ISSN: 3062-3405

Annals of Orthodontics and Periodontics Specialty
Volume 2, Page No: 23-28
Available Online at: aopsj.com

Original Article

Knowledge and Perception of Periodontal-Systemic Interactions Among Dental Professionals

Hina Mahmood[1]*, Abdul Manan Shahid[2], Muhammad Usama[1], Eraj Nadeem[1], Noor-Ul-Ain Zafar[1], Rida Bashir[1]

1. Department of Periodontology, Islamabad Medical and Dental College, Islamabad, Pakistan.
2. Department of Oral Medicine, Islamabad Medical and Dental College, Islamabad, Pakistan.

***E-mail** ✉ hina.mahmood@iideas.edu.pk

Abstract

This study aimed to investigate the awareness of dental practitioners about the association between periodontitis and systemic disorders in private dental hospitals in Islamabad and Rawalpindi, Pakistan. This will help in determining the gaps in knowledge and adjusting the periodontology department's house officers' training accordingly, improving their future patient care. With the approval of each of the six dental facilities in the twin cities of Pakistan, a cross-sectional survey of 190 house officers was conducted. Participants completed a questionnaire and provided written consent. Each right response received a score of 1, and the level of awareness was divided into three categories: low (0–3), fair (4-6), and outstanding (7-8). SSPS version 23 was used for data entry and analysis. The percentages were determined for each question and level of awareness separately. The findings showed that 61 (32.1%) of the house officers had low understanding, 109 (57.2%) had fair awareness, and 20 (10.5%) had outstanding awareness of the association between systemic disease and periodontitis. Only 50 (26%) of the house officers knew the association between periodontitis and atherosclerosis, while 146 (76.8%) were aware of the bi-directional interactions. Regarding the association between systemic disease and periodontitis, more than 50% of the house officers had a fair level of awareness. Subsequent investigation showed that most people were unaware of the connection between atherosclerosis and periodontitis. There was also a dearth of information regarding the use of antibiotics to treat periodontitis in diabetic patients.

Key words: Periodontitis, Systemic diseases, Cardiovascular disease, Smoking, Diabetes

How to cite this article: Mahmood H, Shahid AM, Usama M, Nadeem E, Zafar NUA, Bashir R. Knowledge and Perception of Periodontal-Systemic Interactions Among Dental Professionals. Ann Orthod Periodontics Spec. 2022;2:23-8. https://doi.org/10.51847/BbcDtqLmI1

Received: 28 May 2022; **Revised:** 25 August 2022; **Accepted:** 04 September 2022

Introduction

Along with gingivitis and periodontitis, periodontal disease is one of the most common chronic conditions affecting the oral cavity worldwide [1]. In 2015, a local study in Pakistan with 1918 patients found that one-fourth of the study group had periodontitis [2]. Early tooth loss may be the consequence of periodontitis, a multifactorial inflammatory disease of the teeth's supporting tissues [3]. The diagnosis of periodontitis is determined when two or more non-adjacent teeth exhibit clinical attachment loss, or when two or more teeth exhibit attachment loss and periodontal pocketing of at least 3 mm, and the observed findings cannot be explained by a cause unrelated to periodontitis [4].

In the past, periodontitis has been linked to several systemic risk factors, including age, stress, diabetes, smoking, and medication [5]. Certain systemic diseases damage the host defense mechanism by influencing neutrophil, macrophage, and lymphocyte function, which speeds up the damaging inflammatory process of the periodontium. According to studies, there may be a connection between systemic conditions including diabetes mellitus, preterm low birth weight, cardiovascular disorders, and periodontitis [6].

There is extensive literature on the bidirectional association between diabetes and periodontitis. Patients with diabetes are found to have a threefold greater chance of developing periodontitis [7]. Research further shows that poor glycaemic control deteriorates periodontal health and that people with this condition are 2.8 times more likely to acquire destructive periodontal disease and 4.2 times more likely to have progressive loss of alveolar bone. Likewise, those with diabetes who have severe periodontitis are 3.2 times more likely to develop diabetic neuropathy and ischaemic heart disease [8]. A Cochrane evaluation of the impact of periodontal therapy on glycaemic management found that non-surgical periodontal therapy reduced HbA1C by 0.4% [9]. According to some research, 83%–88% of dentists were aware of reciprocal interactions, and 68%–71% knew that periodontal therapy improved glycaemic management [10-12].

The main risk factor for periodontitis is smoking. Smokers are more likely than non-smokers to have periodontitis [13]. 90% of people worldwide are impacted. Additionally, it causes several illnesses, including cancer, heart disease, lung conditions, and periodontal disease [14]. According to a Saudi Arabian study, smokers had a 3.5-fold increased risk of developing chronic periodontitis, while heavy smokers had a higher overall prevalence of the disease (81.6%). Additionally, they found that heavy smokers had more severe periodontitis than moderate and light smokers [15].

Cardiovascular disorders and atherosclerosis can potentially be linked to periodontitis. A substantial correlation between periodontal disease and cardiovascular disease was found in 12 of the 14 South Asian studies conducted between 2001 and 2012 [16]. Patients with periodontitis had a greater chance of experiencing myocardial infarction (MI), according to a meta-analysis done to calculate the odds ratio of the relationship between the two conditions. In a similar vein, individuals who experienced an MI episode had worse oral hygiene and periodontal conditions than their controls [17]. Additionally, research indicates that patients with periodontitis are more likely to die from cardiovascular disease (CVD) and respiratory conditions than people without the condition [6, 18].

The Global Burden of Illness report stated that Pakistan has a high prevalence of cardiovascular and diabetes diseases, and the STEPS study indicates that there is a danger of an increased prevalence of non-communicable diseases in Pakistan [19, 20]. Numerous studies suggest a potential connection between periodontium and systemic health, involving the accelerated damaging inflammatory process [21]. Around the world, 20–50% of adults in both industrialized and developing nations suffer from periodontitis, and the frequency rises sharply in those over 65 [22, 23].

Young dentists can be quite helpful in educating and counseling patients on the connections between dental and systemic health. Knowledge of this link and its instillation through patient counseling throughout the early years of practice are therefore crucial for improved patient management. This will contribute to the establishment of a better practice centered on providing quality patient care.

The purpose of the study was to determine how well-informed young dentists in Pakistan's twin cities were about the connection between systemic health and periodontitis. To guarantee appropriate management and counseling of compromised patients, this will assist in detecting knowledge gaps and allow for the incorporation of customized reinforcement in future house officer training in the periodontology department.

Materials and Methods

A cross-sectional, questionnaire-based, study was conducted on 190 house officers in 6 dental hospitals in Islamabad and Rawalpindi. After attaining approval from the institutional review board, dental section IM & DC (letter no. IMDC/DS/IRB/143), due permission was sought from all the concerned dental hospitals which included Islamabad Dental Hospital, Riphah Dental Hospital, Margalla Dental Hospital, Armed Forced Institute of Dentistry, Rawal Dental Hospital and Pakistan Institute of Medical Sciences. The sample size of 186 house officers was calculated which was raised to 190 using the WHO sample size calculator with an anticipated proportion (p) of 0.78 [20], a level of confidence of 90%, and a margin of error(e) of 0.05. The data was collected for I year from January 2020 to December 2020 using the convenience sampling

technique. The personalized questionnaire was constructed, and face validity was assessed by five panelists including 2 medical educationists and three senior consultants. After some minor changes, the questionnaire was then piloted on n = 30 participants. The reliability of the questionnaire was checked through Cronbach's alpha which was 0.72. The questionnaire was distributed in the clinical departments of the respective teaching hospitals, written consent was taken from all the participants, and the study was explained to them. It included 8 questions assessing awareness regarding the relationship between periodontitis and systemic disease. There were questions of basic knowledge regarding periodontium, the relation of diabetes with periodontitis, the relation of atherosclerosis with periodontitis, and the effect of smoking on the periodontium. The average time taken to fill out the questionnaire was 8-10 minutes. The score ranged from 0-8 with a score of 1 assigned to each correct answer. The level of awareness was categorized as (0-3) poor, (4-6) fair, and (7-8) excellent. The data was encoded and entered in SPSS version 23.0 and the results were analyzed in the form of percentages for all the individual correct answers and the level of awareness. Quantitative data like age was calculated as mean ± SD.

Results and Discussion

The cross-sectional study included 190 house officers (64 (33.6%) males and 126 (66.3%) females) with a mean age of 24.03 ± 0.3 years. Regarding the relation of systemic health with periodontitis poor awareness was observed for 61 (32.1%) of house officers, fair awareness for n = 109 (57.4%), and excellent awareness for 20 (10.5%). **Table 1** displays the awareness % for a few of the questions.

Table 1. Percentage of responses for each question

Sr.#	Question	Correct (n)	Incorrect (n)	Correct %
1	Basic knowledge of periodontium	106	84	55.8
2	Atherosclerosis linked with periodontitis	50	140	26.3
3	Bidirectional relationship between diabetes	146	44	76.8
4	Effect of smoking on gingival inflammation	149	41	78.4
5	Risk of atherosclerosis in periodontitis	44	146	23.2
6	Effect of periodontal treatment on glycemic control	109	81	57.4
7	Mechanism linking systemic influence and periodontium	135	55	71.1
8	Prescription of antibiotics in diabetic patients	45	145	23.7

The percentage of female house officers (n = 73 (57.9%)) and males (n = 36 (56.3%)) with good awareness did not differ, whereas more females (n = 16 (12.7%)) had exceptional awareness than males (n = 16 (6.3%)). **Figure 1** displays the percentage of awareness levels in males and females. A total of 160 (84%) of the house officers reported giving systemic health advice to their patients.

Mention all the tables and figures in the text as follows:

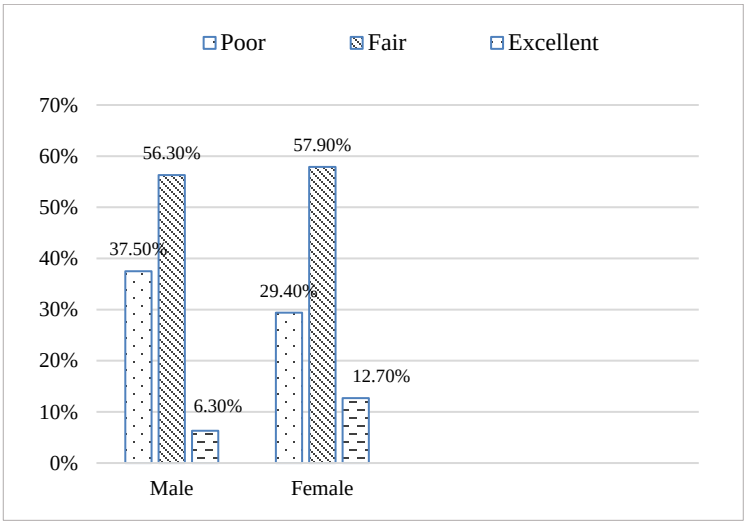

Figure 1. Percentage of awareness level among gender

Given the increasing incidence of systemic disorders such as diabetes and cardiovascular disease in Pakistan [22, 23], young dentists must possess solid knowledge and inform patients about the mutually reinforcing association between periodontitis and systemic health. To identify areas that need development, the current study attempts to gauge knowledge of this relationship.

The findings of the current study demonstrated that the majority of young dentists (> 75%) were aware of the reciprocal association between smoking's negative effects on the periodontium and periodontitis associated with diabetes. According to multiple research, general dentists' understanding of the reciprocal association between diabetes and periodontitis ranges from 83% to 88%, and 68% to 71% concur that periodontal therapy improves glycaemic management. Most professionals also inform their patients about the connection between diabetes and periodontitis [10-12, 24].

Even though the results showed that over half of the participants had a fair awareness, a thorough analysis showed that only a small percentage (< 27%) of the participants knew the mechanism that links periodontitis to systemic health and its relationship to atherosclerosis. While some studies evaluate the knowledge of cardiologists and physicians regarding cardiovascular disease associated with periodontitis, dental professionals' knowledge has rarely been evaluated [25, 26]. While the current study evaluated the awareness of recent graduates working as residents, one of these studies found that a greater percentage of dentists were aware of the connection between periodontitis and cardiovascular diseases, but their study population included experienced dentists [27]. Dental professionals are advised to be aware of the connection between periodontitis and atherosclerosis and to raise awareness of cardiovascular problems because these conditions share genetic and lifestyle risk factors, including smoking, obesity, and poor diet. Periodontitis patients should be made aware of their increased risk of cardiovascular disease. A recent study found that 1 in 4 middle-aged adults in Pakistan have CAD [28]. Hence, It is suggested that patients with a family history or history of cardiovascular disease and periodontitis follow dental prevention, treatment, and maintenance regimens [29].

Concerningly, only 45 young dentists (23.7%) knew when to provide antibiotics for diabetic patients receiving non-surgical periodontal therapy. Antibiotic overprescription is extremely prevalent in areas without national guidelines. Young practitioners are prone to administering antibiotics when they are not necessary because they lack the necessary knowledge and expertise [30]. Subsequent examination of the current data showed that all participants (100%) with exceptional knowledge were aware of the mechanism connecting systemic health and periodontium, the influence of smoking, and the reciprocal relationship between diabetes and periodontitis. Conversely, among the participants with inadequate knowledge, 28 (45.9%) were unaware of the reciprocal relationship between diabetes and periodontitis, 36 (59%) were unaware of the effects of smoking on periodontium, and 41 (67%) were unaware of the connection between atherosclerosis and periodontitis. There is a severe paucity of knowledge about the connection between periodontitis and cardiovascular disease.

This study draws attention to the lack of knowledge among young dentists on certain elements of the connection between periodontitis and non-communicable diseases including diabetes and atherosclerosis. However, the questionnaire was short and did not include topics such as pregnancy, metabolic syndrome, or other systemic disorders. An intricate questionnaire must be created to gauge the awareness of general dentists in Pakistan as well, given the rise in the prevalence of non-communicable illnesses and periodontitis worldwide. For the treatment of periodontitis and other dental illnesses impacted by systemic involvement, this will emphasize the value of continuing education programs.

Conclusion

Most house officers had a moderate understanding of the connection between systemic disease and periodontitis. The detailed investigation, however, showed that the majority of them were ignorant about the connection between periodontitis and atherosclerosis, as well as the use of antibiotics to treat periodontitis in diabetic patients. The majority of house officers gave their patients advice on systemic and periodontal health.

Acknowledgments: Authors acknowledge the contribution of Prof. Tayyaba Saleem and Miss Ayesha Usmani for their input in statistical analysis and proofreading. We are also thankful to all the participants for taking the time to fill out the questionnaire.

Conflict of interest: None

Financial support: None

Ethics statement: Approval from the institutional review board, dental section IM&DC (letter no. IMDC/DS/IRB/143) was taken. Due permission was also sought from all the concerned dental hospitals.

References

1. Chapple I. Time to take gum disease seriously. Br Dent J. 2022;232(6):360-1.
2. Bokhari SA, Suhail AM, Malik AR, Imran MF. Periodontal disease status and associated risk factors in patients attending a dental teaching hospital in Rawalpindi, Pakistan. J Indian Soc Periodontol. 2015;19(6):678-82.
3. Liccardo D, Cannavo A, Spagnuolo G, Nicola F, Antonio C, Carlo R, et al. Periodontal disease: a risk factor for diabetes and cardiovascular disease. Int J Mol Sci. 2019;20(6):1414.
4. Papapanou PN, Sanz M, Buduneli N, Dietrich T, Feres M, Fine DH, et al. Periodontitis: consensus report of workgroup 2 of the 2017 World Workshop on the classification of periodontal and peri-implant diseases and conditions. J Periodontol. 2018;89(1):173-82.
5. Mireya MG, Enrique HL. Periodontal inflammation and systemic diseases: an overview. Front Physiol. 2021;12:709438. doi:10.3389/fphys.2021.709438
6. Makkar H, Reynolds MA, Wadhawan A, Aline D, Anwar TM, Teodor TP. Periodontal, metabolic and cardiovascular disease: exploring the role of inflammation and mental health. Pteridines. 2018;29(1):124-63.
7. Graves DT, Ding Z, Yang Y. The impact of diabetes on periodontal diseases. Periodontol 2000. 2020;82(1):214-24.
8. Weidlich P, Cimões R, Pannuti CM, Oppermann RV. Association between periodontal diseases and systemic diseases. Braz Oral Res. 2008;22(Suppl 1):32-43.
9. Simpson TC, Weldon JC, Worthington HV, Needleman I, Wild SH, Moles DR, et al. Treatment of periodontal disease for glycemic control in people with diabetes mellitus. Cochrane Database Syst Rev. 2015;11(4714).
10. AlShwaimi E, Idrees M, Berri Z, El-Sakka H, Kujan O. Association between diabetes mellitus and periodontal diseases: a survey of the opinions of dental professionals. Med Princ Pract. 2019;28(2):141-9.

11. Tse S. Diabetes mellitus and periodontal disease: awareness and practice among doctors working in public general out-patient clinics in Kowloon West Cluster of Hong Kong. BMC Fam Pract. 2018;19(1):1-9. doi:10.1186/s12875-018-0887-2
12. Chinnasamy A, Moodie M. Diabetes related knowledge, attitudes and practice - a survey among oral health professionals in Victoria, Australia. Clin Cosmet Investig Dent. 2020;12:111-21.
13. Alexandridi F, Tsantila S, Pepelassi E. Smoking cessation and response to periodontal treatment. Aust Dent J. 2018;63(2):140-9.
14. Jiang Y, Zhou X, Cheng L, Li M. The impact of smoking on subgingival microflora: from periodontal health to disease. Front Microbiol. 2020;11(66).
15. Khan S, Khalid T, Awan KH. Chronic periodontitis and smoking. Prevalence and dose-response relationship. Saudi Med J. 2016;37(8):889-94.
16. Bokhari SA, Khan AA, Wajid G. Association of periodontal and cardiovascular diseases: South-Asian studies 2001-2012. J Indian Soc Periodontol. 2015;19(5):495-500.
17. Shi Q, Zhang B, Huo N, Cai C, Liu H, Xu J. Association between myocardial infarction and periodontitis: a meta-analysis of case-control studies. Front Physiol. 2016;7:519.
18. Bengtsson VW, Persson GR, Berglund JS, Renvert S. Periodontitis related to cardiovascular events and mortality: a long-time longitudinal study. Clin Oral Investig. 2021;25(6):4085-95.
19. Rafique I, Saqib MAN, Munir MA, Qureshi H, Rizwanullah KS, Khan SA et al. Prevalence of risk factors for noncommunicable diseases in adults: key findings from the Pakistan STEPS survey. East Mediterr Health J. 2018;24(1):33-41.
20. Murray CJL. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the global burden of disease Study 2019. Lancet. 2020;396(10258):1204-22.
21. Jepsen S, Caton JG, Albandar JM, Bissada NF, Bouchard P, Cortellini P, et al. Periodontal manifestations of systemic diseases and developmental and acquired conditions: consensus report of workgroup 3 of the 2017 world workshop on the classification of periodontal and peri-implant diseases and conditions. J Clin Periodontol. 2018;89(Suppl 1):S237-48.
22. Nazir MA. Prevalence of periodontal disease, its association with systemic diseases and prevention. Int J Health Sci. 2017;11(2):72-80.
23. Nazir M, Al-Ansari A, Al-Khalifa K, Alhareky M, Gaffar B, Almas K. Global prevalence of periodontal disease and lack of its surveillance. Sci World J. 2020;2020:2146160. doi:10.1155/2020/2146160
24. Paquette DW, Bell KP, Pillips C, Offenbecher S, Wilder RS. Dentists' knowledge and opinions of oral-systemic disease relationships: relevance to patient care and education. J Dent Educ. 2015;79(6):626-35.
25. Arya V, Kudpi RS, Rungta N. Periodontal disease as a risk factor for cardiovascular disease - a questionnaire survey among physicians. J Med. 2021;22(1):7-11.
26. Mosley M, Offenbacher S, Phillips C, Granger C, Wilder RS. North Carolina cardiologists' knowledge, opinions and practice behaviors regarding the relationship between periodontal disease and cardiovascular disease. J Dent Hyg. 2014;88(5):275-84.
27. Nazir MA, Izhar F, Almas K. Dentists’ awareness about the link between oral and systemic health. J Fam Community Med. 2019;26(3):206-12.
28. Zubair F, Nawaz S, Nawaz A, Nangyal H, Amjad N, Khan M. Prevalence of cardiovascular diseases in Punjab, Pakistan: a cross-sectional study. J Public Health. 2018;26(5):523-9. doi:10.1007/s10389-018-0898-4
29. Sanz M, Del Castillo AM, Jepsen S, Gonzalez-Juanatey JR, D'Aiuto F, Bouchard P, et al. Periodontitis and cardiovascular diseases. Consensus Report. Glob Heart. 2020;15(1):1-23.
30. AboAlSamh A, Alhussain A, Alanazi N, Alahmari R, Shaheen N, Adlan A. Dental students’ knowledge and attitudes towards antibiotic prescribing guidelines in Riyadh, Saudi Arabia. Pharmacy (Basel). 2018;6(2):6020042.