Saudi Journal of Oral Sciences

ORIGINAL ARTICLE

Knowledge and orientations of medical interns toward periodontal disease in Saudi Arabia

Farah Asa'ad, Nassr Al-Maflehi[1], Bushra Alelyan[2], Lama Asaad[3], Walaa Alrumaih[4], Fatimah Alassad[4], Sara Alshakhs[4], Basma Alshakhs[4]

Department of Preventive Dentistry, Riyadh Colleges of Dentistry and Pharmacy, [1]Department of Preventive Dental Sciences and Biostatistics, King Saud University, [2]Department of Prosthodontics, Riyadh Colleges of Dentistry and Pharmacy, Riyadh, Kingdom of Saudi Arabia, [3]Health Care Systems Optimization, University of Manitoba, Manitoba, Canada, [4]Dental Interns, Riyadh Colleges of Dentistry and Pharmacy, Riyadh, Kingdom of Saudi Arabia

Abstract

Background and Aim: This study was conducted to assess the periodontal knowledge, orientations of Saudi medical interns and the medical curriculum.

Study Population and Methodology: Questionnaires were distributed to 221 medical interns chosen randomly from two major educational institutions in Saudi Arabia. Questions were developed from literature reviews. The questionnaire had five true/false knowledge items, and eight Likert-scale questions. Data were analyzed by computerized SPSS (version 20). Level of significance was set at $P < 0.05$.

Results: Of the 221 respondents, 66% were male and 34% were female. Most of the participants were 24 years old (48%). About 40% of the interns answered all five true/false general knowledge questions correctly, nearly half of the respondents (49.8%) reported they never asked patients if they were diagnosed with periodontal disease, 93.2% reported not receiving any training about periodontal disease in medical school, 23.5% reported they would feel absolutely uncomfortable performing a simple periodontal examination, about one-third of interns (29.4%) agreed that patients expect physicians to discuss/screen for periodontal disease, 43.9% felt that discussing/evaluating the periodontal status of their patients was peripheral to their role as physicians, nearly half of interns (48.4%) reported never screening patients for periodontal disease, and 33% stated they never referred patients to dentists.

Conclusion: Medical interns were not prepared nor trained to screen patients for periodontal disease. They had limited knowledge about the association between periodontal health and general health. Oral health training as part of the medical curriculum is strongly recommended.

Key words: Knowledge, medical curriculum, medical interns, orientation, periodontal disease

Introduction

Periodontal diseases, including gingivitis and periodontitis, are a group of infectious diseases caused predominantly by Gram-negative, anaerobic and micro-aerophilic bacteria that colonizes the sub-gingival area resulting in long-term local and systemic elevation of pro-inflammatory prostaglandins and cytokines.[1,2]

Access this article online	
Quick Response Code:	Website: www.saudijos.org
	DOI: 10.4103/1658-6816.138477

There is growing evidence that periodontal disease may be a source of systemic inflammation that impacts overall health.[3] Watts *et al*., concluded that inflammatory markers are highly elevated in people with periodontal diseases.[4] Studies show that blood leukocytes and plasma levels of C-reactive protein, which is a sensitive marker of systemic inflammation,[5] were higher in patients with periodontitis.[6] The severity of periodontal infection has also been correlated with serum levels of inflammatory markers.[7]

The chronic elevation of serum inflammatory markers due to periodontitis, might be associated with an increased risk of systemic illnesses such as:

Address for correspondence:
Dr. Farah Asa'ad, P.O. Box 1352, Amman 11953, Hashemite Kingdom of Jordan.
E-mail: farahasaad83@gmail.com

Cardiovascular disease (CVD), stroke, and peripheral vascular disease.[8] It might also influence the severity of diabetes mellitus[9] and a bi-directional interrelationship between diabetes and periodontal disease has been described.[10] Periodontal disease has also been considered as a strong predictor of mortality in patients with type 2 diabetes mellitus.[11]

The association between periodontal diseases and adverse pregnancy outcomes such as preterm low birth weight (PTLBW) babies (gestational age <37 weeks and weight <2500 g) and premature labor has been documented.[12-15] PTLBW is the major cause of neonatal death and is a significant health care expense.[16]

Periodontal disease has also been suggested as a risk factor for premature death due to the underlying weakness of the host defense system resulting in life-threatening diseases at later stages of life.[17]

Half of all American adults and 68% of the Saudi population have been reported to have periodontal disease.[18,19] Patients have been reported to turn to primary health care providers for oral health needs, resulting in medical practitioners encountering patients presenting with oral and dental problems.[20]

The above mentioned evidence clearly outlines the need for medical practitioners to possess basic knowledge of periodontal disease. However, few studies have been conducted to investigate the periodontal knowledge of medical practitioners.

Findings from Jordan and Tanzania have reported a poor knowledge of oral health conditions and stressed the need to educate health care providers on the topic.[21,22] However, studies from India have reported good knowledge among medical practitioners and gynecologists regarding periodontal and dental awareness.[23,24]

Studies from the United States and India have reported inadequate knowledge of periodontal disease and have suggested that medical interns may be uncomfortable with performing a periodontal examination.[25,26]

This study seeks to assess the knowledge and orientations of Saudi medical interns toward periodontal disease, which can also give an insight about the degree of incorporation of oral health education into the medical curriculum in Saudi Arabia.

Study Population and Methodology

Ethical review committee of the Riyadh Colleges of Dentistry and pharmacy formally approved the study.

The target population was Saudi medical interns that graduated from a Government Saudi University with a program that was established for at least 10 years.

Interns graduated from two universities that met the inclusion criteria, King Saud University, Riyadh and Dammam University, Dammam, were included in the study.

Sample power calculated to include at least 60% of the population, when the testing proportion 50% at α = 0.05 (level of significance) with power 0.9, suggested a minimum sample of 213.

In this cross-sectional survey, self-administered structured questionnaire was distributed to 221 Saudi medical interns who were chosen randomly, by simple random sampling, from training hospitals attached to two major educational institutions in Saudi Arabia as the following:

King Saud graduates training at "King Khalid University Hospital " (142 interns) and Dammam University graduates training at "King Fahad Specialist Hospital-Dammam" (79 interns).

The questions were developed from the literature review of relevant articles.[25] The questionnaire had five true/false knowledge items, which were considered as a quiz for the medical interns, and eight Likert-scale questions.

The questionnaire was translated to Arabic and the content authenticity was pretested during a pilot study on a random sample of 50 medical interns training in different hospitals to ascertain practicability, cogency and rendition of responses. The 50 questionnaires were not included in the study sample, but were used to measure reliability using Cronbach's alpha test, the coefficient of reliability was 82%.

Written and verbal consents were obtained from the directors of the medical internship program as well as from the medical interns.

Data collection took place from January to April 2013. The estimated time to complete the questionnaire for each participant was 5-10 min.

The questionnaire data were analyzed by means of computerized SPSS version 20 (IBM, Armonk,

NY, USA) statistical package. Chi-square analyses were conducted to compare male and female subgroups. The Spearman correlation coefficient was used to correlate the self-assessed knowledge and quiz scores of interns. Mann-Whitney U and Kruskall-Wallis tests were used to analyze the data with order responses. The level of significance was set at $P < 0.05$.

Results

The survey was answered by a total of 221 incoming medical interns.

Response rate was 100%. The age of the participants ranged between 24 and 27 years old and most of the respondents were 24 years old (48%). Most of the participants were males (66%) and 34% were females.

Table 1 shows the true/false knowledge items with the correct answer and the percentage of subjects who answered each question correctly. The percentage of medical interns that answered any question correctly ranged from about 10% to 95%, respectively.

Although most of the interns had good knowledge regarding the signs and symptoms of periodontal disease, nearly 90% didn't know the effect of diabetes in increasing the severity of periodontal diseases.

The median quiz score was 4 (interquartile range: 3-5), and a complete quiz score was achieved by about 40% of the interns [Figure 1].

Half of the respondents never asked their patients whether they were diagnosed with periodontal disease, nor screened them for it. About one-third of the interns never referred patients to a dentist for evaluation and care [Table 2].

About 24% of the interns felt uncomfortable with the idea of performing simple periodontal exam, 52% reported limited understanding of the association between periodontal health and general health and about 93% did not receive any training in periodontal disease during medical school [Table 3].

About 68% of the respondents disagreed/strongly disagreed that patients expected them to discuss/screen for periodontal disease, and about 44% agreed/strongly agreed that discussing or evaluating periodontal status of their patients was peripheral to their role as physicians [Table 4].

Neither age nor gender was shown to have a statistically significant influence on the scores or responses of participants [Tables 5 and 6].

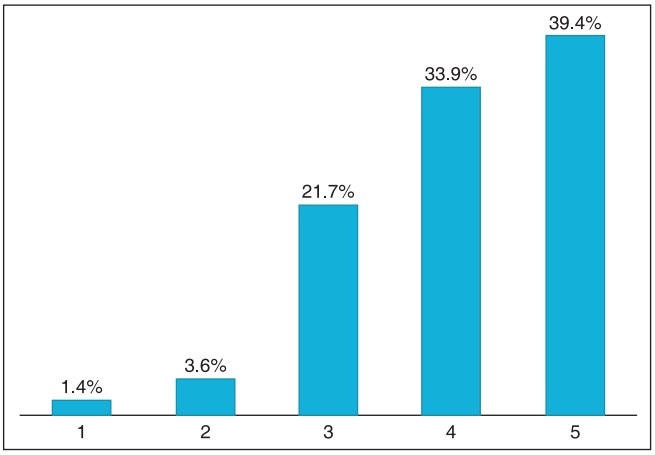

Figure 1: Percentage of subjects achieving one, two, three, four, or five correct answers on the five true/false knowledge items of the questionnaire (***n*** = 221)

Table 1: True/false knowledge items with correct answers and percentages of subjects who answered correctly (*n* = 221)

Item	Correct answer	Answering correctly (%)
1. Bleeding gums, gum recession, unsteady teeth and tooth loss are signs and symptoms of periodontal disease	True	94.6
2. Periodontal disease is associated with suppressed level of serum inflammatory markers	False	29.4
3. Poor oral health may increase the risk of cardiovascular disease	True	92.8
4. Periodontal disease is less prevalent/severe in patients with diabetes	False	10.4
5. Periodontal disease may increase the risk of premature death	True	58.4

Table 2: Questions exploring clinical practice behaviors/orientations. Percentage of interns responding never, sometimes, or always/often to these items are shown (*n* = 221)

Questions	Number	Percentage
6. Do you ask your patients if they have ever been diagnosed with periodontal disease?		
Never	110	49.8
Sometimes	96	43.4
Always	15	6.8
7. Do you screen your patients for periodontal disease?		
Never	107	48.4
Sometimes	88	39.8
Always	26	11.8
8. Do you refer your patients to a dentist for evaluation/care?		
Never	73	33
Sometimes	127	57.5
Often	21	9.5

Table 3: Questions exploring perceived knowledge and training. Responses of interns with percentages are shown (*n* = 221)

Questions	Number	Percentage
9. How comfortable are you with the idea of performing a simple periodontal examination?		
Not at all	52	23.5
Somewhat	121	54.8
Very	48	21.7
10. How would you rate your knowledge about periodontal disease and its association with systemic diseases?		
Limited	115	52
Moderate	79	35.7
Good	25	11.3
Excellent	2	1
11. Did you receive training in periodontal disease in medical school?		
Yes	15	6.8
No	206	93.2

Table 4: Questions exploring attitudes toward periodontal disease and perceptions that may influence clinical practices. Responses of interns with percentages are shown (*n* = 221)

Questions	Number	Percentage
12. "Patients expect me to discuss/screen for periodontal disease"		
Strongly disagree	33	14.9
Disagree	118	53.4
Agree	65	29.4
Strongly agree	5	2.3
13. "Discussing/evaluating periodontal status is peripheral to my role as a physician"		
Strongly disagree	59	26.7
Disagree	65	29.4
Agree	84	38
Strongly agree	13	5.9

There was a weak positive correlation between the total quiz score and self-rated knowledge reflected through the following question to study participants (how would you rate your knowledge about periodontal disease and its association with systemic diseases?), with a Spearman correlation coefficient of 0.19 ($P = 0.055$).

Discussion

There has been a lack of published literature assessing the periodontal knowledge and orientations of medical interns in Saudi Arabia.

The scores obtained by the respondents in this study for the true/false knowledge questions as well as bleeding gums, gum recession, unsteady teeth, and tooth loss are signs and symptoms of periodontal diseases, were comparable to the study by Quijano *et al*. in the United States.[25] This seems to suggest that medical education in both countries cover the basics of oral disease.

When asked if periodontal disease is associated with suppressed level of serum inflammatory markers, only one-third of the medical interns answered correctly compared with half of the medical interns in USA.[25] Almost 93% of medical interns agreed that poor oral health may increase the risk of CVD, which was somehow close to the percentage observed in the American study (89%).[25] Both results were comparable to an Indian study conducted in Chennai where 83% of medical practitioners and interns knew that periodontal disease is a risk factor for infective endocarditis.[23] However, another study conducted in India showed that only 14% of physicians said that periodontal disease may cause cardiac heart diseases.[27]

Table 5: Comparison of responses among the study subjects by Kruskal-Wallis test based on age

Variables	Age (years)	*n*	Median	Range	Minimum	Maximum	χ^2	*P* value
Knowledge score (true/false items)	24	106	4	4	1	5	2.299	0.513
	25	86	4	3	2	5		
	26	23	4	2	3	5		
	27	6	5	2	3	5		
Questions exploring clinical practice behaviors/orientations (questions: 6, 7 and 8)	24	106	5	6	3	9	2.214	0.529
	25	86	5	6	3	9		
	26	23	5	6	3	9		
	27	6	6	6	3	9		
Questions exploring perceived knowledge and training (questions: 9 and 10 only)	24	106	4	4	2	6	0.289	0.962
	25	86	4	4	2	6		
	26	23	4	4	2	6		
	27	6	4	1	3	4		
Questions exploring attitudes toward periodontal disease and perceptions that may influence clinical practices (questions: 12 and 13)	24	106	4	5	2	7	0.838	0.840
	25	86	4	4	2	6		
	26	23	5	3	3	6		
	27	6	4	3	3	6		

Table 6: Comparison of responses among the study subjects by Mann-Whitney U-test based on gender

Question categories	Gender	*n*	Median	Range	Minimum	Maximum	Mann-Whitney U	*Z*-value	*P* value
Knowledge score (true/false items)	Male	146	4	4	1	5	4765.500	−1.671	0.09
	Female	75	4	3	2	5			
Questions exploring clinical practice behaviors/orientations (questions: 6, 7 and 8)	Male	146	5	6	3	9	4953.500	−1.188	0.23
	Female	75	5	6	3	9			
Questions exploring perceived knowledge and training (questions: 9 and 10 only)	Male	146	4	4	2	6	5377.000	−0.226	0.82
	Female	75	4	4	2	6			
Questions exploring attitudes toward periodontal disease and perceptions that may influence clinical practices (questions: 12 and 13)	Male	146	4	5	2	7	5160.500	−0.735	0.46
	Female	75	4	4	2	6			

While differences in university curricula could be a possible source of discrepancies observed in the same country[23,27] we didn't analyze the scores or responses of participants based on the University they graduated from since there is a certain degree of curriculum convergence as the curriculum is basically regulated by the same higher authority.

Most of the Saudi medical interns did not have enough knowledge about the relationship between periodontal disease and diabetes as only 10.4% knew that the statement (periodontal disease is less prevalent in patients with diabetes) was false, while almost all of the medical interns in USA gave the correct answer to this question.[25] In the study by Gur and Majra, only 6% of medical practitioners knew that periodontal disease was more prevalent in patients with diabetes.[27]

This observation is alarming, as the prevalence of Diabetes Mellitus in Saudi Arabia is high, reported to be 30%[28] Medical interns are the future physicians and many of the patients in Saudi Arabia attending hospitals and medical care centers are probably diabetic. Therefore, sufficient knowledge about the association between Diabetes and Oral health should be present among medical interns to be able to advice and educate their patients, now and in the future.

About 60% of medical interns agreed that periodontal disease might increase the risk of premature death. This percentage was drastically lower in the Indian study by Gur and Majra, as 14% of physicians said that periodontal disease can increase the risk of death, and only 10% considered periodontal disease as a predictor of mortality.[27]

About 24% of the respondents didn't feel comfortable in performing simple periodontal examination for their patients. This percentage was much higher in the American study, where almost 70% of the medical trainees didn't feel comfortable in performing periodontal examination.[25] In our study, nearly 93% of the interns didn't receive any training in periodontal disease in medical school, which was comparable to the percentage reported by Quijano *et al*.[25] Interns who said they received training in periodontal disease (7%), mentioned they received such practical information from parents/siblings or relatives who work as oral health professionals.

About half of the medical interns never screened their patients for periodontal disease, nor have asked them if they have ever been diagnosed with periodontal disease. This was slightly less than the American study[25] as almost three quarters of medical trainees never screened their patients nor asked them about periodontal diagnosis.

When asked if they advise their patients to visit the dental clinic or refer them to a dentist for evaluation and care, about one-third of medical interns stated they never did that, this finding was comparable to the American study,[25] while Srinidhi *et al*. reported that about three quarters of medical practitioners and interns in Chennai advise their patients to visit dentist at least once in 6 months.[23]

About 68% of Saudi medical interns disagreed/strongly disagreed that patients expected them to discuss/screen for periodontal disease, compared with 83% in the US.[25] Nearly 44% of the study participants agreed/strongly agreed that discussing or evaluating periodontal status of their patients was peripheral to their role as physicians, this was comparable to the medical trainees in USA as 46% agreed/strongly agreed to that.[25]

From the findings of this study, it's apparent that medical interns in Saudi Arabia have limited knowledge about the association between periodontal health and general health, and also lack periodontal training. This

was comparable to the findings reported by Quijano *et al*., as they concluded that incoming medical interns had inadequate knowledge and training regarding periodontal disease.[25]

Srinidhi *et al*. concluded that medical practitioners and interns in Chennai, India had good knowledge about dentistry, because in Chennai, dental health is included as part of the medical education to improve the knowledge and attitude of medical students towards dental health. Medical students didn't make any dental treatment, but at least they knew how to manage the dental emergency of their patients.[23]

Since there is a strong correlation between periodontal health and general health, it is wise to implement oral health education and training in the medical curriculum. Both medical and dental fields are strongly correlated, and since the dental curriculum includes relevant medical subjects, it is strongly recommended to incorporate dental subjects into the medical curriculum. This will result in a better and more efficient collaboration between oral health and medical professionals, which will improve the well-being and overall health of patients after all.

Some patients might seek the help of a physician before visiting a dentist; therefore there is a crucial need of having competent physicians to advise patients about the importance of periodontal health and its association with general health.[20]

Our study has some limitations. Although the self-reported attitudes and practices were anonymous, the responses might be biased to what the participants believed was ideal. The results presented indicate the opinions of small sample of medical interns in Saudi Arabia. This study does not enable broad generalizations regarding the potential impact of these findings. Caution must be taken in interpreting the applicability of the current data until these findings can be confirmed by larger, prospective investigations.

Conclusion

This cross-sectional study concluded that medical interns were not prepared nor trained to screen their patients for periodontal disease, and they had limited knowledge about the association between periodontal health and general health. Oral health education and training as part of the medical school curriculum is strongly recommended.

References

1. Page RC. The role of inflammatory mediators in the pathogenesis of periodontal disease. J Periodontal Res 1991;26:230-42.
2. Page RC, Kornman KS. The pathogenesis of human periodontitis: An introduction. Periodontol 2000 1997;14:9-11.
3. Hein C, Cobb C, Iacopio A. Report of the independent panel of experts of the Scottsdale project. Grand Rounds Oral Syst Med 2007;2(Suppl.):6-27.
4. Watts A, Crimmins EM, Gatz M. Inflammation as a potential mediator for the association between periodontal disease and Alzheimer›s disease. Neuropsychiatr Dis Treat 2008;4:865-76.
5. Jousilahti P, Salomaa V, Rasi V, Vahtera E, Palosuo T. Association of markers of systemic inflammation, C reactive protein, serum amyloid A, and fibrinogen, with socioeconomic status. J Epidemiol Community Health 2003;57:730-3.
6. Loos BG. Systemic markers of inflammation in periodontitis. J Periodontol 2005;76:2106-15.
7. Bretz WA, Weyant RJ, Corby PM, Ren D, Weissfeld L, Kritchevsky SB, *et al*. Systemic inflammatory markers, periodontal diseases, and periodontal infections in an elderly population. J Am Geriatr Soc 2005;53:1532-7.
8. Joshipura K. The relationship between oral conditions and ischemic stroke and peripheral vascular disease. J Am Dent Assoc 2002;133 Suppl:23S-30.
9. Mealey BL. Periodontal disease and diabetes: A two-way street. J Am Dent Assoc 2006;137:26S-31.
10. Southerland JH, Taylor GW, Offenbacher S. Diabetes and periodontal infection: Making the connection. Clin Diabetes 2005;23:171-8.
11. Saremi A, Nelson RG, Tulloch-Reid M, Hanson RL, Sievers ML, Taylor GW, *et al*. Periodontal disease and mortality in type 2 diabetes. Diabetes Care 2005;28:27-32.
12. Scannapieco FA, Bush RB, Paju S. Periodontal disease as a risk factor for adverse pregnancy outcomes. A systematic review. Ann Periodontol 2003;8:70-8.
13. WHO. International Classification of Diseases. Revision, 1975. Vol. 1. Geneva: WHO; 1977.
14. WHO. The incidence of low birth weight: An update. Wkly Epidemiol Rec 1984;59:205-11.
15. Offenbacher S, Lieff S, Boggess KA. Maternal periodontitis and prematurity: Part I — Obstetric outcome of prematurity and growth restriction. Ann Periodontol 2002;7:90-4.
16. Wener ME, Lavigne SE. Can periodontal disease lead to premature delivery? How the mouth affects the body. AWHONN Lifelines 2004;8:422-31.
17. Söder B, Jin LJ, Klinge B, Söder PO. Periodontitis and premature death: A 16-year longitudinal study in a Swedish urban population. J Periodontal Res 2007;42:361-6.
18. Eke PI, Dye BA, Wei L, Thornton-Evans GO, Genco RJ. Prevalence of periodontitis in adults in the United States: 2009 and 2010. J Dent Res 2012;91:914-20.
19. Al-Zahrani MS, Kayal RA. Alveolar bone loss and reported medical status among a sample of patients at a Saudi dental school. Oral Health Prev Dent 2006;4:113-8.
20. Ilm WU, King NM, Tsai JS, Wong HM. Dental knowledge and attitude of medical practitioners and caregivers of preschool children in Macau. Br J Oral Maxillofac Surg 2005;43:61-4.
21. Al-Habashneh R, Aljundi SH, Alwaeli HA. Survey of medical doctors' attitudes and knowledge of the association between oral health and pregnancy outcomes. Int J Dent Hyg 2008;6:214-20.
22. Habib ZM, Moshy J. Knowledge, awareness and attitude of medical doctors towards periodontal disease in Dar es Salaam, Tanzania. Prof Med J 2013;20:290-5.
23. Srinidhi S, Ingle NA, Chaly PE, Reddy C. Dental awareness and attitudes among medical practitioners in Chennai. J Oral Health Community Dent 2011;5:73-8.
24. Tarannum F, Prasad S, Muzammil, Vivekananda L, Jayanthi D, Faizuddin M. Awareness of the association between periodontal disease and pre-term births among general dentists, general medical practitioners and gynecologists. Indian J Public Health 2013;57:92-5.
25. Quijano A, Shah AJ, Schwarcz AI, Lalla E, Ostfeld RJ. Knowledge and orientations of internal medicine trainees toward periodontal disease. J Periodontol 2010;81:359-63.

26. Gur A, Majra J. Awareness regarding the systemic effects of periodontal disease among medical interns in India. J Glob Infect Dis 2011;3:123-7.
27. Gur A, Majra J. Knowledge, attitude and practices regarding the systemic effects of oral diseases among the medical practitioners. Internet J Dent Sci 2009;6:25-9.
28. Alqurashi KA, Aljabri KS, Bokhari SA. Prevalence of diabetes mellitus in a Saudi community. Ann Saudi Med 2011;31:19-23.

Cite this article as: Asa'ad F, Al-Maflehi N, Alelyan B, Asaad L, Alrumaih W, Alassad F, *et al*. Knowledge and orientations of medical interns toward periodontal disease in Saudi Arabia. Saudi J Oral Sci 2014;1:98-104.
Source of Support: Nil, **Conflict of Interest:** None declared.