

# Comparative evaluation of awareness of link between oral and systemic health among undergraduate dental and medical students

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## ABSTRACT

**Background:** Oral health maintenance is indispensable for the upkeep of overall health, and a close association has been found between oral diseases and several systemic conditions.

**Aims and objectives:** To assess the status of awareness of link between oral health and systemic health among undergraduate dental and medical students.

**Materials and methods:** A cross sectional study was performed using a standardized questionnaire, wherein 20 questions were asked related to oral hygiene care, practice done and association of potential link between oral and various other systemic diseases like diabetes, rheumatoid arthritis, myocardial infarction, respiratory diseases, osteoporosis. A total of 300 subjects were randomly selected for the study, wherein 150 were third and final year medical students and the other 150 third and final year dental students.

**Results:** Dental students had more number of mean positive responses and less negative responses in comparison to their medical counterparts, and this difference was found to be statistically significant. Thereby, it is perceptible that dental students had more awareness with respect to the link between oral and systemic health. Moreover, it was also noted from the responses of the first six questions that dental students had better oral health behavior, knowledge and status than the medical students.

**Conclusion:** Our study shed some light on the lacunae that exists in the inter-field (medical and dental) training from the undergraduate level which can be rectified by modifying the regulations.

**Keywords:** Awareness, Oral health, Dental, Medical, Systemic health, Undergraduate students.

## 1. INTRODUCTION

Oral health maintenance is indispensable for the upkeep of overall health, which is a crucial part of general health.<sup>1,2</sup> FDI world dental federation have defined oral health to be multifaceted which includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex. It is a fundamental component of health and physical and mental well-being which exists along a continuum influenced by the values and attitudes of people and communities. It reflects the physiological, social, and psychological attributes that are essential to the quality of life and is influenced by the person's changing experiences, perceptions, expectations, and ability to adapt to circumstances.<sup>3</sup>

Oral cavity can be considered to be a mirror of overall health. Several studies have reported a close association between oral diseases and systemic conditions like diabetes, digestive diseases, stroke, cardiovascular diseases, metabolic syndrome, adverse pregnancy outcomes, obesity, chronic respiratory disease, osteoporosis and chronic renal failure.<sup>4-8</sup> This interconnection can be attributed to the commonality of risk factors shown by changes in systemic inflammatory mediators and body metabolism. Regardless of its significance in general health, oral health is always neglected.<sup>9</sup>

Owing to the relevance of oral health in general health maintenance, proper knowledge of oral diseases is crucial in everyday practice for both dental and medical practitioners. Improved awareness of oral health amongst dental students would aid in early diagnosis, help in providing adequate care and would also be instrumental in preventing diseases.<sup>10</sup> Moreover, if dentists are well trained in this arena, they could refer patients to physicians for in time treatment, and reduce the morbidity and mortality rates. It has often been seen that medical students and practitioners are more likely to encounter underserved and vulnerable patients in comparison to dental students.<sup>11</sup> As the providers of primary health care for the majority of patients, medical professionals are also expected to play a part in diagnosis and management of oral conditions.<sup>12</sup> Studies have shown that most of the dental and medical conditions have better prognosis when diagnosed at an early stage.<sup>13</sup> Thus, adequate training must be provided to both dental and medical practitioners, and it can be concluded that a collective effort from dentists and clinicians is imperative to provide overall health care, and this regime should be integrated as a part of comprehensive health promotion.<sup>14</sup>

Studies reporting knowledge, awareness about oral-systemic disease connection of dental and medical students in other countries exist in the literature, but there is a scarcity of such studies in India.<sup>15,16</sup> Hence, the present study was conducted to assess the status of awareness of possible link between oral health and systemic health among undergraduate dental and medical students. This would help in coming up with an appropriate plan for a multi-professional approach towards an improved level of patient-care.<sup>16</sup>

## 2. MATERIALS AND METHODS

This was a cross sectional study based on a standardized questionnaire, wherein questions asked were related to the oral hygiene care, practice done and possible association of potential link between oral and various other systemic diseases like diabetes, rheumatoid arthritis, myocardial infarction, respiratory diseases, osteoporosis. Required ethical clearances were obtained before the commencement of study.

A total of 300 subjects were randomly selected for the study from private medical and dental streams in Raichur, Karnataka, wherein 150 were third and final year medical students

and the other 150, third and final year dental students. All the students were explained about the nature and purpose of the study and were instructed how to fill the questionnaire.

The questionnaire comprised of 20 questions. First 6 questions were designed to evaluate oral health behavior, knowledge and status. Remaining questions were devised to assess awareness with respect to systemic conditions such as diabetes, premature delivery, coronary heart disease, COPD (chronic obstructive pulmonary disease), osteoporosis and oral health (Figure 1).

*Statistical Analysis*

The data was collected and analyzed using IBM SPSS statistics 20.0 (IBM Corporation, Armonk, NY, USA). Chi square test and students unpaired t test was used. Level of significance was fixed at  $p=0.05$  and any value less than or equal to 0.05 was considered to be statistically significant.

**3. RESULTS**

A total of 300 students participated in the survey, including 150 third, final year medical students and 150 third, final year dental students. Respondents were predominantly females. Demographic data of the participants is detailed in Table 1. Table 2 shows comparison of positive and negative responses in terms of {Mean (SD)} among both the groups using unpaired t test. It is clearly evident from the results that dental students had more number of mean positive responses and less negative responses in comparison to their medical counterparts, and this difference was found to be statistically significant. Thereby, it is perceptible that dental students had more awareness with respect to the link between oral and systemic health.

Moreover, it was also noted from the responses of the first six questions that dental students had better oral health behavior, knowledge and status than the medical students. These comparative results thereby indicate towards the fact that medical students lack the adequate knowledge, awareness and practice and hence need to be trained satisfactorily in this field also to facilitate the welfare of patients.

Table 1: Comparison of gender among both the groups.

			Gender		Total
			Male	Female	
Group	Medical students	Count	59	91	150
		Percentage	39.33%	60.67%	100.0%
	Dental students	Count	45	105	150
		Percentage	30%	70%	100.0%
Total		Count	104	196	300
		Percentage	34.66%	65.33%	100.0%

Table 2: Comparison of positive and negative responses in terms of {Mean (SD)} among both the groups using unpaired t test

Responses	Group	N	Mean	Std. Deviation	t value	p value
Yes	Medical students	150	11.87	4.453	6.12	<0.001**
	Dental students	150	14.95	4.254	5	
No	Medical students	150	8.13	4.453	6.46	<0.001**
	Dental students	150	4.93	4.109	8	

\*\*Highly significant

<u>Questionnaire</u>	
<b>Oral health and systemic health is there any possible link?</b>	
Name -	Age- Sex-
<b>Occupation- Medical/Dental (Kindly tick)</b>	
1. Is oral health important in one's life?	
a) Yes b) No	
2. Does oral health play a role in social communication?	
a) Yes b) No	
3. Did you know about the various cleansing agents of oral cavity apart from normal tooth brushing?	
a) Yes b) No	
What do you know among these?	
a) Interdental cleansing aids such as interdental brush or floss	
b) Mouthwash	
4. How frequently do you change your tooth brush?	
a. 1 month b. 3 months	
c. 6 months d. Not regularly	
5. Did you know that there is a link between oral health and systemic health?	
a) Yes b) No	
6. How frequently do you visit dentist?	
a) 1 month b) 3 months	
c) 6 months d) once problem occurs	
7. Is there a link between diabetes and periodontal disease?	
a) Yes b) No	
8. Did you know that poor maintenance of oral hygiene in pregnancy may lead to pre term low birth weight Babies(PTLBW) and Premature delivery?	
a) Yes b) No	
9. Is there a link between periodontal disease & coronary heart disease?	
a) Yes b) No	
10. Is there a link between periodontal disease and Respiratory disease?	
a) Yes b) No	
11. Is periodontal disease transmissible within family members?	
a) Yes b) No	
12. Does periodontitis decrease the insulin sensitivity thus increasing the risk of poor glycemic control in individuals with diabetes?	
a) Yes b) No	
13. Does periodontal treatment improves the glycemic control by reducing the bacterial burden and the inflammatory response?	
a) Yes b) No	
14. Periodontitis is the sixth complication of diabetes mellitus.	
a) Yes b) No	
15. People with periodontal disease are twice as likely to suffer from Coronary artery disease as those without periodontal disease.	
a) Yes b) No	
16. Do periodontal pathogens increase the risk of atheroma formation and so the risk for Cardio vascular disease.	
a) Yes b) No	
17. Is there a relationship between oral infection and respiratory disease, in particular, COPD and pneumonia.	
a) Yes b) No	
18. 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	
19. Is there a link between osteoporosis and bone loss in the jaws.	
a) Yes b) No	
20. Does osteoporosis lead to tooth loss.	
a) Yes b) No	

Figure 1 : Questionnaire

#### 4. DISCUSSION

The significance of alliance between the medical and dental professions can prove beneficial in the management of cancer therapy, bisphosphonate associated osteonecrosis, human immunodeficiency virus infection and AIDS, diabetes, rheumatoid arthritis, Sjögren's syndrome and the status after organ transplantation.<sup>17</sup> It can also be crucial in the management of patients in intensive care units, and long term care facilities, as neglecting oral health can result in systemic infections, increase morbidity and adversely affect the quality of life.<sup>18,19</sup> A joint venture would thus help to improve both oral and systemic health. Therefore, a better integration of both the professions is recommended, so that the students would have an opportunity to get trained.

Yao et al assessed the oral health knowledge, behavior and status of dental and medical Chinese undergraduate students in the first and third year of study. They reported dental freshmen to be slightly superior to the medical ones in terms of brushing methods and awareness of oral disease-systemic disease relationship. This finding was in concordance with our study. They concluded that although dental students performed better than medical ones, both of them needed to improve their knowledge, behavior and status of oral health.<sup>15</sup>

Sujatha et al assessed oral health awareness among undergraduate medical students in Davangere city, Karnataka, India wherein questions asked were related to oral health problems and their relation with general health. They reported oral health awareness among undergraduate medical students to be poor, a finding similar to our study. This lack of awareness among medical students could be attributed to less clinical exposure of medical students to oral health problems since they are pre-occupied with their own curricular

activities, and also to the attitude of the students toward oral health considering it to be of less importance.<sup>20</sup>

Alzammam et al gauged and compared the knowledge and awareness of periodontal diseases among Jordan University of science and technology students. They reported that students of medical specialties (medicine, pharmacy, nursing, applied medical sciences) and females were more aware of the relationship between smoking, diabetes mellitus, heart diseases and periodontal diseases in comparison to students belonging to science and literature, engineering, agriculture information technology. This finding was in concordance with our study. They also concluded that a relative lack of knowledge and awareness was seen among university students regarding the etiology of periodontal diseases as well as the effect of local and systemic factors on periodontal health.<sup>21</sup>

Andhare et al evaluated awareness regarding periodontal health and oral hygiene practices among dental and medical undergraduate students in Beed district of Maharashtra, India. Statistically significant differences were observed between the dental and medical students in terms of use of cleaning aids, duration of teeth cleaning, change of toothbrush, use of interdental aids, wherein dental students scored better than their medical counterparts.<sup>22</sup> All these findings were in agreement with our study.

Al-Johani et al assessed the awareness of medical and dental students regarding the bidirectional relationships between periodontal and systemic conditions in Saudi Arabia, and reported that a large portion of medical and dental students appeared to be insightful and knowledgeable about the interrelationships between periodontal disease and major systemic conditions, especially diabetes, pregnancy issues, osteoporosis, and cardiovascular diseases. However, they reported the students to be less knowledgeable about the evidence linking periodontal disease to rheumatoid arthritis and respiratory diseases.<sup>23</sup> Mehrotra et al assessed the knowledge, attitude and dental awareness among medical practitioners in Kanpur city, Uttar Pradesh, India and reported medical practitioners had good knowledge about dentistry.<sup>24</sup> The findings of both these studies were not in concordance with ours. Tasdemir et al evaluated the knowledge of medical doctors in Turkey with regard to the association between periodontal disease and systemic health using self reported questionnaires. 90.8% of their participants agreed that there was a relationship between the two entities. However, they also reported that this awareness was not supported by precise knowledge, and often failed to translate into appropriate clinical practice.<sup>25</sup>

Vellayappan et al conducted a cross sectional survey among 227 medical practitioners in Chennai, India by distributing a self-prepared questionnaire about the possible influence of periodontal disease on systemic health, and reported that 79% of the doctors were aware of the association between periodontal health and systemic disease. Significant awareness was seen in association of periodontal disease with diabetes mellitus and only 58% of the doctors had the practice of referring patients with systemic health complications to dentists. They also divulged that the practice of referral to dentist and the awareness of relationship between periodontal health and systemic disease was not proportionate.<sup>26</sup>

Nazir et al evaluated the awareness of Pakistani dentists regarding link between oral and systemic health, and reported that most of the dentists were aware of the oral-systemic link, a finding similar to ours. They were also of the belief that patients access to oral care would improve if they were aware of the connection between oral and systemic health, and thus advocated patient education.<sup>27</sup>

Al-Sharrad et al performed a cross sectional study in Saudi Arabia and Kuwait wherein physicians and dentists' awareness were assessed regarding current evidence of the relationship between systemic diseases, conditions like diabetes mellitus, cardiovascular diseases, adverse pregnancy outcomes (DM, CVD, APO) and periodontal diseases. They reported more than half of the participants i.e 52.1% physicians and 67.5% dentists agreed that

there exists a relationship between periodontal diseases and DM, CVD and APO.<sup>28</sup> Thus, the study showed that dentists had a statistically higher level of awareness compared to the physicians, a conclusion in agreement with ours.

Mian et al assessed the awareness and practices related to oral-systemic connection among dental and medical practitioners in Faisalabad city, Pakistan. They reported a moderate level of awareness i.e. 83% of respondents were aware of a relationship between oral and systemic health, but application of this knowledge was limited. 59% medical practitioners were in practice to look for dental conditions in medical patients in comparison to 79% dental practitioners who looked into medical conditions while examining dental patients. Thus, they concluded that dentists showed better awareness and practice, a finding alike ours. They also reported medical and dental professionals with post-graduate qualification to have better awareness and application of knowledge in daily practice. Females were better in status of awareness and practice in this study sample.<sup>29</sup>

Opeodu et al assessed the perception of medical doctors concerning the possible link of oral diseases as causal/confounding factors of systemic diseases in Nigeria, and reported doctors' perception on the investigated topic to be deficient and, therefore, recommended improvement through health education and awareness.<sup>30</sup> Umeizudike et al performed a cross sectional study to determine the knowledge, attitudes and practices regarding periodontal-systemic disease interactions among medical doctors in Nigeria, and concluded that poor knowledge of periodontal diseases and periodontal diseases as risk factor for some systemic illnesses, coupled with unsatisfactory oral hygiene and dental examination practices was evident among the doctors.<sup>31</sup>

Our study showed lack of awareness of the link between systemic and overall health among medical undergraduate students, thus warranting the need to train them adequately in this field also.

## 5. CONCLUSION

Our study shed some light on the lacunae that exists in the inter-field (medical and dental) training from the undergraduate level which can be rectified by modifying the regulations. Further studies with larger sample size and in varied regions of the country have to be done to obtain more authentic data regarding the deficit which would help the authorities to set up proper guidelines to combat this shortfall. It would be advisable to introduce oral health curriculum in undergraduate medical training.<sup>32</sup> In addition, it is also advisable to develop a strong specialty in oral medicine which would upskill a dentists professional calibre to serve as a capable partner to physicians.<sup>33</sup> These collaborations would help in reducing the morbidity, mortality and increase the quality of life of elderly patients and patients suffering due to the emerging relationship between systemic and oral conditions.<sup>32,34</sup> Moreover, continuing education programs should frequently be conducted on educating dental, medical, and other health-care professionals on the robust and latest evidence of the oral-systemic link.

## REFERENCES

- [1] Sheiham A. Oral health, general health and quality of life. *Bull World Health Organ.* 2005;83(9):644.
- [2] Baiju RM, Peter E, Varghese NO, Sivaram R. Oral health and quality of life: current concepts. *J Clin Diagn Res.* 2017;11(6): ZE21–6.
- [3] Glick M., Williams DM., Kleinman DV, Vujcic M., Watt RG, Weyant RJ. A new definition for oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health. *J Am Dent Assoc* 2016;147(12):915–7.

- [4] Chan S, Pasternak GM, West MJ. The place of periodontal examination and referral in general medicine. *Periodontology 2000* 2017;74(1):194–9.
- [5] Winning L, Linden GJ. Periodontitis and systemic disease: Association or causality? *Curr Oral Health Rep* 2017;4(1):1-7.
- [6] Le Bars P, Matamoros S, Montassier E, Le Vacon F, Potel G, Soueidan A, et al. The oral cavity microbiota: between health, oral disease, and cancers of the aerodigestive tract. *Can J Microbiol* 2017;63(6):475–92.
- [7] Tavares M, Lindefjeld Calabi KA, San ML. Systemic diseases and oral health. *Dent Clin N Am* 2014;58(4):797–814.
- [8] Bahekar AA, Singh S, Saha S, Molnar J, Arora R. The prevalence and incidence of coronary heart disease is significantly increased in periodontitis: A meta-analysis. *Am Heart J* 2007;154(5):830–7.
- [9] Bradbury-Jones C, Innes N, Evans D, Ballantyne F, Taylor J. Dental neglect as a marker of broader neglect: A qualitative investigation of public health nurses' assessments of oral health in preschool children. *BMC Public Health* 2013; 13:370.
- [10] Baseer MA, Rahman G, Al Kawaey Z, Al Awamy B, Al Manmeen Z, Al Shalaty F. Evaluation of oral health behavior of female dental hygiene students and interns of Saudi Arabia by using Hiroshima University dental Behavioural inventory (HU-DBI). *Oral Health Dent Manag.* 2013;12(4):255–61.
- [11] Kaur SKB, Ahluwalia SS. Oral health knowledge, attitude and practices amongst health professionals in Ludhiana, India. *Dentistry* 2015; 5:315.
- [12] Gambhir RS, Batth JS, Arora G, Anand S, Bhardwaj A, Kaur H. Family physicians' knowledge and awareness regarding oral health: A survey. *J Edu Health Promot* 2019; 8:45.
- [13] Chandna S, Bathla M. Oral manifestations of thyroid disorders and its management. *Indian J Endocrinol Metab* 2011;15(Suppl 2): S113-6.
- [14] Rabiei S, Mohebbi SZ, Patja K, Virtanen JI. Physicians' knowledge of and adherence to improving oral health. *BMC Public Health* 2012; 12:855.
- [15] Yao Ke, Yao Y, Shen X, Lu C, Guo Q. Assessment of the oral health behavior, knowledge and status among dental and medical undergraduate students: A cross-sectional study. *BMC Oral Health* 2019; 19:26.
- [16] Mian FI, Hamza SA, Wahid A, Bokhari SAH. Medical and Dental Practitioners' Awareness about Oral-Systemic Disease Connections. *J Pak Dent Assoc* 2017;26(4):151-7.
- [17] Migliorati CA, Madrid C. The interface between oral and systemic health: The need for more collaboration. *Clin Microbiol Infect* 2007;13(Suppl 4):11-6.
- [18] CL Munro, Grap MJ. Oral health and care in the intensive care unit: State of the science. *Am J Crit Care* 2004;13(1):25-33.
- [19] RA Jablonsky, Munro CL, Grap MJ, Elswick RK. The role of biobehavioral, environmental, and social forces on oral health disparities in frail and functionally dependent nursing home elders. *Biol Res Nurs* 2005;7(1):75-82.
- [20] Sujatha B K, Yavagal PC, Gomez MS. Assessment of oral health awareness among undergraduate Medical Students in Davangere city: A cross-sectional survey. *J Indian Assoc Public Health Dent* 2014; 12:43-6.
- [21] Alzammam N, Almalki A. Knowledge and awareness of periodontal diseases among Jordanian University students: A cross-sectional study. *J Indian Soc Periodontol* 2019; 23:574-9.
- [22] Andhare MG, Dhonge RP, Dhuldhwaj RM, Dede RA, N. Sayyad IF. A comparative evaluation of awareness regarding periodontal health and oral hygiene practices among

- dental and medical undergraduate students in Beed District of Maharashtra. *Indian J Dent Sci* 2017; 9:215-9.
- [23] AlJohani K, AlZahrani AS. Awareness among Medical and Dental Students Regarding the Relationship between Periodontal and Systemic Conditions. *International Journal of Pharmaceutical Research & Allied Sciences* 2017; 6(4):61-72.
- [24] Mehrotra V, Garg K, Sharma P, Sajid Z, Singh R. A Study Based on Dental Awareness, Knowledge and Attitudes among the Medical Practitioners in and Around Kanpur City (India). *J Interdiscipl Med Dent Sci* 2015; 3:183.
- [25] Taşdemir Z, Alkan BA. Knowledge of medical doctors in Turkey about the relationship between periodontal disease and systemic health. *Braz Oral Res* 2015; 29:55.
- [26] Vellayappan R, Varghese SS. A survey on knowledge, attitude and practice among the doctors towards systemic health possibly influenced by periodontitis. *International Journal of Applied Dental Sciences* 2017; 3(2): 190-2.
- [27] Nazir MA, Izhar F, Akhtar K, Almas K. Dentists' awareness about the link between oral and systemic health. *J Family Community Med* 2019;26(3): 206-12.
- [28] 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. *The Open Dentistry Journal* 2019; 13:288-95.
- [29] Mian FI, Hamza SA, Wahid A, Bokhari SAH. Medical and Dental Practitioners' Awareness about Oral-Systemic Disease Connections. *J Pak Dent Assoc* 2017;26(4):151-7.
- [30] Opeodu O I, Ogunrinde T J, Fasunla A J. An assessment of medical doctors' perception of possible interrelationship between oral and general health. *Eur J Gen Dent* 2014; 3:120-4.
- [31] Umeizudike KA, Iwuala SO, Ozoh OB, Ekekezie OO, Umeizudike TI. Periodontal systemic interaction: perception, attitudes and practices among medical doctors in Nigeria. *J West Afr Coll Surg* 2015;5(1):58-75.
- [32] Stearns JA, Stearns MA, Paulman PM, Chessman AW, Davis AK, Sherwood RA, et al. Family Medicine Curriculum Resource Project: The Future. *Fam Med* 2007;39(1):53-6.
- [33] Baum BJ. Inadequate training in the biological sciences and medicine for dental students: An impending crisis for dentistry. *J Am Dent Assoc* 2007;138(1):16.
- [34] Kikutani T, Enomoto R, Tamura F, Oyaizu K, Suzuki A, Inaba S. Effects of oral functional training for nutritional improvement in Japanese older people requiring long-term care. *Gerodontology*, 2006,23:93-8.