheroscl* 2016;12:1–9.
9. Al-Khabbaz AK, Al-Shammari KF, Al-Saleh NA. Knowledge about the association between periodontal diseases and diabetes mellitus: Contrasting dentists and physicians. *J Periodontol* 2011;82:360–6.
10. Parakh MK, Kasi A, Vignesh A, Prabhu S. Knowledge and awareness of oral manifestations of diabetes mellitus and oral health assessment among diabetes mellitus patients – a cross sectional study. *Curr Diabetes Rev* 2019;15:1–9.
11. Yavagal PC, Veeresh DJ, Dutta A, Syiem H, Subramaniam N, Mohd N. Knowledge and Attitudes of Dental Interns about oral health considerations in patients with renal problems in Davanagere city: A cross sectional survey. *Int Dent J Student Res* 2020;8:22–6.
12. James S, Rohan P. Knowledge, attitude, and practice in treating pregnant women: A questionnaire survey among dental students of Mangalore city. *J Indian Assoc Public Health Dent* 2018;16:338–41.
13. Alowaini S, Alsharqi D, Ansari SH. Knowledge and attitude of dental practitioners regarding the association of oral health and systemic diseases; A survey-based study in Riyadh. *Int Dent J Students Res* 2020;8:108–13.
14. AlJohani K, AlZahrani AS. Awareness among medical and dental students regarding the relationship between periodontal and systemic conditions. *Int J Pharm Res Allied Sci* 2017;6:61–72.
15. Al Sharrad A, Said KN, Farook FF, Shafik S, Al-Shammari K. Awareness of the relationship between systemic and periodontal diseases among physicians and dentists in Saudi Arabia and Kuwait: Cross-sectional study. *Open Dentistry J* 2019;13:288–95.

How to cite this article: Mani S, Pazhani A, Swaralaya SB, Sahuthullah YA, Sivaraman GS, Susairaj B. Knowledge About The Interrelationship of Oral and Systemic Health Among Postgraduate Dental Students and General Dental Practitioners of West Tamil Nadu – A Questionnaire Study. *Dent J Indira Gandhi Inst Med Sci.* 2023;2:99–105. doi: 10.25259/DJIGIMS_10_2023

Questionnaire	Response
Q1: Did you know oral health is associated with systemic health?	Yes No
Q2: Oral bacteria plays a significant role in the initiation and progression of atherosclerosis	Yes No
Q3: Antibiotic prophylaxis is recommended before extraction of minor surgical procedures in patients at risk for infective endocarditis, rheumatic heart disease and prosthetic heart valve	Yes No
Q4: Patients under procainamide for cardiac arrhythmias may present with recurrent oral ulcers	Yes No
Q5: Modern pacemakers are not influenced by any type of dental equipment	Yes No
Q6: Poor oral hygiene is associated with an increased risk for exacerbation of chronic obstructive pulmonary disease	Yes No
Q7: Prolonged use of Beta-2 agonists in asthmatic patients cause reduced salivary flow	Yes No
Q8: Aspiration of salivary secretions into lower respiratory tract can rarely cause aspiration pneumonia	Yes No
Q9: Maxillary sinusitis may present as a maxillary posterior toothache	Yes No
Q10: Dental erosion with dentin hypersensitivity or irreversible pulp changes can be seen in patients with Gastro-esophageal reflux disease	Yes No
Q11: Recurrent aphthous ulceration and mucosal swelling can occur in patients with Crohn's disease	Yes No
Q12: Periodontal disease contributes to poor glycaemic control in people with diabetes	Yes No
Q13: Poor glycemic control can lead to occurrence of mucormycosis following extraction of tooth	Yes No
Q14: Uremic stomatitis, ammoniacal odor, taste changes (metallic taste), mucosal petechiae or ecchymosis are the common oral manifestations of renal failure	Yes No
Q15: Elective dental treatment should not be done in the first 6 months after renal transplantation	Yes No
Q16: Presence of gingival bleeding in patients with chronic liver diseases requires coagulation tests before invasive dental treatment	Yes No
Q17: Increasing level of parathyroid hormone leads to generalized bone loss with spacing of teeth	Yes No
Q18: Mucosal erythema or atrophic glossitis is the common oral manifestations of anemia	Yes No
Q19: The periodontal bacteria, porphyromonas gingivalis, worsens rheumatoid arthritis	Yes No
Q20: Periodontal disease has a strong association with preterm or low birth weight	Yes No
Q21: Successful periodontal treatment minimizes the risk of exacerbation of lupus erythematosus	Yes No
Q22: Knowledge about the oral manifestations and referral by the general physician to the dental surgeon can help in prompt and effective treatment of oral diseases	Yes No